

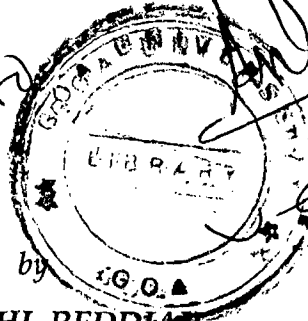
EVOLUTION OF AN ECO-DEVELOPMENT STRATEGY FOR COASTAL AREA
CASE STUDY OF SINDHUDURG DIST. MAHARASHTRA

Thesis submitted to
GOA UNIVERSITY
for
the degree of
Doctor of Philosophy
(Urban Environmental Planning Studies)

330.954792
RED/ERN

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S.P. Deshpande
S.P. Deshpande *6/9/2000*



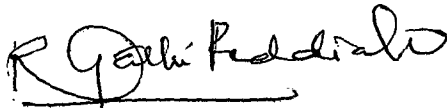
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Declaration

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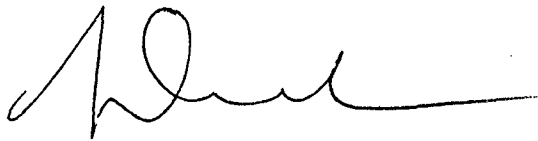
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Research Fellow

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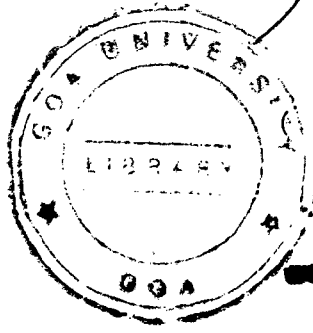
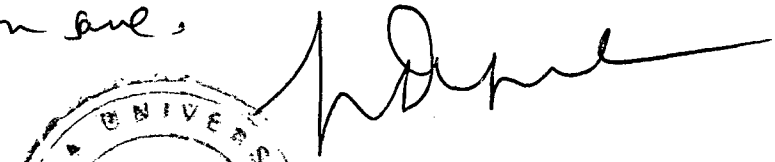
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Dr. S. P. Deshpande)

Research Guide

ENVIRONMENTAL PLANNING & DESIGN CONSULTANTS

SINDHUDURG:

Ocean fort, named as ' Sindhudurg ' was built in 1667 by Shivaji, on a low island, about 1.6 km from the shore with a rampart of about 3 km. The walls are about 30 feet high and 12 feet thick with 52 towers. The towers are generally outstanding semicircles with fine embrasures for cannon. To collect so much material (72,576 kgs iron, hard stone) initially at the shore and then carry it to the island site across the reef intercepted rough sea by medieval naval transport is nothing less than a miracle. The fort spread over 48 acre has now a few small temples - silent testimonies of the once great past. The fort has a big temple of Shivaji, only of its kind in India, built by Rajaram, the second son of Shivaji.

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Rule 11; X (i) : Goa University Handbook 1996 - 97

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1997

On 1st May, 1981, the district Sindhudurg of Maharashtra came into being with Kudal as Headquarter comprising the southern part of the greater tract of 'Konkan'. It includes Kudal, Malwan, Devgad, Kankavli, Sawantwadi and Vengurla tahsils of the former Ratnagiri District and 53 villages of Bawda tahsil of Kolhapur district which has been renamed as Vaibhavvadi. The name of the District has been adopted from the famous sea fort Sindhudurg (= sea fort) located near Malwan. The State of Maharashtra leads the rest of India in Industrial investment as well as in employment. Yet the economic development conceals wide regional disparities in both income and industries for many districts are backward in this respect. No district of the State is as retarded as Sindhudurg.

The district is second smallest in size and population in the State and lies between 15° 37' - 16° 40' north latitude and 73° 19' - 74° 13' east longitude. The district is bounded by Sahyadri range in the east, Arabian sea towards the west, State of Goa and Karanataka - Belgaum in the south, and Ratnagiri District in the north. It stretches on an area of 5207 Sq.kms with a population of 832,152 with 389,834 males and 442,768 females and sex ratio of 1000 males to 1137 females. The density of population is 160 persons per Sq.km. Sindhudurg ranks 29th in

Maharashtra State both in area and population and consist of 736 villages. The climate is moist and humid almost throughout the year covering the three seasons of summer (March to May), monsoon (June to October), and winter (November to February). The maximum temperature is 34°C and minimum of 15°C. Soils are of laterite, salty and coastal alluviums type. The percentage of urban population to total population is 7.59% which can be grouped into Main, Marginal and non workers representing 38.27%, 9.22% and 52.51% respectively. The of the district is mostly dependent on agriculture.

Sindudurg is not a god-forsaken land and its poverty is not a curse of nature but is essentially a reflection of the dismal failure of the State apparatus.

Nature has provided it with bountiful resources, ideal land for cultivation of cashewnut, mango and coconut, a long coast line with marine resources, unexploited mineral reserves, abundant rain fall, virgin beaches, historical forts and pictureseque slopes of Sahyadri range. Other activities are manufacturing, processing, servicing and repairs industry both in household and non household sectors. Besides, people are engaged in construction, trade and commerce, transport, storage and communication. The number of occupied residential houses of the district is 161,157.

It is against this background, that the present work "Evolution of an Eco-development Strategy for Coastal Area-Case Study of Sindhudurg District Maharashtra" has been taken up with a main concern revolving around conserving and sustaining the fragile ecology of the district-a rational response to both the nature of living resources and the population.

The study aims to account the facets of Sindhudurg like; a retrospect of the district, and some aspects viz., the soils, land use, agri-horticultural potential, forests, fish farming, transport, industry, mineral, district as a tourist's delight, demography, economy and administration. with a hope to evolve a strategy for eco-development and better use of biosphere. The study aims at suitable modification of biosphere by taking into consideration human, financial, living and nonliving resources for a development leading to improve the quality of life and prosperity of the region. The district Sindhudurg has been selected for study of the over all development scenario, present as well as potential taking into account all regional sectors encompassing economy and infrastructure in relation to population.

Further it aims at the identification of environmental problems resulting from development and intersectoral conflicts. Also, it is envisaged to evolve an ecocodevelopment strategy for balanced

development of the region by not jeopardising the fragile ecology of the region for promoting better quality of life of the people and enhancing healthier quality of environment.

The term "environment" used herein encompasses physical, (natural and man-made) as well as economic and socio-cultural environment.

The present work envisages that it would provide an approach for evolving an eco-development strategy for regional development having wider application to other regions also.

RAPARTHI REDDIAH
Research Fellow

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INTRODUCTION

Environment is the surrounding which includes all forms of existence around us i.e. both living and non-living. It envelopes all spheres of man's life in this Universe. This environment may be natural or man made. The scope of environment is all pervading and starts from microcosm of a cell and ends in cosmos.

The process or action being a means to unfold is development. It includes elaborate systematic growth for nurturing, maintaining and utilising the environment without causing irreversible or irreparable damage to the ecological set up of the surrounding . To this end a cohesive, interactive, non conflicting and honest approach devoid of excesses balance is the need for evolution of a close relationship between environment and development - a complex niche.

Earth is the only planet to sustain life where paradoxically the very existence of the mother earth is endangered. Human activities are progressively reducing the planets' life supporting capacity at a time when alarmingly rising numbers (Population) and consumption are making increasingly heavy demands on it.

A large majority struggling to stay alive and an affluent minority consuming most of the worlds resources are undermining the very means by which all people can survive and flourish.

It is in this context, the modification of biosphere and application of human, financial, living and non-living resources to satisfy human needs and to improve the quality of life in its every sense is development. For having a sustained development, social, economic and ecological factors to include biotic/abiotic, and resource base coupled with short and long term advantages and disadvantages need reconsideration as alternative actions .

Management of human use of biosphere represents a positive trend which embraces preservation, maintenance, its sustained utilization to optimal level coupled with restoration and enhancement of natural environment represents conservation. The distinction between conservation and development is minimal for the former is for the people while the latter aims to achieve human goals, largely through use of biosphere. The main concern of conservation is maintenance and sustainability - a rational response to the nature of living resources and an ethical imperative expressed in the belief that we have not inherited the earth from our forefathers but have borrowed it from our children.

The environment of human settlements differs from other environment in a broad sense for it is created and controlled by man. Such an environment may theoretically be defined as a system comprising units viz., nature, man, society and their interactions. The interactions be they at micro (environment within a dwelling), or at intermediate (town), or at macro level (metropolis) which legitimately belong to the jurisdiction of the environmental planning.

Such an approach with reference to region include the soil of the region, land and its spatial distribution, agro-horticulture, forests, fish farming, transport and power supply, mineral resources, industrial perspective, tourism, demography, education and medical facilities, economy and administration.

These in turn takes into account aspects and prospects like how they function, how they staisfy the social needs of individuals, groups and institutions.

The concepts that are presented have been translated with reference to Sindhudurg, a coastal district of the State of Maharashtra.

Distinct regions like Marathwada, Vidharbha, Western Maharashtra and Greater Bombay constitute the State with 30 districts. Some of the salient features of Maharashtra and Sindhudurg have been summarised in Table-I.

Very often the process of development leaves adverse effects on the environment leading to ecological imbalance it is because to achieving short term gains, resulting into huge losses to the community at large in long term. It is the dictate of the time to think about how best to carry forward the different activities with a view to conserve its resources, ecology and rich socio cultural heritage reflected in its very way of life.

Ecologically, Sindhudurg is a sensitive region with a potential to grow and the same can be achieved by developing an ecosystem perspective without damaging the quality of life. Sindhudurg region is showing ^{such} a gradual awakening from the last two centuries or so.

COMPARATIVE ACCOUNT OF THE STATE AND SINDHUDURG DISTRICT

TABLE -I.

TOTAL DISTRICTS
MAHARASHTRA STATE

01. GREATER BOMBAY
02. THANE
03. RAIGAD
04. RATNAGIRI
05. SINDHUDURG
06. NASHIK
07. DHULE
08. JALGAON
09. AHMADNAGAR
10. PUNE
11. SATARA
12. SANGLI
13. SOLAPUR
14. KOLHAPUR
15. AURANGABAD
16. JALNA
17. PARBHANI
18. BID
19. NANDED
20. LATUR
21. OSMANABAD
22. BULDHANE
23. AKOLA
24. AMRAVATI
25. YAVATMAL
26. WARDHA
27. NAGPUR
28. BHANDARA
29. CHANDRAPUR
30. GADCHIROLI

CHARACTERISTICS	STATE/SINDHUDURG	CHARACTERISTICS	STATE/ SINDHUDURG
1. Population in lakhs	789.37/8.32	15. Live stock, Forestry Fishing, hunting and plantations, orchards and allied activities (III)	1.52/3.09
2. Density	257/160	16. Mining & Quarring (IV) Manufacturing, Proce- ssing, Servicing & repairs in	0.37/1.45
3. No. of houses per Sq. Km	48/31	17. House hold industry (Va)	1.61/1.10
4. House hold size	5.14/4.73	18. Other than house hold industry (Vb)	11.60/3.88
5. Percentage of Popula- tion to State popula- tion	100.00/1.05	19. Construction (VI)	2.59/2.32
6. Sex ratio	934/1137	20. Trade & Commerce(VII)	8.57/5.23
7. Proportion of 0-6 population	17.11/13.09	21. Transport, Storage & communications (VIII)	3.74/3.16
8. Percentage of SC	11.09/5.10	22. Other Services (IX)	10.38/8.10
9. Percentage of ST	9.27/0.47	23. Proportion Marginal	3.68/9.22
10. Percentage of Literates Work participation rate	64.87/75.87		
11. Male	52.16/51.18		
12. Female	33.11/44.25		
13. Cultivators (I)	32.81/60.49		
14. Agriculture Labourers (II)	26.81/12.19		

Source : District Census handbook 1995, The Maharashtra Census Directorate, Bombay.

ENVIRONMENT AND DEVELOPMENT

Presently, as far as it is scientifically known, Earth is the only place which is sustaining life. Notwithstanding this, progressively the human activities are reducing the planet's life supporting capacity by loading it with heavy demands like endlessly increasing population and food required for this increasing numbers. The thrust of increase in population and the demand for feeding are creating a destructive impact on a poor majority struggling to stay alive and an affluent minority consuming most of the valuable resources. This indeed is undermining the very means through which all people can survive and flourish. The relationship of man with the thin covering of the planet - biosphere sustaining life is in the process of deterioration and will continue to be in the same state until such time a new economic order and environmental ethos replaces the old order. In this context, it is hoped that the human populations stabilise by adopting to sustainable modes of development by conserving the resources. Implicitly, it involves the basic tenets like environment, development which by no means can remain in isolation but need to be complimentary with a harmonious blend.

Both at national and international forum, now the emphasis has shifted from mere survival to quality of life which include all variables and should collectively contribute what may precisely be called 'life worth living'. The essentials for this are adequate resources to provide health, education, harmony and tranquility which flow primarily from the environment a composite entity. The various elements of the environment are not closetted but represent an 'open

system' and collectively form the 'reality'. Its categorisation into physical and human environment is merely a mental abstraction and any such dichotomy leads to erroneous concepts.

Development takes in aspects of the modification of biosphere wherein application of human, financial, living and non-living resources for satisfying the needs (of man) and is desirable to make it sustainable in terms of social, ecological and economic facets of both living and non-living resource base keeping in view the long and short term advantages and disadvantages of the alternatives, if any.

Conservation is another dimension wherein the management of human use of biosphere is involved for it may yield high sustainable benefit to the present and future.

Therefore, conservation is a positive activity which in a broad sense embraces preservation, maintenance, sustainable utilization, restoration and enhancement of natural environment.

Conservation of living resource is mainly concerned with plants, animals, microbes and the non-living elements of the environment on which they depend. The living resources are renewable if conserved and get destroyed if not.

The activity of every living organism including man is to modify its environment which in all essentialities is natural and also a part of development. Indeed this does not mean that every modification leads to development.

That system which impinges upon the human organisms, living system, non-living system or any combination of these is environment. Such an environmental concept conveys implicitly, that it is something in comprehensibly large and complex.

Ecologists, geographers and natural scientists consider environment as a system of physical and biological elements of nature. present in the litho, bio, trop, and stratosphere of the planet encompassing at both micro-, and macrolevel. Precisely, it conveys the meaning that there exists an ecological balance between human activities and biophysical macro environmental system. This also accounts for air water and soil pollution and its effect on human life including the problems of over population.

Urban and land - scape planners, architects, engineers look environment at a local level (micro). Unconsciously, they ignore the implications of macro environment and as a consequence the micro- and macrolevels become mutually irrelevant. Precisely, their emphasis is on a limited area i.e. a place of working, living and recreation of humans whose sole purpose is to only to serve. Thus they take into account designing techniques of the physical environment, study of the structure of rural/urban settlements, land use, and migration pattern of urban areas. Also it is pertinent to point out that they consider the socio-, and psychological implications of the design environment.

Sociologists, Psychologists and behavioural scientists and economists look at the environment as an abstract psycho-social entity impinging upon all human beings as 'social animals'. Thus they are mostly concerned with the psychosocial reaction of individuals towards environment and changes therein with a stress on interaction between individuals, between individuals and his community and also between communities.

In any case, there is a total lack of a comprehension of environment in its totality or entirety and as such it is merely not a biophysical system or physical, place for living or a psychosocial phenomenon and needs to be synthesised for a comprehensive approach - a totality.

To achieve such a synthetic approach, the two major dimensions viz., horizontal and vertical dimensions need consideration. The horizontal dimension deals with classification of environment into physical, biological and psycho-social sub-environments, while the vertical dimension deals with the classification from micro-to macro level environment conveying the concept that it is a multilevel one.

The most comprehensive definition of environment has been given by Mc Hale. This definition divides the environment into two systems: Natural (Environ) Systems including Atmosphere, Lithosphere and Hydrosphere and Human Systems (Including bio-physical, psychological and technological systems). A special merit of this definition is that though it is horizontal in character, it is also adaptable to vert-

icality. Hence, it is able to embrace all the meanings of the term 'environment' as used by scientists at micro- or at macro-level. At the same time, it enables the study of any "compartmental" environment without disregarding its perspective.

Schematic approach for defining environment as conceived by MC Hale is indicated in the Table.

SCHEMATIC DEFINATION OF ENVIRONMENT AS CONCEIVED BY **Mc Hale**

TO TAKE IN ALL ASPECTS - TOTALITY

Mc Hale - "Global Ecology: Toward the Planetary Society"

American Behavioural Scientist Vol. XI, No. 6, July-August-1968, pp 29-33

ENVIRON SYSTEMS

ATMOSPHERE

Airborne
Spores,
Pollen,
Dust

Air, Water
Radiant
Energy and
Gas Cycles

TERRESTRIAL
(Lithosphere)

Plant and
animal
organic
populations

Rock,
Mineral
deposits and
cycles

OCEANS
(Hydrospheres)

Plant and
animal
organic
populations

Water,
mineral
deposits and
cycles

BIOPHYSICAL

Physiological and metabolic processes: The organic life cycle - birth, ageing, death - individuals, generations, and populations, etc.

PSYCHO-SOCIAL

Interpersonal (and interenviron) relation expressed in individual and collective patterns of behaviour: social institutions - kinship, religions, political, economic, productive, recreative, etc.: symbolic and ideological systems - arts, science, philosophy,

TECHNOLOGICAL

Material, mechanical, physical and chemical tools, techniques, organised systems of tools and processes. Extraction, production, transportation, communication,

"We need to extent the physical, biological concepts of ecology to include the social behaviours of man as critical factor in the maintenance of his dynamic ecological balance."

HUMAN SYSTEMS

INTERNAL HUMAN
METABOLISM

EXTERNAL HUMAN
METABOLISM

ECO-DEVELOPMENT SCENARIO:

It is in 1972, at Stockholm, at the United Nations Conference on Human Environment, for the first time the concept of conservation principles for incorporation were advocated. This and related ideas have become formalised under the term "Eco-development". The term was coined by Maurice F. Strong, the first Executive Director of the United Nations Environment Programme (UNEP).

The concept of 'Eco-development' is based on the accepted dogma that development at regional and local levels should be consistent with the potentials of the area involved with an application of technological styles - innovation and assimilation, and organisational forms that as a rule should respect the natural ecosystems and local socio-cultural patterns.

However, this concept was widely debated and interpreted within the framework of its main supporting values i.e. sustainability and basic needs and subsequently resulted into its further refinement.

In every sense, Eco-development embraces a unique characteristic i.e. 'small is beautiful' approach to development with characteristics of integrated watershed development. It emphasizes on the form of development based on sustainable utilization of the local renewable resources, coupled with the use of low impact appropriate technology going in harmony with local life styles and the natural environment. Therefore, emphasis is needed on a holistic treatment of an ecological unit integrating education, development of man power, increase in agricultural output and more importantly on the rehabilitation of

degraded environments. For achieving these goals eco-development programme cannot be implemented and sustained without the local initiative. Precisely people's participation is of paramount importance.

Ecologically sustainable economic development of the local people based on sustainable utilization of local renewable resources by adoption of site specific conservation friendly package of measures is a pre-requisite for eco-development. It is desired that eco-development should help by enhancing sustainable economic productivity of private property resources, increase in the productivity of the buffer zones specially to meet the needs of locals and utilization of low impact technology for improving the efficacy of use of conventional resources and at the same time promote the use of substitutes wherever available.

The recent trend according to World Bank recommendations with regards to Eco-development, consist of a fully participatory planning process involving local people, Non-governmental organisations (NGOs') and government agencies concerned with land use resource use and rural development i.e. a holistic site specific package of measures is worked out in an appropriate combination best suited to the given site.

In the State of Kerala and Andhra Pradesh the eco-development activity has been confined to only the Protected Areas (PAs) like sancturies, where the PA manager is expected to initiate the activity. In fact,

this is a joint effort of all the concerned agencies (NGOs and Governmental). During planning, the PA manager decides in consultation with these agencies and the people. Precisely, such a plan document indicates the general and or the specific roles of the agencies to play.

A question often entertained is where eco-development measures should be undertaken. For the ideal situation would call for such measures being taken in villages situated in the multiple use zone and buffer zone. Further, whether or not eco-development initiatives can be undertaken in villages which are right inside the heart of the Protected Area (PA) is a debated question.

The lessons learnt from modern lifestyles and development models created chaos on the planet, threatening all the living beings including humans. As rightly said by Garrison, "the products of modern life style and technology are displacing the source upon which this technology is based. It is analogous to taking stones from foundation to repair/build the roof". This warning bell should make everyone to think of alternate models of development, compatible to specific environments so as to achieve sustainable development.

In this regard, the immediate concerns are:

- i) How do we minimize the ever increasing pressure on the already identified protected areas?

- ii) How do we protect and conserve our left out green, rich and biodiversity zones?
- iii) How do we stimulate the self sustained development process outside the protected areas?
- iv) How do we motivate the people at large about the need to protect and conserve the biodiversity store house?
- v) How do we motivate and make everyone to realize the need to inculcate regard and respect towards all living beings?

Every creature has a specific role and share in nature.

In this context, ^{Mahatma} Gandhi said that there is enough for everyone's need, but not for greed

Broadly the objectives of Eco-development are:

- to protect and conserve biologically rich protected areas.
- to minimise the pressure on the resources of these protected areas through alternative technologies.
- to facilitate self sustained development process among the communities at and around the protected areas.
- to see that the development process initiated is compatible with the locale specific ecosystem.
- to respect and strengthen the socio-cultural aspects of communities, with a view to protect and improve the traditional knowledge and skills.

- to educate, train and strengthen the collective managerial capacities of the communities leading to sustainable institutional mechanisms.
- to ensure effective participation of the communities through a partnership approach.
- to enable the participation of deprived sections of society, especially women, in the decision making process of eco development.
- to create awareness and sensitise the communities about the need for protecting and conserving biodiversity.
- to inculcate respect and regard towards all living being, and
- to achieve viable models of sustainable development through the encouragement of holistic perspectives.

SELECTION OF RESOURCE REGION

Maharashtra predominantly ranks fourth in percapita income amongst the States of India. The first three positions being held by the smaller States of Punjab, Goa and Haryana despite the fact that Maharashtra leads rest of India in industrial investment as well as employment.

The economic development of Maharashtra reveals wide regional disparities in terms of income and industries. Barring Greater Bombay/Thane and Pune, and a few fortunate districts of Western Maharashtra, the rest of the State ————— has been left high and dry by the State's planning process. Therefore most of the districts of the State are backward even after five decades of planning.

Sindhudurg with an area of 5087.64 Sq.km is the smallest of four districts in the Konkan region of the State. It has nearly 8.5 lakh population and is overwhelmingly "rural", Barely 8 percent of it resides in an area characterised as urban. A part of its population belonging to working age group migrates to urban centres like Bombay, Thane, Pune, Belgaum, Goa and Kolhapur. It is because lack of work opportunities locally. The depleted manpower resource is partly responsible for backwardness.

It is apparent from the Census data of 1971 and 1981 that the migration trend remained the same. However, figures for 1991 show a downward trend in migration due to Horticultural and other activities within the Sindhudurg.

It has a long coastline (120 Km) endowed with large continental shelves which abounds in many marine resources.

Its most mineral resources are still unexploited and has a potential to develop if explored.

The land is ideal for the growth of thick forests due to abundant rainfall. The beaches, historical seaports and picturesque Sahyadri slopes make Sindhudurg a tourist paradise..

Unfortunately, with diverse natural resources of commercial value, still development awaits for it needs a beginning towards the development of industry and allied activities. It is against this background a systematic study to assess the over all economic ^{growth} and eco-development, is being taken up to assess the self sustained potential.

Sindhudurg is an ecologically sensitive region. Due to an accelerated development with the ecological balance is under stress and strain and needs a development of an ecosystem prospective to ensure that no further damage is inflicted for very often the process of development has adversely affected the environment leading to ecological imbalance for short term gains. Therefore it becomes imperative to consider out the various activities by conserving its resources, ecology and the rich socio cultural environment reflected in its way of life.

The present study underlines the need for a comprehensive integrated planning of the district for a comprehensive development in every sphere

MAHARASHTRA STATE AND THE RESOURCE REGION :
SINDHUDURG



REVIEW OF LITERATURE

Eco-development reflects the perspectives of blending conservation interest with community development as mutually supplementary processes contrary to the earlier notions of viewing them as irreconcilable and exlulist interests.

Conservation measures like National Parks and Sanctuaries are the cherished goals of rehabilitation of Ecology which indeed is a precise aspiration of any community. Aspects like tapping biomass, increase of an organism, its development and conservation need to be in harmony with the ecology of the region in question for the planet earth is a dynamic living system. Nature is complete with a mixed population of a wide range of intrinsic biological diversifies wherein presently paradoxically habitat destruction is dominating over many other biological activities for realising the ever increasing selfish goals of man.

According to WWF report based on completion of its mapping project, of the 8.080 million hectares of forest of the world, now only 3.044 million hectares remain today. The project was aimed at studying the forest cover and forest protection measures in Agrica, Asia - Pacific, Europe, Latin America, North America and Russia and quantlying the total forest loss world wide. The study also indicates that EI salvador, Ghana, Madgascar, and Pakistan are left with a forest cover of less than 10 percent with a prediction that within the next 25 years only 10 percent of Asia pacifics original forests will remain.

Eco-development, a nascent concept conceived and coined by Maurice, the first Executive Director of the United Nations Environment Programme (UNEP) during the year 1972 has struck roots and its relevance in every context is being aptly realised by all. It is an inter disciplinary discipline and encompasses all aspects of a living system and its surrounding for improving the quality of life. It is intimately associated with aspects environment, ecology, development, conservation, and sustenance to take in development at regional and local levels and should be consistent with the potentials of the area involved. It is not isolated from the application of technological styles - innovation and assimilation, organisational forms that respect the ecosystems and local sociocultural patterns.

Studies on various natural and social aspects, which directly affect the human habitats and his surroundings aim at projecting the various theoretical models. Studer (69) proposed a model for environment design for environment programming. Likewise Craik (17) devised a process model for the comprehension of environment.

Upto the advent of civilised man, the biosphere consisted of a complex pattern of erotic communities responsive to a variety of environments. The harmony prevailing between the erotic and physical relations was the result of hundreds of millions of years of evolution and adjustment of one organism to another and each to the habitat in which it lived. this relationship was salient one.

A sporadic outbreak of a species for some temporary advantages, or a catastrophe to a population due to change in physical environment became tempered and a balance restored. In this context, primitive man occupied a niche and assumed a role comparable to other animals and the ecosystem maintained itself in a vigorous healthy condition.

Unlike this modern man initiated a number of abrupt changes during the last few centuries beyond the capacity of the eco-system to adjust or sustain for he became dominant in biosphere forcing changes to suit his needs, desires and creating new ecosystems different from the one that existing. Accordingly, man to a great extent modified or replaced the natural processes, their control stability and balance with the ecosystem with new techniques at his command and also manufactured products which the environment cannot absorb. This resulted in a general deterioration of the environment, population, explosion of the human species. The conflict between the demands of man for expanding population, productivity, power and pleasures and the functioning of natural laws for maintaining stability and equilibrium (dynamic) between the living and physical environment.

Environmental planning and design and its intricate relationship with environment and development or precisely 'Environment for Man' as dealt by Studer (69) Arvill (5), Borystrom (9), Buch (11), Craik (17), Hardin (34) and Langdon (45) are notable contributions dealing with the basic tenets of eco-development.

Eco-development is closely related to many disciplines and many of the earlier contributions are scattered in ; ecology, geology, environmental science, socio-economic and cultural studies and so on.

The biodiversity, coastal zone management, its geology and mineral resources, environment management, conservation, and planning, awareness and integrated rural development, afforestation, water resources, wastelands, environmental pollution, social forestry, green house effect, demography, agriculture, are known from the contributions of various workers^{*}. Further, other contributory studies with regards to eco-development pertaining to industry, power, transport, tourism telecommunication, education and medical facilities, economy, administration and social service are also known from the works mentioned^{**}.

Ratnagiri, Sindhudurg Resource Region and the eco-development strategy has been presented in the report prepared for Ratnagiri Regional Planning Board (18,20).

* 1,2,11,18,21,34,40,41,45,48,55,64,67

** 3,8,10,12,23,35,43,44,52,64,66,72,75,77

METHODOLOGY

Regarding formulation of specific methodology for the present work reference was made to work carried out by the National Remote Sensing Agency, Mapping cartographic studies, work done by the Karnataka State Council for Science and Technology for formulation of a Environmental suitability plan for citing non-polluting industries as pilot study for Hassan District and the topographic maps of the Survey of India.

Land use/land cover mapping of Sindhudurg district is carried out by visual interpretation techniques. The Indian space programme is primarily oriented towards harvesting space technology for its relevant application to National development, timely, accurate and reliable information on various renewable and non-renewable Natural resources a necessary requisite for a developing country like India. The conventional resource survey method suffer from the limitation of subjectivity of resource information, inaccuracies and the time lag between data collection and its availability for resource management.

Remote sensing from space and aerial altitude can admirably complement and supplement ground data collection. The satellite based remote sensing techniques are unique in their speed and mobility in terms of collection ability to provide a synoptic view of large area and the capability to repetitively cover the same area in every few days. Land cover mapping using Satellite imagery, false colour composite made from IRS bands 2,3,4 was the logical step towards the national semi-operational, operational satellite based remote sensing system which directly generates resource information

in variety of ways having manifold applications in areas such as agriculture, forestry, geology and hydrology.

Looking at the physiographic and coastal environment, Sindhudurg district forms a unique system of having everything at large but nothing on the other hand.

In the light of the above preliminary observations Satellite image interpretation pertaining to the period up to 20 January, 1993 was chosen by Indian Remote Sensing Satellite Information Agency with LISS (Linear imaging self sensing satellite data). The use of current satellite data provides the basic sensing information with regard to various factors related to Natural resources (IRS/IB. 1:500,000).

The Satellite data is in false colour composite fluorescent colour composite of bands 2,3 and 4 combination (NIR + Red band + Green band) with Histogram equalisation. A positive transference is generalized for path and Row 29 and 57.

The period selected was 20 January wherein the Rabi will be in the harvest stage and undulating uplands on moist forest besides irrigated cropland could be deciphered well during the study taking advantage of coastal area and harvest season. Image interpretation has been carried out using 'PROCOM' II system by keeping the Satellite transference and enlarging it to a scale 1:50,000.

Various attributes and the image characteristics are considered while interpreting of texture, tone, pattern, location and association of shape. These elements in conjunction with special properties have facilitated for detecting in discriminated use of land and land cover classes in the district Sindhudurg. Thus by the above image, elements and various land covers have been interpreted on transparency to map.

In the Pilot study for Hassan District carried out by the Karnataka State Council for Science and Technology, Environmental consideration have been taken up prominently over economic criteria for citing polluting Industries as a pilot exercise for the region. Minimum damage has been studied by adopting the technique of sitting model for delineation of areas by physical, ecological features, human nature, land use features and logistics. Individually and then using the step by step overlaying of the features of the region to understand the output. With the above method social and cultural factors have been extended to the domain encompassing the concept of Natural Resources thereby playing a very significant role in evolving the most optimum use of resources causing minimum damage to environment.

Cartographic depicators of objects as existing on the ground are communicated in a symbolic way by using scale (as desired) through the maps. They are prepared by surveying the surface/plain table, sight rule and using clinometer with controlled points on the base paper, for indicating the height and location in different altitudes.

For depicting contours, sight rule was used to convey details by intersecting the objects in different fixings. Accordingly, the whole area under same scale and mosaic was prepared to the needs.

Also photomosaic technique based on aerial photography was used in depicting photomaps. Photographs with 60% overlap and 30% strip to strip overlap covered the entire area wherein control points of the existing map of the region with projections were taken into account.

Further, latest technique of dipositives using photogrammatic instrument namely A-7, A-8, B-8, C-8, P.G 2 were put to use. The maps thus obtained were transferred on a transparent film and inked with required colours and with symbols for which illustrations have been provided wherever necessary.

By using the Survey of India maps on a scale of 1:50,000, 1:25,000, and 1:250,000 and other maps such as Tourists, District and Defence maps (very restricted and permitted one) cadastral survey plans and toposheets were used. The area was delineated and located by adopting methods like: Ground method (original surveying); Photo verification method; Photogrammatic method; Blue print verification method ; and Updating by correction.

Survey of Socio - economic Aspects

Population, environment and development are interdependent. People have realised their needs. A greater awareness and under-

standing of the interdependence of nature and man has come to surface. A broader appreciation of the role of environmental issues in the context of socio-economic needs, emphasis on the study of environment and development for improving quality of life by adopting a systematic and balanced approach has been taken up in Sindhudurg district: the population lives in poverty and is dependent on economic sustenance, remittances by migrants who have left in search of greener pastures.

Lack of • Potable water,

- Scarcity of land for productive cultivation due to falling topography, absence of adequate irrigation facilities throughout the year despite high rainfall during monsoon,
- adequate transport facilities and all weather roads to remote and inaccessible areas, and inadequate infrastructure for effective exploitation of marine resources ,
- health facilities and higher education ,
- political will and leadership on the part of the administration,
- concerted effort to involve participation of the people at grasing level,
- Government machinery in implementation of welfare programmes for the common people

• confidence in the people and social attitudes, superstitions and so on, and

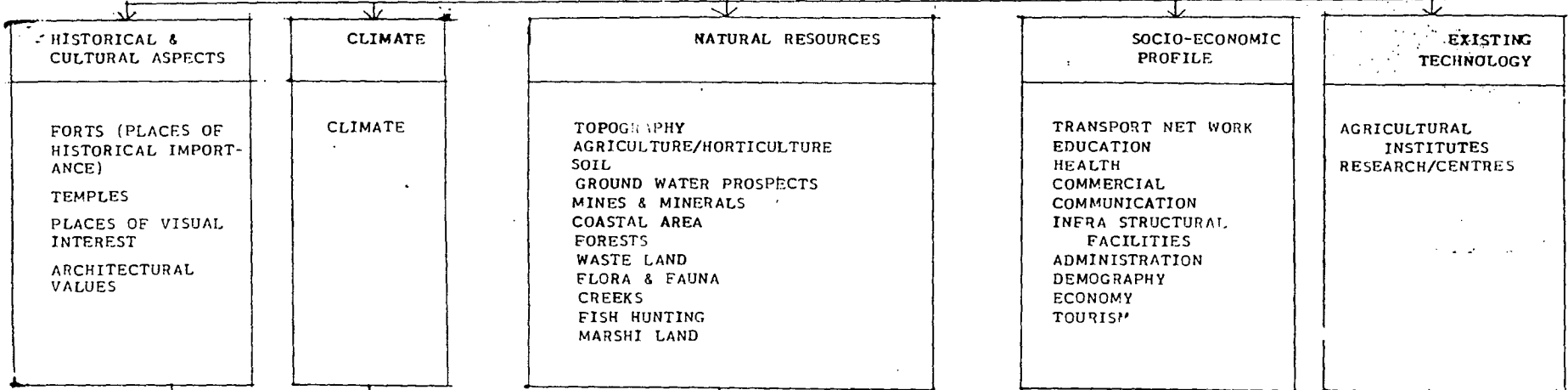
• infrastructure has resulted in the Natural Resources

Due to small individual holdings of agricultural land, mechanisation cannot be deployed.

Despite the presence of live-stock adequate grazing facilities are not available.

EVOLUTION OF ECO-DEVELOPMENT STRATEGY FOR COASTAL AREA

APPROACH TO STUDY REGION - SINDHUDURG DISTRICT



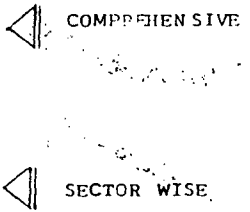
IDENTIFICATION PROBLEM : FINDINGS ON ENVIRONMENTAL SHORT COMINGS IN EACH SECTOR

FORMULATING OBJECTIVES FOR STRATEGY

STRATEGY FOR BALANCE ECO-DEVELOPMENT OF THE COASTAL REGION OF SINDHUDURG (FOR A PERIOD OF TWENTY YEARS)

SPECIFIC GUIDE LINES FOR DEVELOPMENT (ZONING OF ECO-DEVELOPMENT REGULATIONS)

SPECIFIC PROGRAMMES POLICIES AND PROPOSALS



The study was taken up with an intention to know the factors affecting the environment and Ecology of the coastal district and propose sustainable Eco-development measures.

Further, the study aims at:

- to achieve sustainable Eco-Development in Coastal district having features of varying physical and Socio-economic conditions
- to integrate the districts with the neighbouring regions by providing infrastructural facilities through the balanced eco-development network
- it accounts to assess the existing physical and natural resources of the region
- considers Socio-economy conditions of the people
- suggests ways and means for the integration of economic and spatial development of the coastal district in a way that both become mutually supportive
- for developing a regional plan for optimal utilisation of available resources
- generate employment opportunities
- to develop network of transportation system of all types to minimise inter and intra regional disparities to resolve
- conflicts between economic development and environmental protection in coastal area.

DISTRICT SINDHUDURG - A RETROSPECT

Sindhudurg district was formed on 1st May 1981 (82). It stretches from Vijaydurg Creek in the north and Kiranpani river in the south flowing along the boundaries of the State of Goa and Maharashtra. The average north-south length is about 160 Kms and east west width of 60 Kms (Cf. Map. 1 & 2). It is situated between $15^{\circ}37'$ - $16^{\circ}40'$ north latitude and $73^{\circ}19'$ - $74^{\circ}13'$ east longitude.

The district in fact is the southern part of the greater tract 'Konkan'. Before Sindhudurg came into being as a separate district the entire Sindhudurg - Ratnagiri region formed part of Ratnagiri representing the greater tract known as 'Konkan' - historically famous for its long coast line and safe harbours of Arabian Sea. The word 'Konkan' no doubt is of Indian origin of considerable antiquity but paradoxically very little explanation is available about it (82).

According to Hindu mythology, it consisted of 7 Kingdoms which find their mention in the 'Hindu History of Kashmir' and is believed that it included nearly the whole of Westcoast. Also, it is believed that Pandavas passed through this region and settled for some time in the 13th year of their exile. Veerat Raj the King of this region accompanied Pandavas to the famous war of Kurukshetra. Mythology personified, it is claimed that this land mass (of coastal region) of Konkan had arisen from the bed of the ocean by the arrow of legendary Parsurama. It is during the

second century A.D., the great Mauryas annexed the Konkan coast. Kings of Maurya and Nala dynasties appear to have been ruling in Konkan during the middle of 6th century. It is interesting to note that the district Ratnagiri was under Silharaas with initially Goa and later Kharepatnam as capital. Of all the places Chandrapur was one of the ancient towns in Konkan. There are caves at Chiplun, Khed, Dabhol and Sangameshwar. The Buddhist legends records embracing of Buddhism in Konkan during the life of Gautam Buddha around 500 BC (82).

The Portuguese power was on rise on West coast during the 16th Century. The Sultan lost hold of the district in 1675 and was taken over by Shivaji till 1817 and subsequently the whole of the Konkan was transferred to British Crown.

The name "SINDHUDURG" for the district has been derived from the famous sea fort 'Sindhudurg' built by Shivaji.

The district comprises 7 Tahsils viz; Kanakavli, Kudal, Sawantwadi, Vengurla, Malwan, Devgad and Vaibhavvadi. All the Tehsils excepting Vaibhavvadi are (Vabhava) from old Ratnagiri district. Vaibhavvadi has been taken from the Kolhapur district. (Map 1 and 2). The radial distance of various villages from the Headquarter Kudal has been indicated taking 15, 25 and 30 Kms distance (Map.3).

The relief features essentially reflect its geological past, like highly uneven nature with very narrow riverine plains fringing the coastline. Over 85% of the land surface is hilly. On the east a steep and forbidding scarp of the main range with higher elevations in the middle portions can be noticed. Where the hill ranges run parallel to each other. As a consequence, the numerous streams which flow through the valleys form a parallel drainage pattern. The rivers of the region flow from east to west and merge in the Arabian Sea. The rivers originate from the Sahyadri range, reach their base level of erosion within a distance of 20-30 Kms. The Sahyadri slopes in the east, the sea coast on the west, and the innumerable small hill ranges running east west and north-south wherein the whole area is divided by 9 rivers and many rivulets (Map-2) 12 creeks and some plateaus near the coastline are the features that govern the physiography and landscape of Sindhudurg (Cf. Map 5)

The Sahy^adrian scarp at some places ends abruptly thereby creates spectacular scenery with rich landscape of tree laden hills (mango and coconut).

Sindhudurg district stretches over an area of 5087.64 Sq. Kms and represents the second smallest in the state of Maharashtra with a population 8.5 lakhs which is mostly rural. 8% of this population resides in an area that can be called urban in the context of the district. This feature is very much in contrast to the State of

which ranks fourth in the per capita income among the state of India and indeed leads the rest of India both in Industrial investment and employment (cf. Income disparity). It is pertinent to note that the economic development in the State of Maharashtra exhibit wide regional disparities in income and industrial development excluding greater Bombay, Thane, Pune and some districts of Western Maharashtra, the rest has been left high and dry by the State Planning Apparatus - an anomaly that needs every consideration. It is in this context, Sindhudurg is often referred to a region thriving on Money Order Economy. *That* is a paradox in itself when compared to the resources potential of the district.

The district has unique distinction of producing outstanding personalities in all walks of life - Sunil Gavaskar, Vijay and Sanjaya Manjrekar, Dilip Vengsarkar (Sports); N.C. Kelkar, G.T. Madkholkar, V.S. Khandekar, M.M. Karnik (Literature) and Hansa Wadkar (Cine Artist).

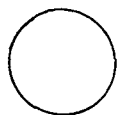
The district has 12 creeks viz; Vijaydurg, Wade., Mithumbari, Mithabav, Achara, Sarjekot, Kolamb, Tarkarli, Kochara, Mochemad, Redi and Kiranpani which were useful for inland ^{water} transportation but due to silting they lost their utility and infact they offer potential difficulty in providing coastal road link for modern transportation requirements.

The climate of the region is moist and generally healthy. The summer season extends during the months of March to May and the rainy season from June to September. Winter season is experienced from December to February. October to November represents the post-monsoon season.

The temperature variation is between 19-40°C (in the interior) with May as the hot month and January as cold. Places like Amboli & others represent hill stations and have a climate of its own. The rainfall is heavy with ^{an} average rainfall for the region of 3940 mm annually. There is little variation with regards to rainfall. Malwan experiences lowest rainfall, while Vaibhavvadi the highest. The relative humidity ranges between 63-93% (December to January and July to August respectively). The humidity is about 55% during winter.

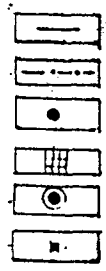
Vegetation is luxurious represented by Teak, Kinjal, Ain, Jamun, Phanas, Cashew, Mango (Alphonso), Coconut and Areca nut, which in itself reflects the richness of the region in terms of crops of economic importance.

The district has several spots of touristic interest like Amboli, Kanakeshwar, several forts and centres for crafts (Sawantwadi) representing high potential for tourism.



MUMBAI'S WESTCOAST DISTRICTS AND SINDHUDURG

- Region boundary
- Taluga boundary
- Taluga place
- District place
- Municipal town
- Urban centre



ARABIAN
SEA

Ratnagiri

Devgad

Malwan

Vengurla

Vaibhavvadi

Kankavli

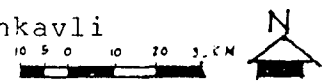
OROS

Kudal

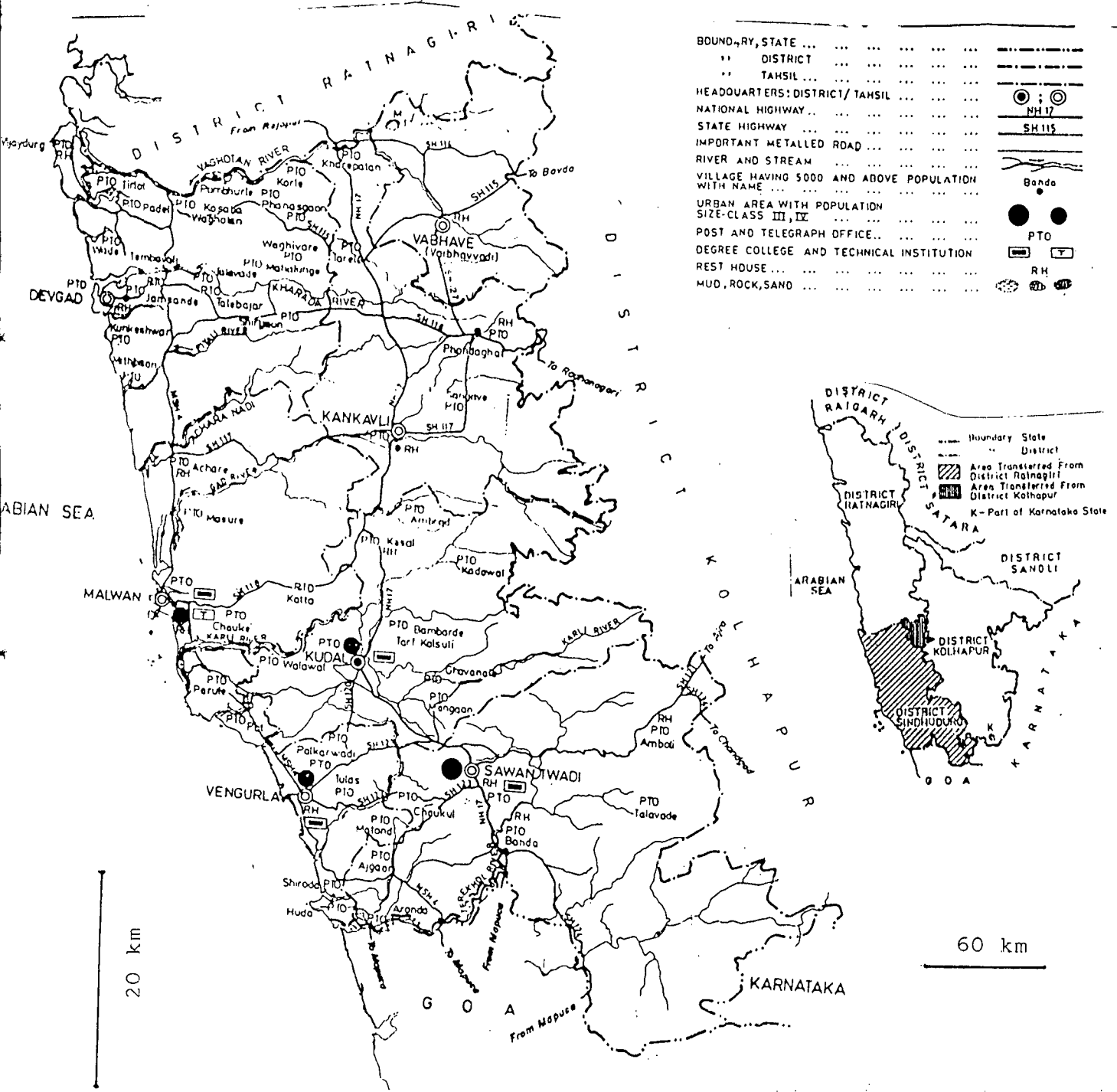
Sawantwadi

Belgaum

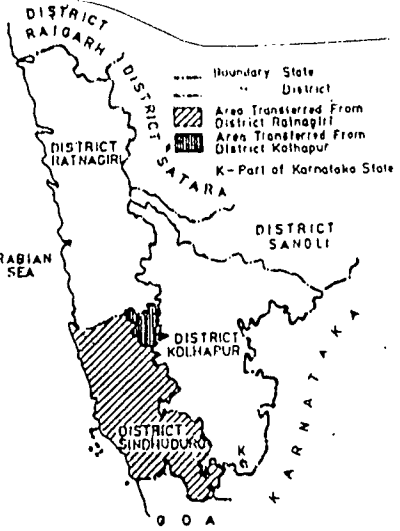
Goa State



SINDHUDURG TALUKAS AND VILLAGES GENERAL PICTURE



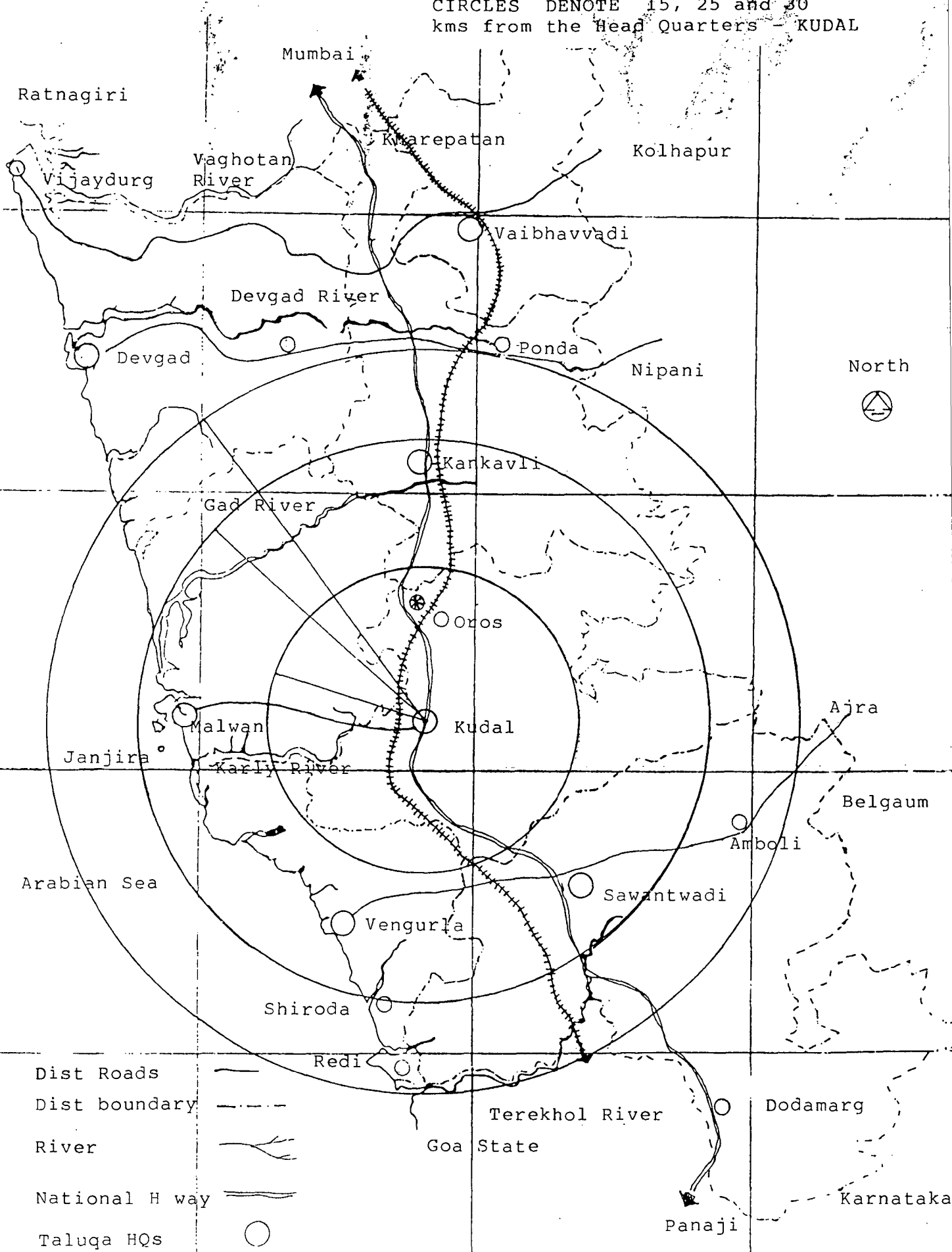
BOUNDARY, STATE ...	---
" DISTRICT ...	---
" TAHSIL ...	---
HEADQUARTERS: DISTRICT/ TAHSIL	● ; ○
NATIONAL HIGHWAY ...	NH 17
STATE HIGHWAY ...	SH 115
IMPORTANT METALLED ROAD ...	---
RIVER AND STREAM	~~~~~
VILLAGE HAVING 5000 AND ABOVE POPULATION WITH NAME	Banda
URBAN AREA WITH POPULATION SIZE-CLASS III, IV	● ●
POST AND TELEGRAPH OFFICE..	PTO
DEGREE COLLEGE AND TECHNICAL INSTITUTION	□ □
REST HOUSE ...	RH
MUD, ROCK, SAND ...	⊙ ⊙ ⊙



20 km

60 km

VILLAGES - 1st, 2nd and 3rd
CIRCLES DENOTE 15, 25 and 30
kms from the Head Quarters - KUDAL



- Dist Roads ———
- Dist boundary - - - - -
- River ~~~~~
- National H way = = = = =
- Taluqa HQs ○



SINDHUDURG RESOURCES - SOME ASPECTS

The district Sindhudurg is of recent origin (about a decade and half). It has been selected as a resource region for evolving strategies by taking into account the basic tenets like: Study of the overall development scenario present as well as potential taking into consideration all sectors of regional economy, also infrastructural sector in relation to population; identification of environmental, ecological problems resulting from the development and from the intersectoral conflicts; and based on this for evolving and Eco-Development strategy for balanced development of the district by eliminating the ecological problems, if any, thereby leading to a healthier quality of environment and better quality of life for the people.

For this, herein some select parameters regarding resources have been presented and based on this an attempt has been made to develop appropriate strategies without the fragile ecology of the region.

The aspects that have been documented herein would help in formulating the Eco-development strategy - theme of the present work.

THE SOILS

The predominant soils in the district are of laterite type. They show variation in colour and range from bright red to brownish red due to the preponderance of hydrated Iron Oxides. Their Nitrogen and organic matter content is fairly rich thereby give a loamy texture. Due to porous character, the moisture retention capacity is reduced. The important grades are Rice and Workas soils which are available on the slopes of hills. They are characterised by poor fertility with yellowish red colour. This is the principal soil wherein the major crop paddy is grown.

Laterisation has taken place all over the district as laterite capping is seen over the present material upto 175 mt above MSL. The following geological formations are found.

i) Pre-Cambrian formation: The Archaean Dharwar Group extends between the border with Goa and Phondaghat consisting of ferruginous phyllite and pink banded ferruginous quartzite, micaceous quartzite, mica and chlorite schist, amphibolites, orthoquartzite, thin calcareous band, chlorite phyllite with intercalations. The rocks display green schist facies of metamorphism on the area adjoining Goa. Towards further north the grade of metamorphism is of amphibolite facies while beyond Sawantwadi, the rocks are highly granatized. The regional strike of the formations is N.NW - S. SE where three fold movements have affected the area. These formations are all along the strike extended in Goa and can be connected with the upper Dharwar sequence (Karnataka).

ii) Kaladgi group is characteristic of Phondaghat area which is represented by large, thick quartzites with minor conglomerates like shells, and lime stones exposed below the traps. They are the western extensions of the Kaladgi group of Karnataka and southern parts of Kolhapur. The quartzites are white grey or brown and are weathered at places to yield sand with folded and faulted beds. The strike varies from NNE - SSW with upto 80° dips.

iii) Mesozoic and Tertiary group: The major part of the district is covered by basalts commonly referred to as 'Deccan traps' which have been considered to belong to upper Cretaceous to lower Eocene. A modified stone - Argillite Ferruginous is derived from the original rock formation of Sahyadri range (Deccan trap) and forms the main rock deposits of Ratnagiri Sindhudurg Resource region. Formation of the rock is facilitated by forests, high rainfall and humid climate. The rock contains Iron and Aluminium oxide and because of high rain fall, the soils and minerals are washed away rendering the rock acidic. In the north and south black stone soil is found mixed with laterite. Sea water backlashes in the coastal areas (creeks also) and produce a type of soil called 'Khajans', not fit for cultivation. In general, the soil _____ appears reddish due to passing of rain water through rocks. It is deficient in phosphate and calcium (making less fertile) which has a good percentage of Potassium and Nitrogen. precisely, the regions soil is influenced by climate.

The laterite stone is good for building construction as it can be cut to requirements and one of the outstanding qualities is that it improves in strength when exposed to weather. The pH of the soil ranges between 4.5 - 6 (Acidic).

In general, Sindhudurg has its own geological and Physiographic characters. It has a relatively recently created crust in the history of planet earth and is subjected to vagaries of natural forces like coastal damages, land slides and tremors (mild). In December, 1967, an earthquake having its epicentre near Koyna dam (Chiplun) caused considerable damage to the rural settlement on the hill slopes of Sahyadri. Even in 1983, land slides have taken a heavy toll of settlement.

LAND USE AND ITS SPATIAL DISTRIBUTION

The land cover can be grouped primarily into Agricultural, Forests, Waste land and Water bodies. Their spatial distribution is indicated in the map (Cf. Map).

Access to the rural terrain is quite difficult, Sawantwadi, Vengurla, Kanakavli and Malwan pockets represent urban area. They have built up land. Lack of large settlements made it difficult to delineate the same from satellite imagery (1:250000). The area mapped in this category has been estimated to the extent of 23.32 Sq. Km representing 0.5% of the total geographical area.

Through IRS LISS-1, imagery pertaining to crop land of Kharif season indicates that about 48,758 hectares is under cultivation. The Kharif season stretches from June to October of the year (Monsoon season). Paddy is the major crop followed by Ragi, Kodra, Varai and pulses.

In Rabi season, the district has negligible area under cultivation. Paddy and pulses are grown at some places where paddy is limited to areas with irrigational facilities while pulses in dry lands. The period extends from January to April. Thus the agricultural activity is restricted and dependent on rain (IRS LISS/IB).

With the commissioning of irrigation projects, double crop area regions may come up but presently this type of double cropping

pattern is very negligible. There is another kind called 'Fallow Land' which is cultivable agricultural land without crop during Kharif and Rabi seasons. It is because the Konkan belt is hilly and cultivable land is quite sparse. Compared to Ratnagiri and Raigad (adjoining districts), Sindhudurg has more flat terrain and has the scope to bring more area under cultivation. The extent of fallow land is not precisely known (lack of survey). At present some places the fallow and cropped land are in continuity.

The coastal belt is fertile and quality agriculture is in practice. However, the extent of such area is very small. Large areas of agriculture lands are found on the up lands with rolling and undulating topography. The gentle slopes of minor hillocks of the region get partly eroded and become soils with poor surface fertility having yellowish to red colour. The major crops of this soil is cashewnut and mango. Mango gardens are in plenty in Devgad, Malwan and Vengurla, while in Sawantwadi Cashew plantations are in abundance. Areca nut and coconut also grow luxuriously in the coastal alluviums but they are not in plenty as found in Goa and Kerala. The agricultural area is about 11% of the total geographical area of the district.

SINDHUDURG, MAHARASHTRA STATE

Agroclimatic Zone No.XII i.e.

The West-Coast Plain and Ghat Regions.

Courtesy : National Remote Sensing
Agency, Balanagar, Hyderabad.

Date of pas : 20.1.93

Path/Row : 29/57

Scale : 1:500,000
1:250,000 (Rabi)

Major identified Categories:

Built up land

Agricultural land

Forests

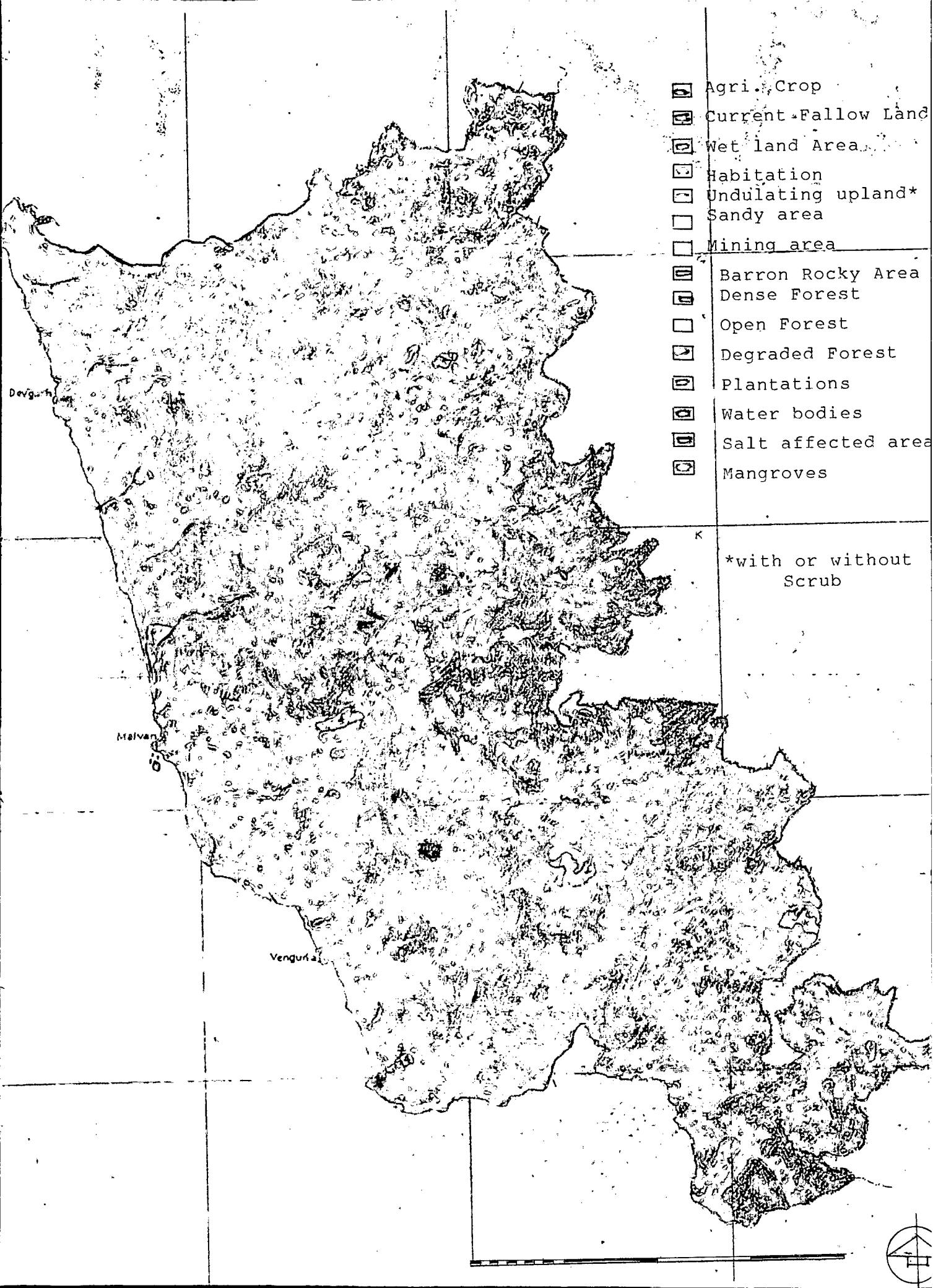
Waste land

Water bodies, etc.



0 1 2 3 4 5 6 7 8 9 10
FORESTRY DIVISION

7-00-37 FORESTRY DIVISION



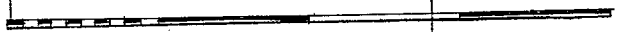
- ☐ Agri. Crop
- ☐ Current Fallow Land
- ☐ Wet land Area
- ☐ Habitation
- ☐ Undulating upland*
- ☐ Sandy area
- ☐ Mining area
- ☐ Barron Rocky Area
- ☐ Dense Forest
- ☐ Open Forest
- ☐ Degraded Forest
- ☐ Plantations
- ☐ Water bodies
- ☐ Salt affected area
- ☐ Mangroves

*with or without Scrub

Devghat

Malvan

Vengurda



SINHDURG PHYSIOGRAPHY



Boundary of Region
 Taluka boundary
 Taluka place
 National Highway
 State Highway
 Altitude
 100 mt and above
 100 - 250 mt
 250 - 400 mt
 400 mt and above



Vijaydurg

Vaghota River

Devgad River

Devgad

Achata River

Gad River

Kolhapur District

Malwan

Karla River

Tarkarl

Kiranpani

Terekhol River

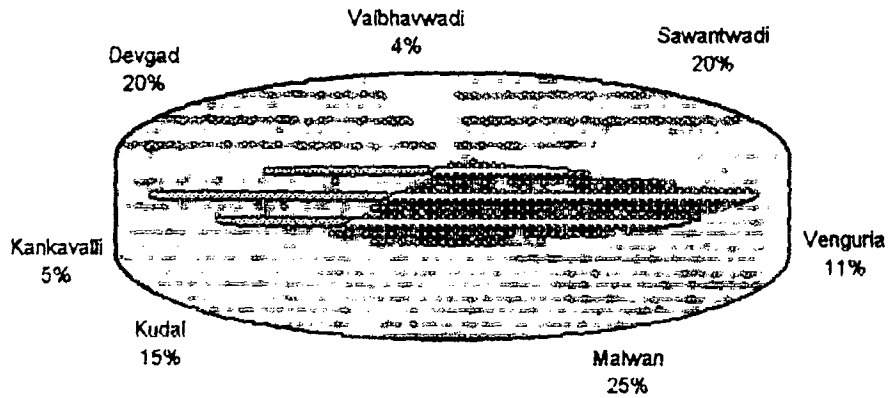
GOA STATE

Belgaum District

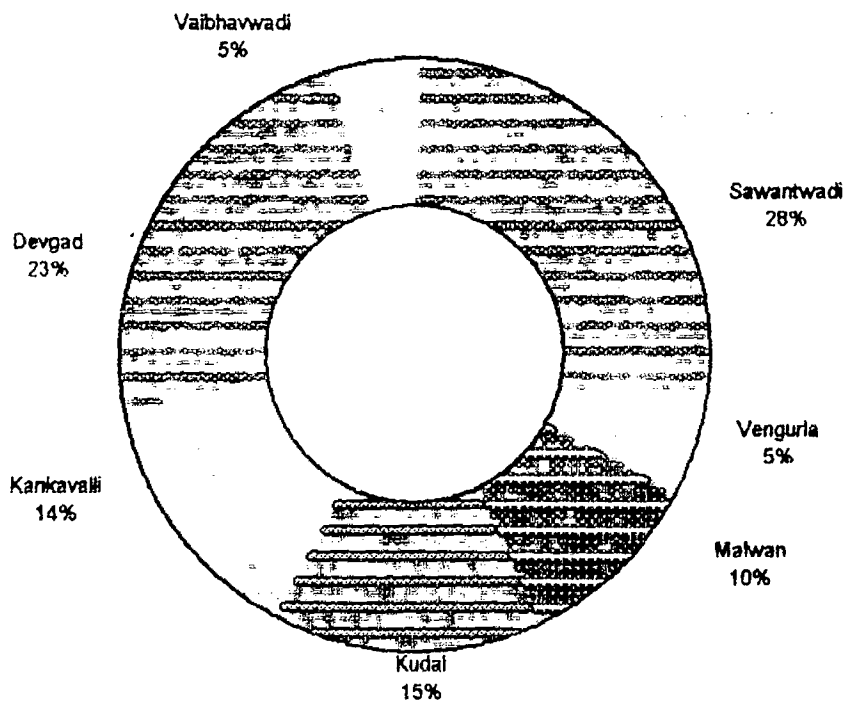
LAND USE PATTERN – SINDHURG DISTRICT

Sl.No.	Items	Sawantwadi	Vengurla	Malwan	Kudal	Kankavali	Devgad	Vaibhawwadi	Total
1	Agricultural Crop	122.00	71.00	156.00	92.00	30.00	124.00	25.28	620.28
2	Current Fallow Land	162.94	32.20	61.12	87.34	84.82	138.29	28.13	594.84
3	Wet Land Area	10.68	7.63	8.21		5.38	1.29	8.62	41.81
4	Habitation	6.79	3.65	1.94	2.00	3.90	4.34	1.43	24.05
5	Undulating Upland with or w	363.93	53.48	226.73	264.24	278.39	230.13	128.89	1545.79
6	Sady Area		11.08	3.23			5.13		19.44
7	Mining Area	6.28	3.11					1.68	11.07
8	Barron Rocky Area	235.50	36.07	34.84	73.70	100.18	130.82	87.49	698.60
9	Dense Forest	181.65	4.05	9.74	78.22	63.00	26.83	49.53	413.02
10	Open Forest	131.39		22.41	126.04	105.45	17.17	60.86	463.32
11	Degraded Forest	82.01	4.60	29.26	40.04	28.72	8.55	35.54	228.72
12	Plantations	42.73	49.06	39.78	48.29	46.82	100.35	54.48	381.51
13	Water Bodies	4.58	1.58	14.75	3.69	6.71	12.43		43.74
14	Salt Affected Area								
15	Mangroves	0.84	0.66						1.50
	Total Area	1351.32	278.17	608.01	815.56	753.37	799.33	481.94	5087.70

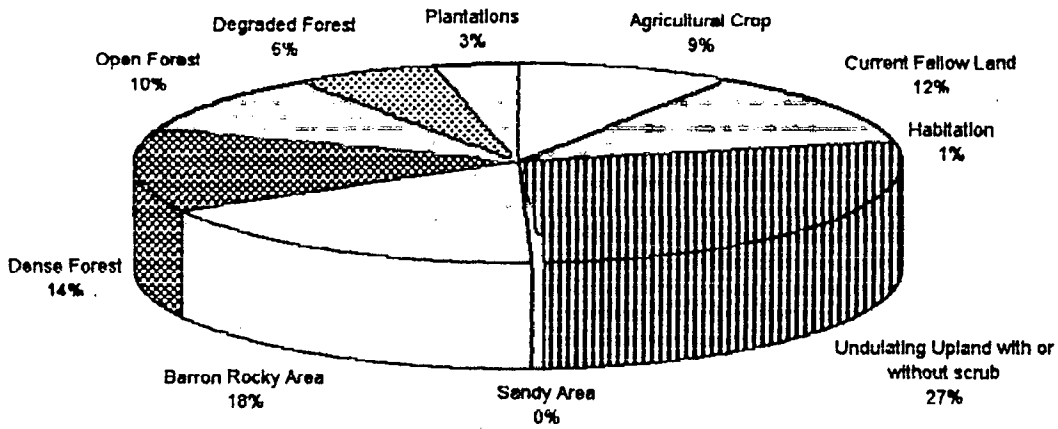
AGRICULTURAL LAND TALUKAWISE DISTRIBUTION



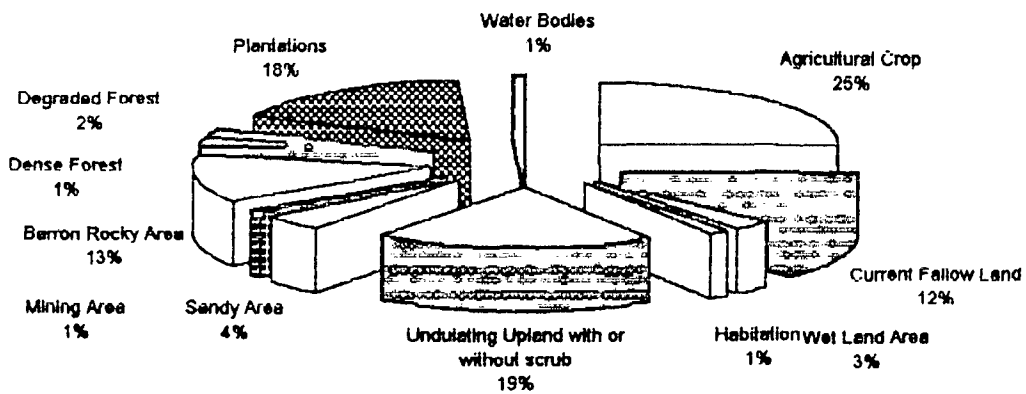
CURRENT FALLOW LAND TALUKAWISE DISTRIBUTION



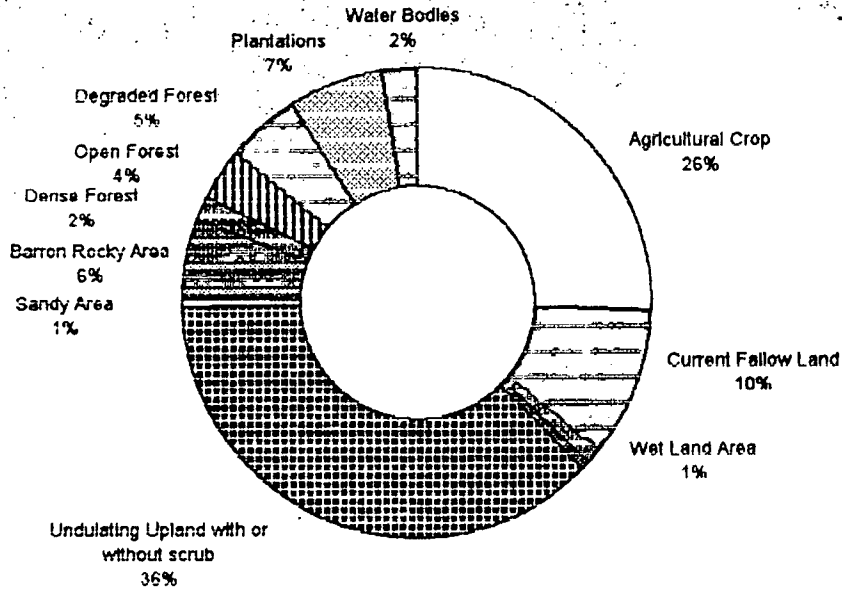
LAND UTILISATION OF SAWANTWADI TALUKA



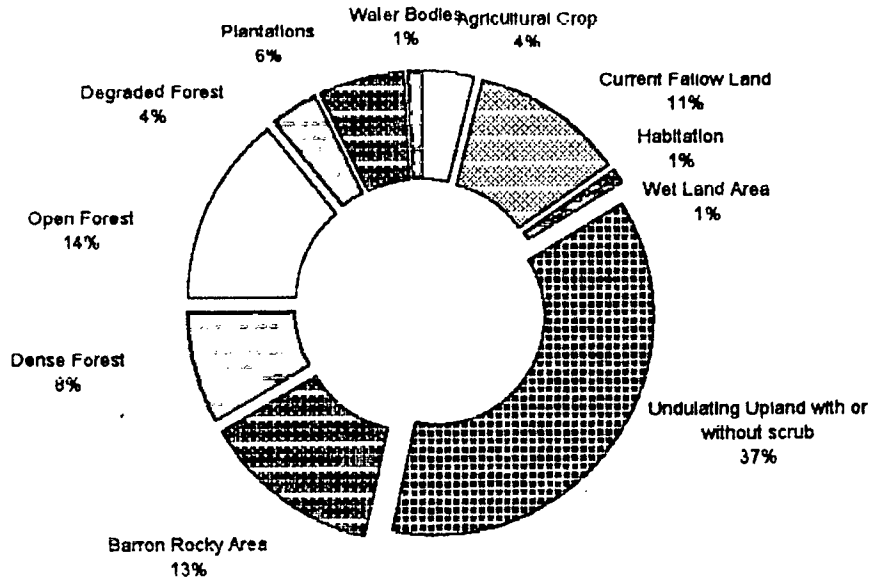
LAND UTILISATION OF VENGURLA TALUKA



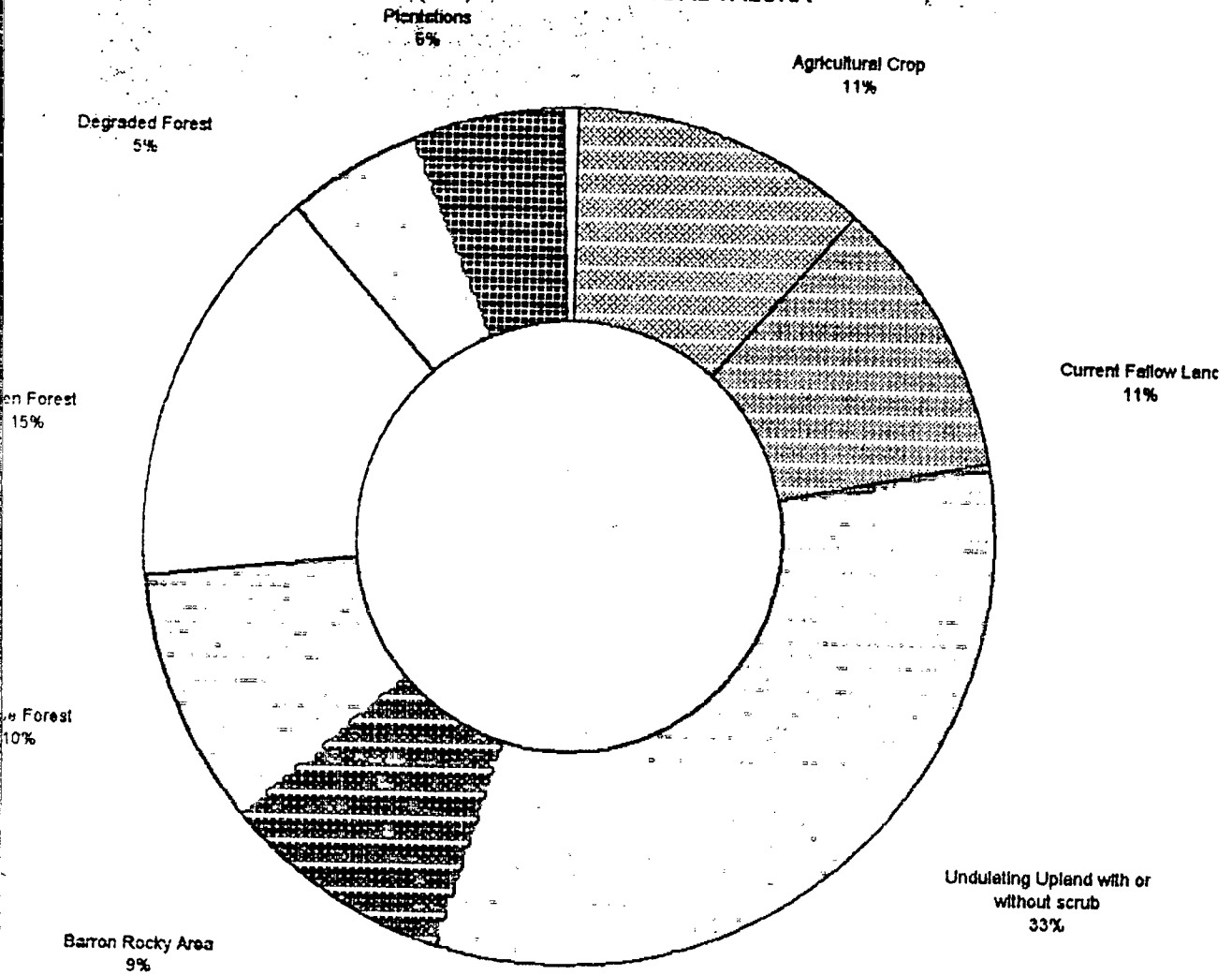
LANDUSE PATTERN OF MALWAN TALUKA



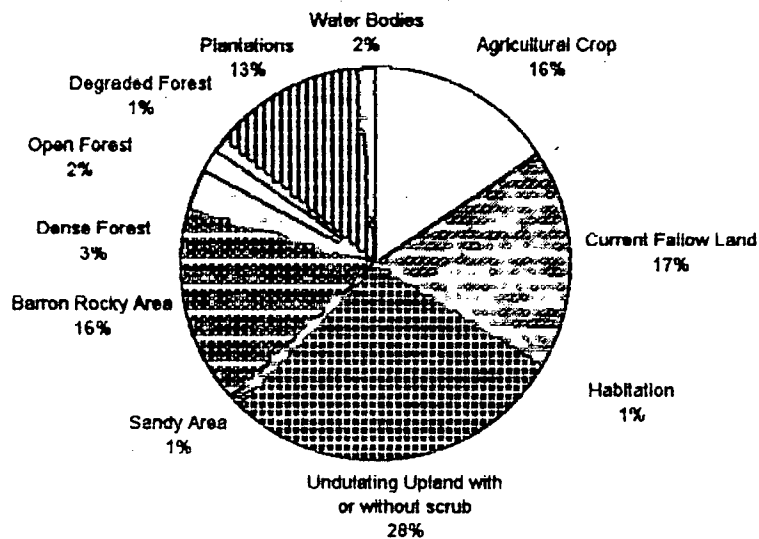
LANDUSE PATTERN OF KANKAVALI TALUKA



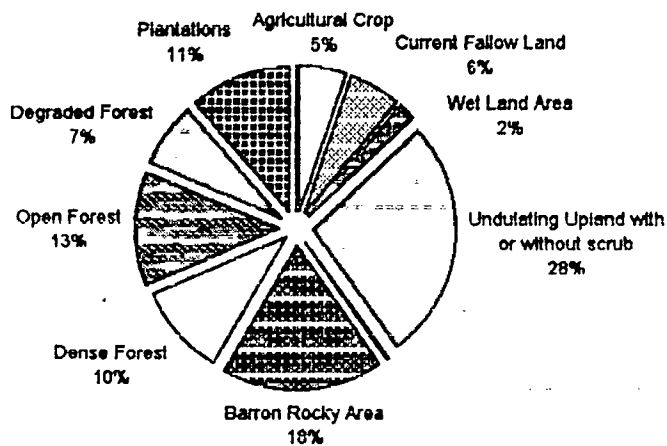
LAND USE PATTERN OF KUDAL TALUKA



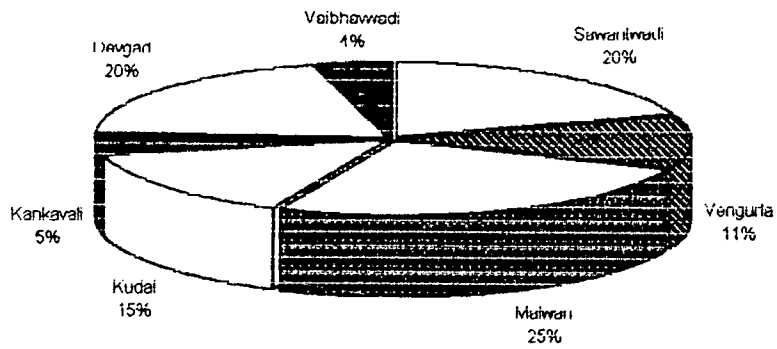
LAND USE PATTERN OF DEVGAD TALUKA



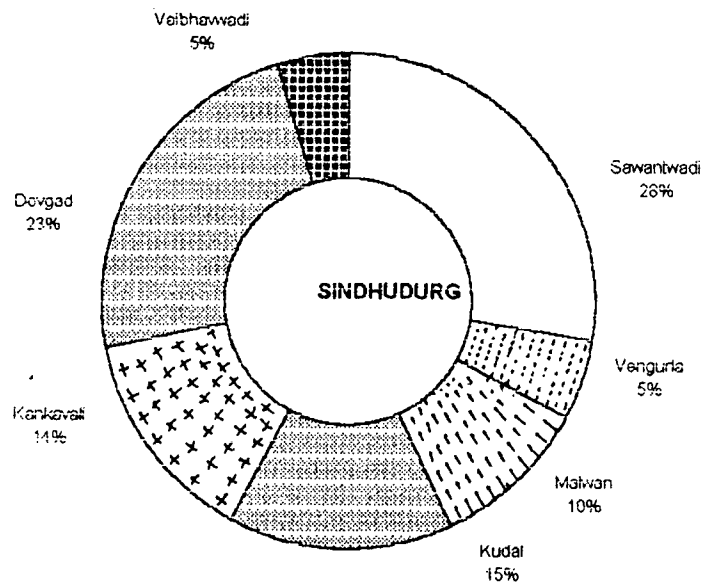
LAND USE PATTERN OF VAIBHAWADI TALUKA



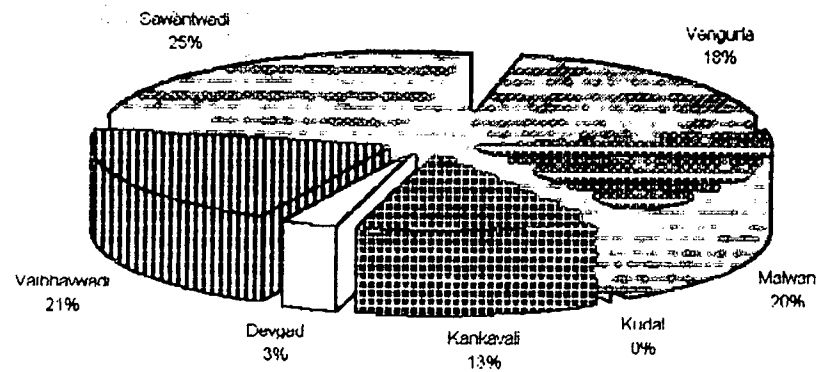
AGRICULTURAL LAND TALUKAWISE DISTRIBUTION



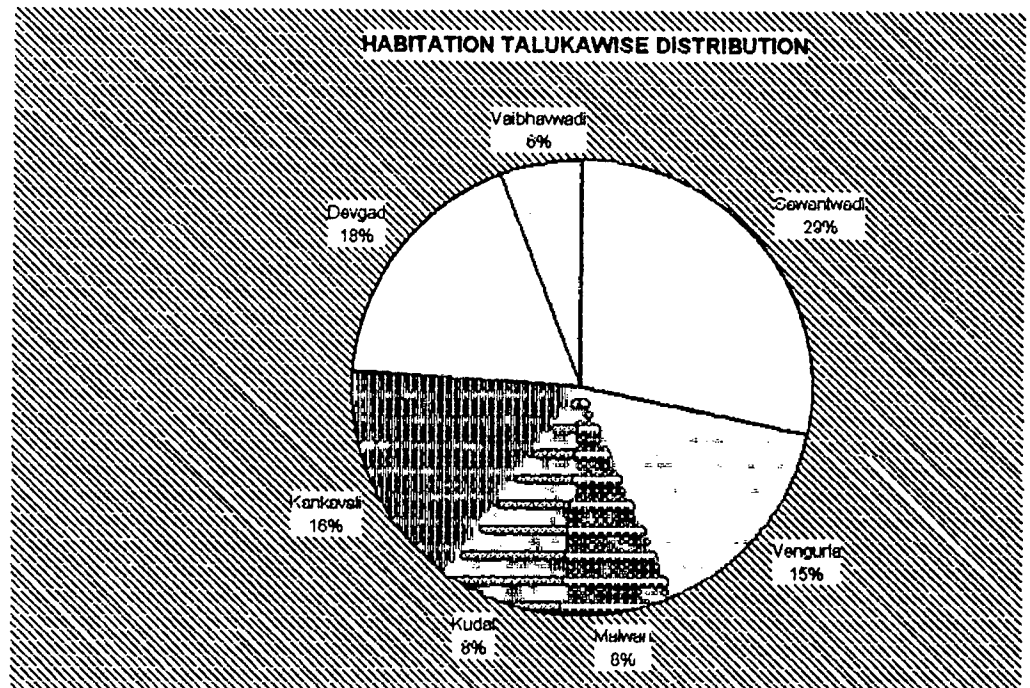
CURRENT FALLOW LAND TALUKAWISE DISTRIBUTION



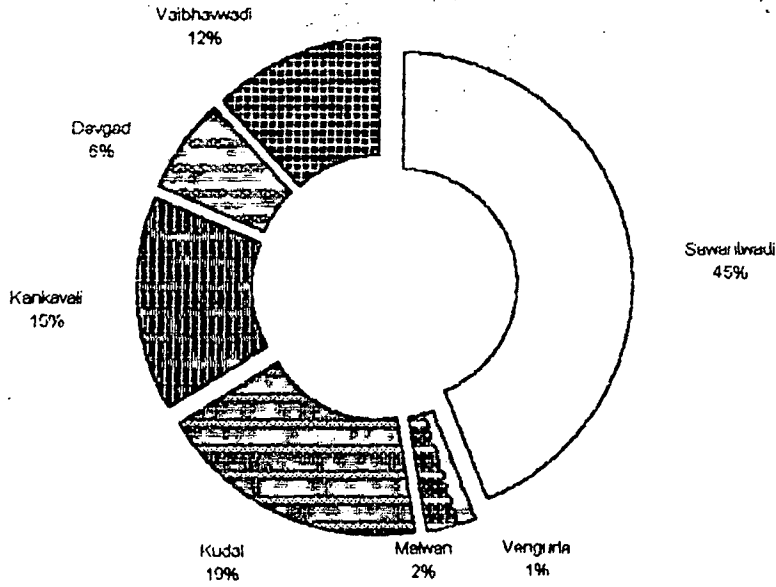
WETLAND TALUKAWISE DISTRIBUTION



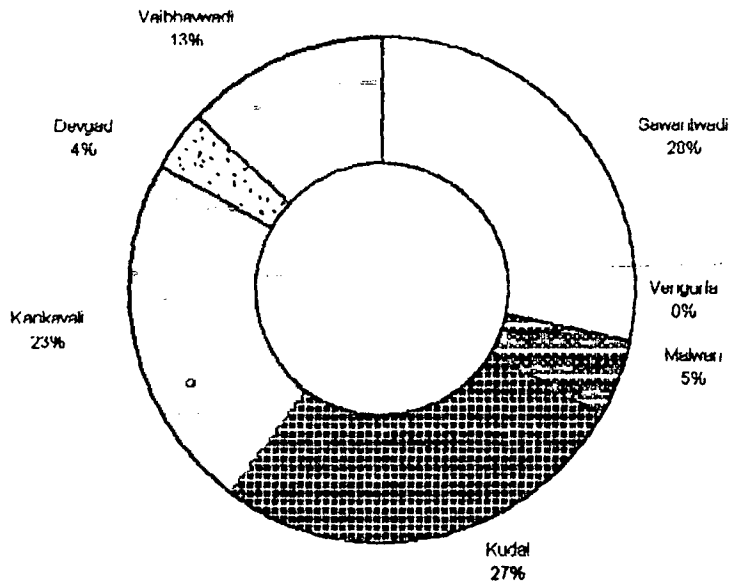
HABITATION TALUKAWISE DISTRIBUTION



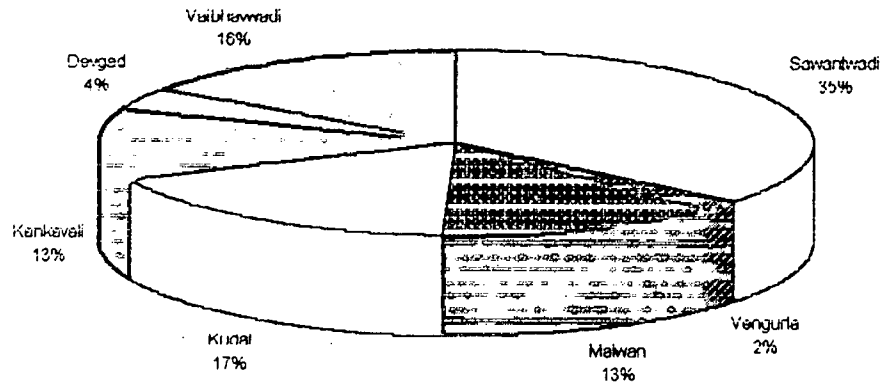
**DENSE FOREST OF SINDHDHURG DISTRICT
TALUKAWISE DISTRIBUTION**



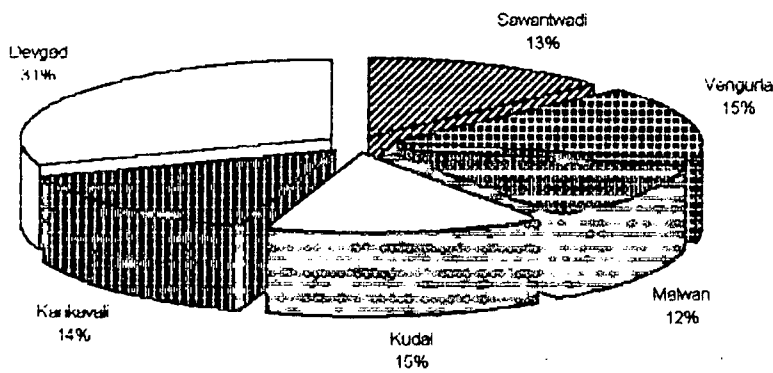
**OPEN FOREST OF SINDHADHURG DISTRICT
TALUKAWISE DISTRIBUTION**



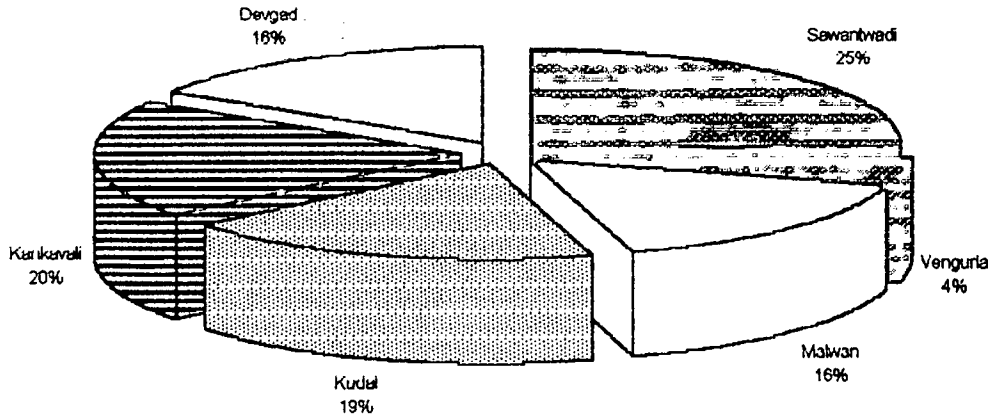
**DEGRADED FOREST OF SINDHADHURG DISTRICT
TALUKAWISE DISTRIBUTION**



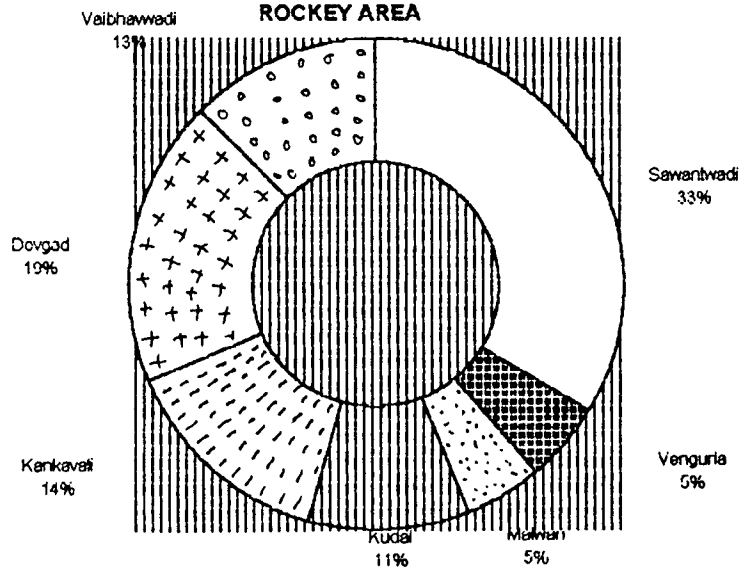
**PLANTATION OF SINDHADHURG DISTRICT
TALUKAWISE DISTRIBUTION**



**UNDULATING UPLAND WITH OR WITHOUT SCRUB
TALUKAWISE DISTRIBUTION**



ROCKY AREA



WATER RESOURCES AND MANAGEMENT

The district receives abundant rainfall during monsoon but provisions to conserve this valuable resource are conspicuously lacking.

Further, the width of rivers is narrow and do not flow over long distances. The major rivers are Vaghotan, Devgad, (Kharada) Tillari, Karli, Terekhol, Gad and Achara. The other source of water is from wells owned by either Government or Private parties. The number of wells are as below.

Taluq	Wells		Adequacy of Water	
	Govt.	Private	Yes	No
1	2	3	4	5
Devgad	1807	154	43	24
Vaibhavvadi	1043	121	5	31
Kankavli	2190	503	35	33
Malwan	2435	302	38	29
Kudal	2209	592	34	46
Vengurla	1922	176	12	13
Sawantwadi	1685	665	75	48
	13291	2513	242	224

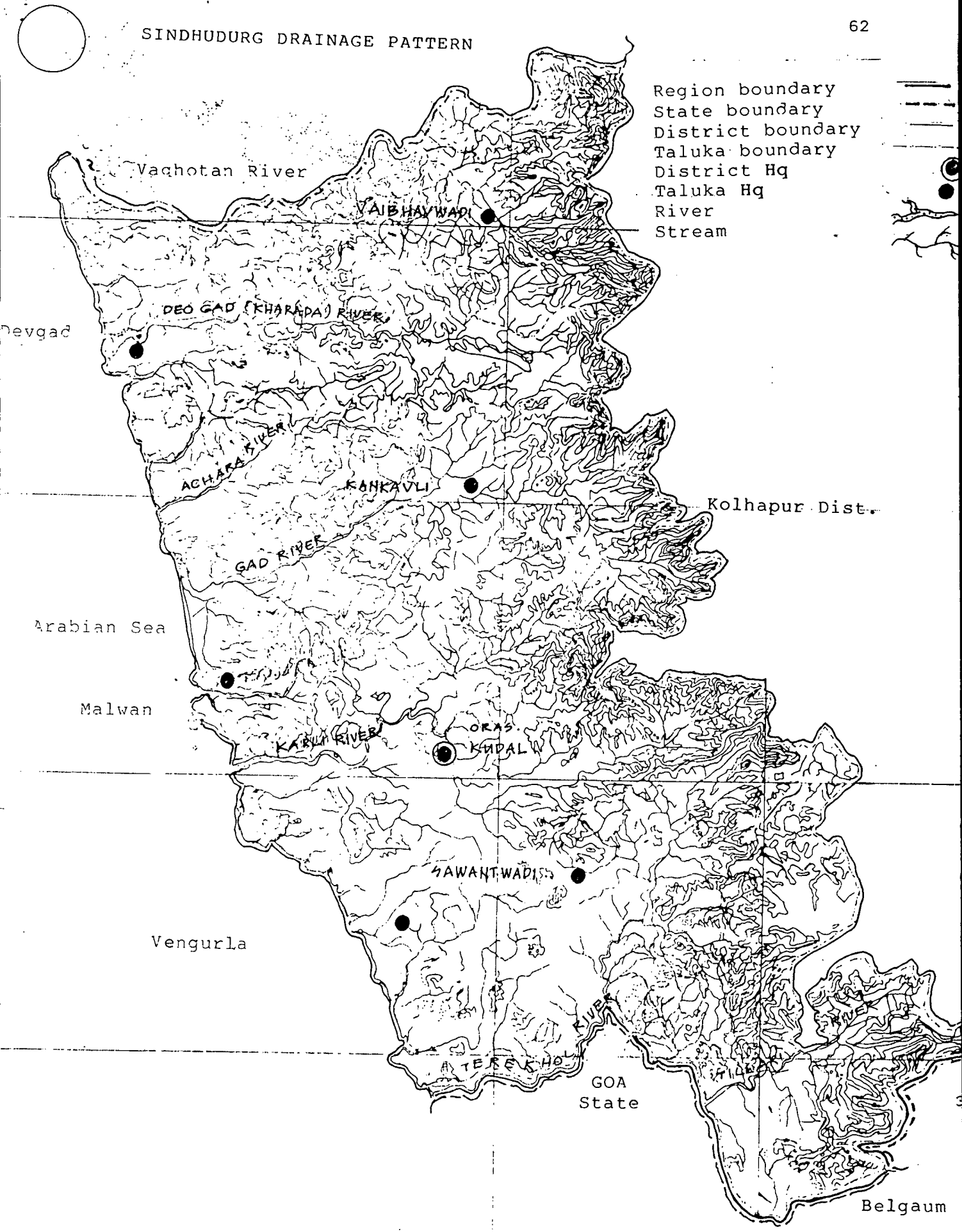
Courtesy - Zilla Parshad, Ratnagiri and Sindhudurg

There is Municipal Water supply to Sawantwadi, Vengurla and Malwan. Despite municipal supply, the entire Sawantwadi does not receive this water (at higher level) and is supplemented by 400 private and 20 public wells. The water supply scheme of Vengurla is no longer functioning but the demand is met through 1200 private and 4 public wells. Similar is the situation of Malwan too where there are 2000 private and 10 public wells.

The Industrial Units receive their requirement through MIDC and any surplus is utilised by the surrounding settlements of Kudal.

The rural and urban areas get their water requirement from the Maharashtra Water Supply and Sewerage Board. Besides this, Ground Water Survey and Development Agency is also engaged in the Water Supply Schemes.

SINDHUDURG DRAINAGE PATTERN



- Region boundary
- State boundary
- District boundary
- Taluka boundary
- District Hq
- Taluka Hq
- River
- Stream

Vachotan River

VAIBHAVWADI

DEO GAD (KHARADA) RIVER

ACHARYA RIVER

KANKAVLI

GAD RIVER

Kolhapur Dist.

Arabian Sea

Malwan

KARLI RIVER

ORAS
KHDALW

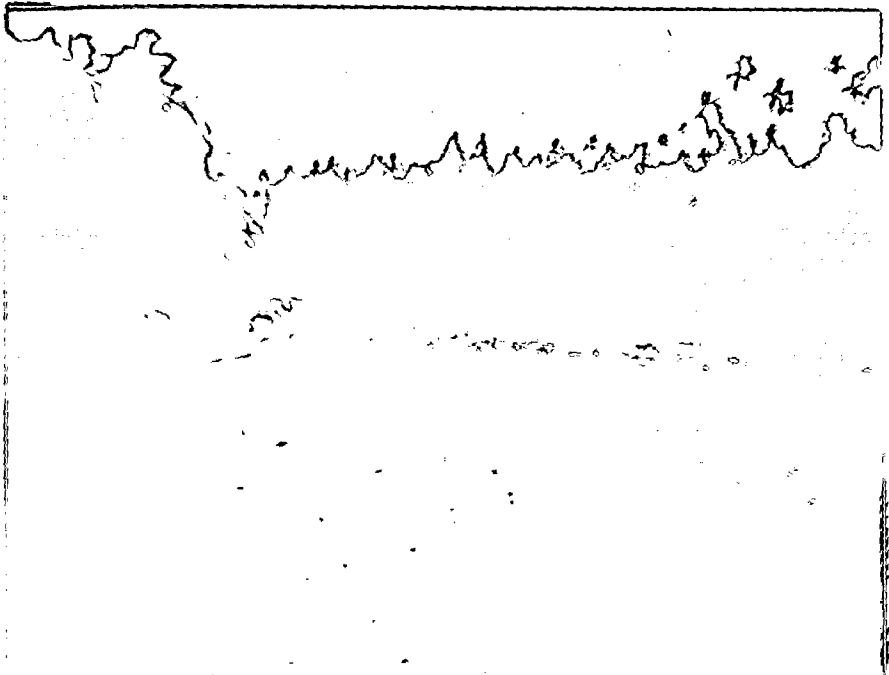
SAWANTWADI

Vengurla

TERAKHO

GOA
State

Belgaum



**COASTAL SUB REGION:
PLACING TOPOGRAPHY WITH THICK VEGETATION SHOWING WIDE
RIVER BEDS.**

AGRICULTURE AND HORTICULTURAL POTENTIAL

Agriculture is the main economic base and activity of the District. Though it is on a low key, it has been the main source of livelihood for generations. Any boost to agriculture will go a long way to promote development and creation of enhanced employment opportunities to a large extent. The number of agriculturists and agricultural workers in the district are 38813 (Census, 1991) and the actual land under cultivation is about 3995 hectares.

Historically, the district was said to be progressive in agriculture but had ecologically degenerated in the past 200 years due to over exploitation of natural forests. Approximately 85% of the districts land is undulating but its eastern mountain slopes receive heavy rainfall. There are number of gorges which can provide sites for dams for impounding reservoirs. Traditionally irrigation by wells and by medium/small rainfed tanks have been used for farming. The cultivable land is divided into three categories as 'Khar' paddy land, and garden soil on the mountain slopes, at the foot hills and the coastal plateau. There is another category of land suitable for horticulture. Unlike other lands, the Khar land needs special efforts for making it cultivable. The land under the forest is less and tree cover on the private lands has been removed. The proportion of Khar, ————— wasteland is about 59% and 41% respectively which can be brought under cultivation both for agriculture and horticulture. Another impedement for agriculture is fragmented holdings.

It can be inferred that the holdings 0-20% Area constitute 1/5 hectare and are in large numbers which infact limit the potential for further development.

During the last 10-14 years, there was no increase in land under cultivation and more or less remained at the same level despite double crops. In Devgad, the area has been reduced while the areas in Kankavli, Sawantwadi, Vengurla and Malwan has slightly increased. The area under grains and pulses has been reduced but cultivation of mango, paddy, cashew, sugarcane, ground and coconut has increased.

The three main physiographic conditions show following agricultural practices.

- i) In the coastal belt paddy, coconut, betelnut, kadave wal and karlith represent major crops. While mango and cashew are seen in areas away from the coast. Special variety of rice is cultivated in the reclaimed Khajan lands.
- ii) To the east of coastal area extending right up to the foot hills of the western ghats wherein variety of mango, coconut, betelnut, oil seeds and pulses are grown, and
- iii) The eastern mountain slope area in which Nagali, Wari, havik and cashew are grown along with bamboos at the foot hills.

The east west district tract runs from North to South of State and forms the main agricultural activity belt of the district.

The district has a peculiar practice of cultivation of Hill Millets on the high hill slopes and Rab method involving burning of patches of soil. The hill millet has high protein content and serves as rich food. Even today this practice is in vogue which infact imbalances the ecology of the region for the soil cover is washed away thereby exposing the rocky bottom resulting in silting up of the rivers.

Waste lands, unrecorded tenancy, benami land strips, non cultivation and stray cattle offer potential hazards and practical impediments to agriculture. With reference to waste lands, the studies of Konkan Krishi Vidyapeeth has focussed attention on aspects like: levelling the lands, providing irrigation facilities, improving the fertility of the soils, funding and exposing the farmers to technical guidance and controlling the stray cattles.

As for as the facilities for irrigation are concerned, no projects were undertaken in the past to construct dams and canals. Partly this was due to nonfeasibility in the entire konkan belt but presently the trend is changing and the region is under intensive and extensive study for irrigation potential. As a consequence, only 6.94% of the land is under irrigation.

Horticulture have been treated as a special sector of development because of its potential when compared to agriculture with

Plate 2

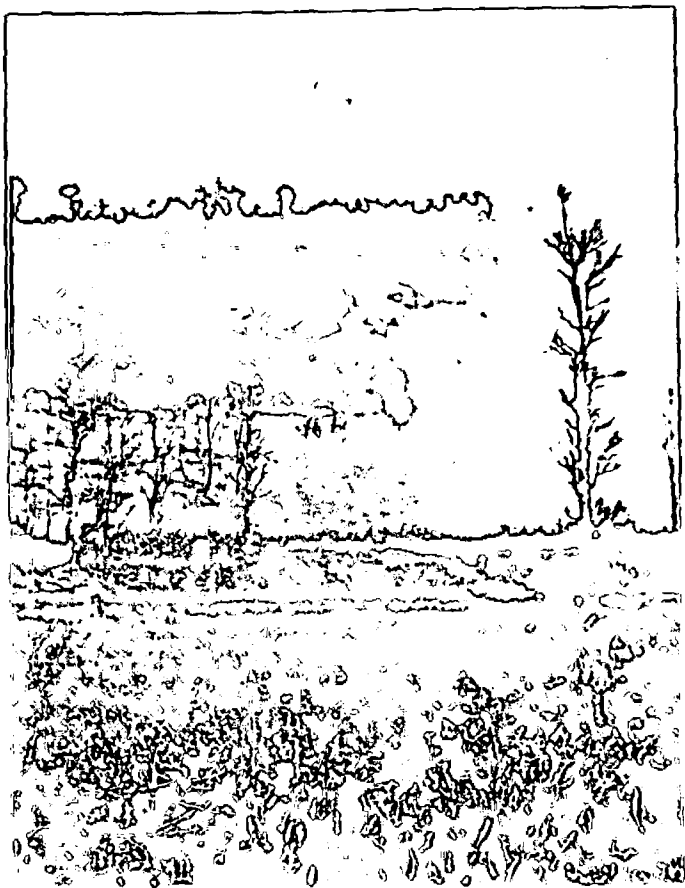


A POTENTIAL HORTICULTURAL LAND WITH GENTLE SLOPES
AND THEIR SOIL COVER.

Plate 3



AGRICULTURAL FARMS:
PADDY AND COCONUT PLANTATION



RAB SYSTEM
ECOLOGICALLY HARMFUL AND WASTEFUL USE OF RESOURCES



TERRACING IN SUBMOUNTANEOUS SUB REGION FOR
HORTICULTURAL PLANTATION

limitations of its own. For Sindhudurg horticulture accounts for 23% of the gross cropped area during 1990-91 while its share was only 19% in 1988-89. The horticultural crops grown are cashew, mango and coconut. However, commercial crops like groundnut are posing threat and resulting in marginal decrease in the cultivable area. Growing rubber *is going* to have good commercial prospects.

FOREST RESOURCES

The forest cover of Sindhudurg is only 6.8% of the total area which is grossly inadequate when compared to the desired level of 33% (17% for the State and 19% for the Country). Further, there is a depletion of 1.5% per annum - a dangerous trend.

The forest cover is spread over in Sawantwadi, Kudal and Kankavli and falls in the Sahydran range. The forest belongs to semi-evergreen type with a top canopy represented by Mangifera indica (Known as 'amba' in the region), Terminalia tomentosa (Ain), Mimosops elengi (Bakul), Petrocarpus Marsupium (Asan), Tamarindus indica (Chinch), Adina cordifolia (Hed), Hollarhena antidysentrica (Kuda), Mitragyna parviflora (Kalamb), and Garcinia indica (Phuiand).

The middle canopy is formed by Olea dioka (Parjambul), Aflantia monophylla (makadlimbu), Grewia filiacfolia (Dhaman), and Vitex altissima (Bulgi).

The undergrowth consists of shrubs Grewia micreces (Hasoli), Carrisa carandas (Karaunda), Calycopteris floribunda (Ukshi) and Hollarhena antidysentrica.

The area delineated as semi evergreen forest is to the extent of about 10% of the district area out of which 28,988 hectares is notified one while 22,562 hectares belongs to private ownership.

Besides this, the South Indian moist deciduous forest in the district is composed of edaphic variations viz., forests on red lateritic soil and laterities and forests on sandy loams. The important species is *Tectona grandis* ^(teak) which thrives well on sandy loams and also in moderate laterite soils. The percentage of teak is upto 30% in both the edaphic variations. It is associated with *Terminalia tomentosa*, *T. Panciulate*, *Lagersroemia trifuga*, *Xylia xylocarpa* and *Salmnalia malabaricum* (Bombax).

The middle storey of the forest consists of *Alstonia Scholaris*, *Pterocarpus marsupium*, *Artocarpus integrifolia* ^(Jack Fruit) and *Dalbergia latifolia*.

The undergrowth is made up of evergreen or semi-evergreen shrubs and bamboos.

Most of the deciduous forest is of private ownership and stretches to the extent of 66588 hectares the district area - IRs Data (cf. Map).

A patch (about 4112 hectares) near Chankul in Swantwadi represents degraded forest area.

Industrial timber and fine wood is the major forest produce both in terms of value and quantity. The minor forest produce are bamboo, honey, wax, Agave and grasses. Sawantwadi is one of the major contributor for the forest products (especially wooden toys, fruit display boxes).

MARINE RESOURCES - LIVE STOCK RESOURCES & POULTRY

Out of 1720 Km long coast of Maharashtra, almost 21% falls within the Sindhudurg district and constitutes an important fishing centre between Bombay and Goa. The activity is on rise because of mechanisation of fishing boats and increase in the number of trawlers. As a consequence, processing plants and ice factories have come into being recently. Despite the fishing activity of the Sea, the coastal fishing "Rapan" deserves attention for it is a costly operation due to the Khajan lands along the coast and creeks. Brackish water fisheries is also an important activity. There appears to be a scope for fresh water fisheries.

About 80% of people consume fish and in view of the growing demand, fisheries has an immense potential for further growth. More than 25% population of the district is related with this activity and needs a comprehensive planning for those involved in this profession. Despite some efforts and investment, no special optimal efforts were made for promoting the employment avenues and increasing productivity. The entire activity is centred around many small scale market networks which are ill organised for lack of cold storage or dry yard preservation. The length of the coastline available for fisheries is about 121 Kms and the population of fishing families is 9835; number of villages involved are 159, number of trawlers is 240 (not mechanised) and 105 mechanised. The figures in itself reflect that fisheries have a potential future.

Fish catch centres are located in almost all the coastal taluqas of which Devgad, Malwan, and Vengurla are important one. Some of the methods employed are 'Rapan' gill net fishing. Trawlers, Purse-sein net fishery and fishing by small mechanised boats.

Fishing farming is presently not prominent but experiments in Goa and Andhra Pradesh have established their future economic viability. Though potential was estimated in the past, it indeed needs more scientific investigations.

The recommended norms for accommodating number of boats per port are less than 50 for smaller ports and 51-100 for larger fishing ports (86).

As pointed out earlier, Sindhudurg has 12 important creeks out of which Vijaydurg, Mithbav, Achare, Mithumb'ari, Sarjekot, Wade, Kolamb, Tarkarli, Kochara, Mochemad and Redi are the important creeks for fishing. The other creeks are devoid of fishing activities.

In collaboration with the Central Institute for Fishers Education, Varsova and the National Institute of Oceanography, ^{at Goa.} probable sites like Mithbhav, Taramumbri Mochemad, Devgad, Vijaydurg, Achare, Jaitapur, Tarkarli, Redi, and Kochara have been selected for the promotion of brackish water fishery covering a total area of about 1000 hectares. In is context, it may be mentioned here that a well equipped brackish water fishery is under development at Sindhudurg.

With the policy of the government to provide stimulus for the development of fresh water (Sweet) fisheries, certain subsidies like 50% of nylon threads or 25% of cotton threads, exemption of Sales tax and other subsidies like seed purchase (33%) fertilizers and fish food, lake improvement, construction of fisheries tank and purchase of seed for seed ponds are offered.

There are certain difficulties that are encountered in the fish farming. Of all these, uncertainty of catch is of primary concern. Lack of information about the availability of fish in the area to trawler operators also hinders the activity. Further, often uneducated persons are engaged in this activity who in fact need training and require education; conflicts between trawler operators and fisherman (Rampankars) of one or other areas also affect the normal catching activity. Another aspect that deserve consideration is the denudation of the tree cover and soil erosion thereby leading to the silting of the creeks, which are more favourable for biological operation of the breeding cycle and growth for fish breeding.

LIVE STOCK RESOURCE AND POULTRY

No doubt agriculture is the primary occupation for the district but has its own inherent limitations. In order to supplement the lacuna that arises out of agriculture, Live stock farming has become a subsidiary for livelihood. Cattle, dairy and poultry development are coming to forefront due to the recently introduced project of Co-operative movement for the benefit of small farmers.

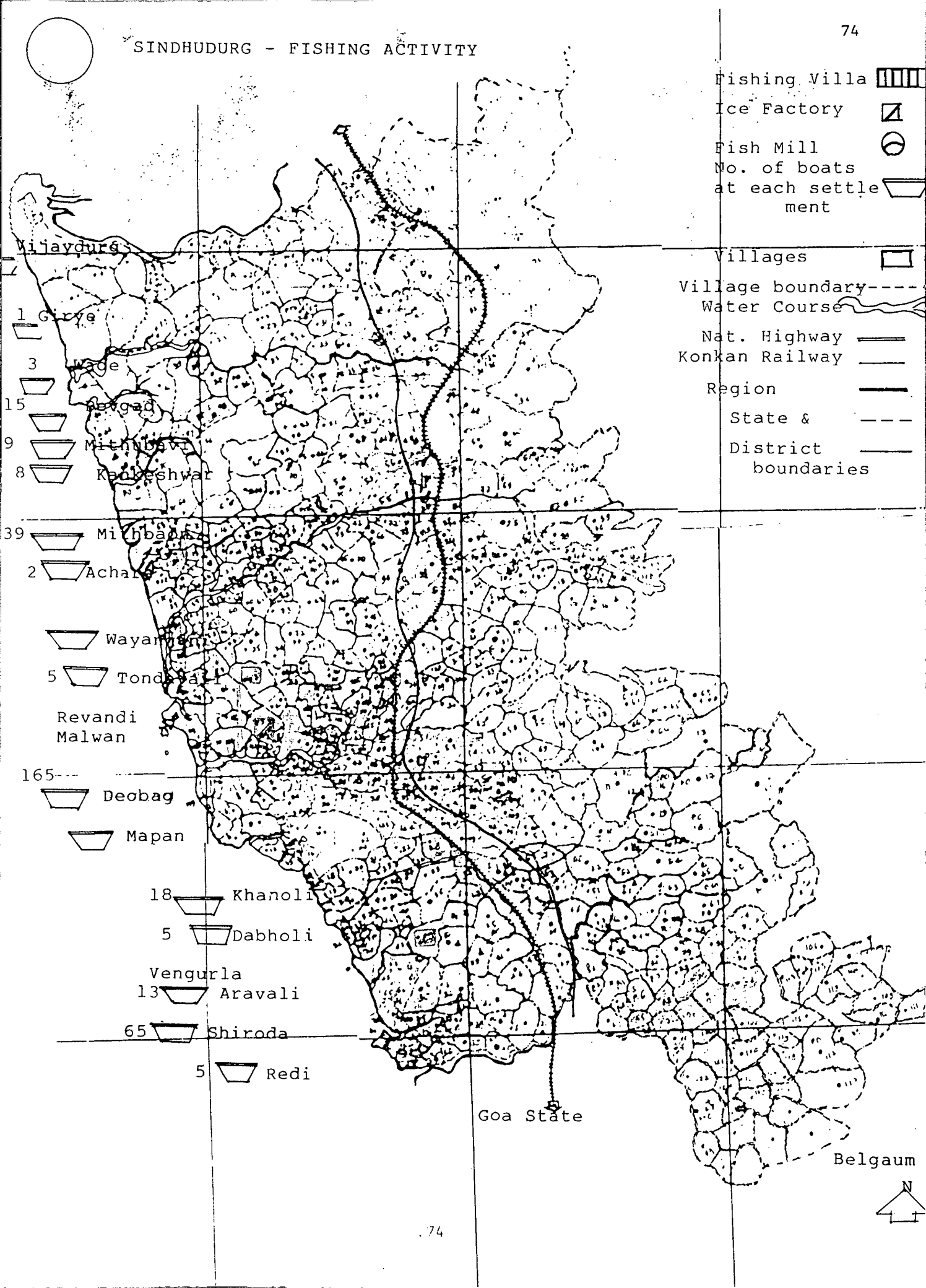
Animal husbandry sector, though lucrative, is not able to get established on a scale as expected for lack of quality breed animals. According to local sources, the yield per animal is particularly very low in Sindhudurg when compared with the surroundings.

Despite the discouraging trend, the dairy development activity has been on the increase. Milk to the extent of 9700 - 16800 litres (from 1975 - 1993) is being sent to Bombay which in turn brings cash to the tune of Rs. 35 - 40,000 per day. The cattle and dairy development programme encounters problems, ^{like} inadequate grass and feed, technical guidance with regards to veterinary aid, transportation and adequate finance. The activity need to be organised on a scientific basis to make it both supplementary as well as an independent.

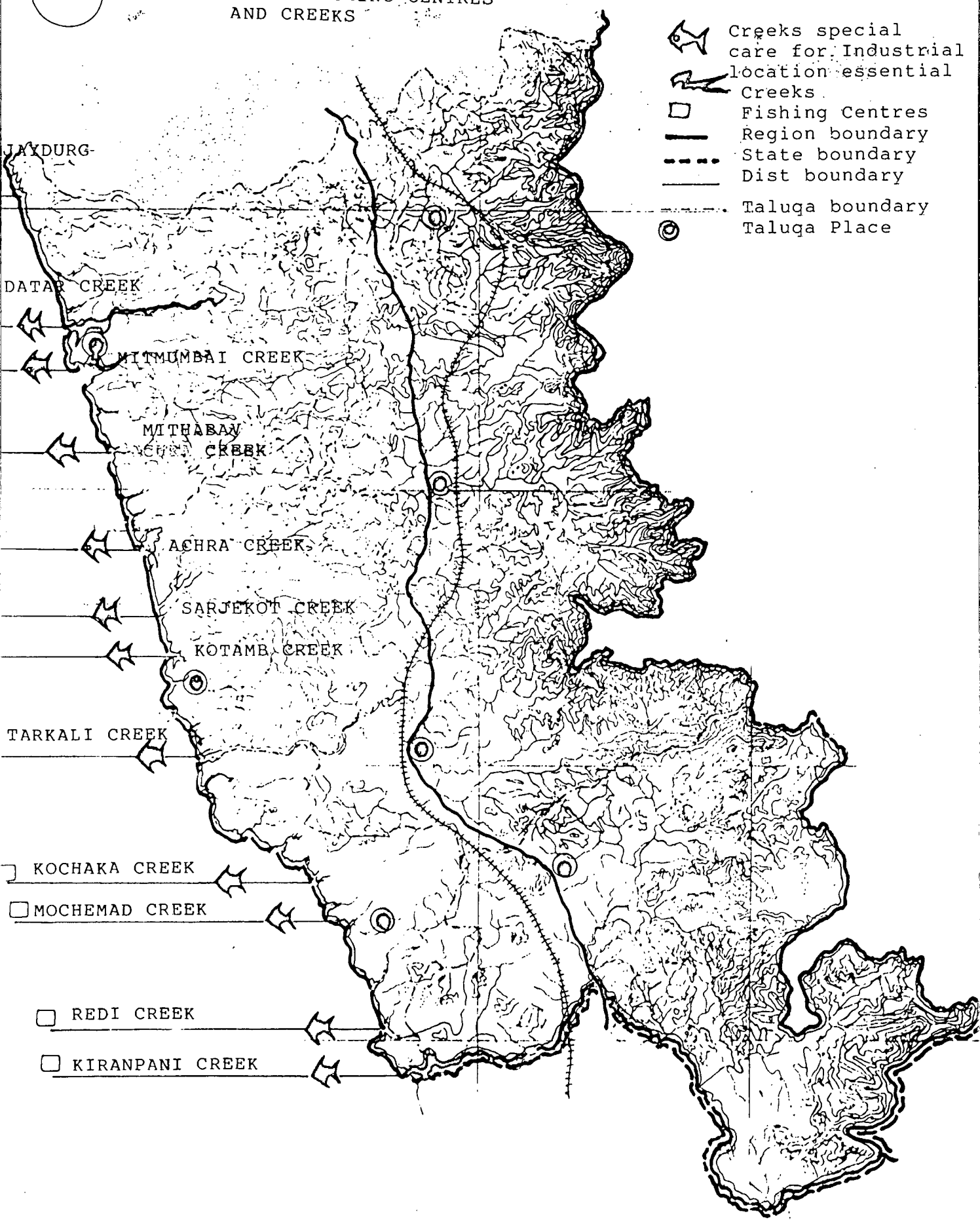
The present estimated milk collection during the last decade is on the increase, for 72,400 litres, 96,500 and 1,25,000 litres are the figures available from the District Dairy Development Office for the year 1984-85, 1990-91, and 1995-96. It is expected to increase to 1,55,000 litres during 2000 - 2001 A.D.


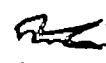






Sindudurg has the highest number of poultry birds ~~compared~~ compared to the other districts of the State. It is estimated that there are over 7,000 poultry birds of which more than 50% are egg laying one. The estimated need of 40,00000 eggs is much less when compared to the local needs and those of nearby market centres like Bombay and Goa. In order to meet this requirement eggs are obtained from Kolhapur and Belgaum.

SINDHUDURG - FISHING ACTIVITY



SINDHUDURG - FISHING CENTRES AND CREEKS



-  Creeks special care for Industrial location essential
-  Creeks
-  Fishing Centres
-  Region boundary
-  State boundary
-  Dist boundary
-  Taluqa boundary
-  Taluqa Place

JAYDURG-

DATA CREEK

MITUMBAI CREEK

MITHABAI CREEK

ACHRA CREEK

SARJEKOT CREEK

KOTAMB CREEK

TARKALI CREEK

KOCHAKA CREEK

MOCHEMAD CREEK

REDI CREEK

KIRANPANI CREEK



ECOLOGICALLY HARMFUL PRACTICE OF DUMPING IRON ORE
REJECTS DIRECTLY INTO THE SEA AT REDI.

MODES OF TRANSPORT

Surface transport plays a significant role for the development of any area. Till recently, in Sindhudurg transportation was dependent on Kacha roads. In the past, the main communication link was via Kolhapur or Patha (Satara district); Mahad - Bhore - Pune). It is with the laying of National Highway 17, transportation has considerably improved including the internal transport.

Unfortunately the total length of the Highway that passes through Sindhudurg is not very long (only 4.55% of the total). The major roads within the district are also not adequate. Precisely, the situation of the existing (position roads is: National Highway 86 Km, Major State Highway 151 Kms, Ordinary State Highway 569 Kms, District Roads 689 and 619 Kms existing, while the Village roads run upto 1036 Kms.

Thus the total road length for Sindhudurg per 100 Sq. Kms is only 66 Kms, which is certainly higher when compared to the State (56 Km). This is not adequate against the background of topography, human habitation and widely scattered natural resources.

The situation becomes apparent from the fact that the district stretches from North to South with a indented coastline on one

side and hill slopes on the other with undulating narrow strip in between. Because of this, the roads have many curves, bends and slopes which infact tends to increase only the road length. As far as this district is concerned, 93% of the population lives in rural areas and road is obviously the only transport link whether usable or not during all the seasons.

The forest areas and coastal regions are not connected by all weather roads. No doubt the district has higher average road length than that of the State is a poor consolation for the existing network does not connect all the villages and rapidly growing markets.

The coastal route along Konkan towards South remained neglected and unbridged for a very long time resulting in the backwardness of the region. The section between Diva to Panvel, Panvel to Apta, and Apta to Roha was connected in 1964, 1966 and 1986 respectively.

The newly *constructed* Konkan Railway is going to reduce the distance between the following cities on the west coast.

The distance between Mangalore-Bombay from 2041 Kms to 914; Mangalore - Ahmadabad 2653 to 1358; Mangalore - Delhi 3033 to 2249; and Cochin - Bombay 1849 - 1336 Kms. This undoubtedly would save the time, fuel, haulage time and facilitate to switch

over from road to rail with an expected savings of Rs.200 crores on fuel alone.

Sindhudurg remained under-developed due to the absence of such vital rail transport link.

Mumbai and Dabolim (Goa) are the nearest airport to the region. Another airstrip at Thane near Ratnagiri was in use (Jan.1978 to Dec.1979) for passengers from Bombay to Ratnagiri. There is a proposal to introduce a small aircraft service but unfortunately the route is not in operation.

Inland Waterways

In the past navigable water ways and minor ports were crucial commercial transport links for Sindhudurg and the surroundings. They need reviving for making them navigable for they were neglected.

It is not very normal to build roads in the region due to undulating landform terrains and creeks which ordinarily necessitate the construction of bridges - a highly expensive proposition.

Coupled with this state of water ways, railways are also conspicuous by their absence. These two situations resulted in the retarded growth of the district as transport is pivotal for any activity.

A general observation reveals that coastal shipping on the whole is drying up in the country. Revival will not only serve the coastal areas but will help in opening the disbanded inland waterways.

The newly laid down Konkan Railway will go a long way in serving the region by providing inter district movement of bulk commodities and manufactured goods. Inadequate transport facilities, to a great extent are responsible for the retarded development of the district specially the industrialisation. Indeed

this situation has virtually cut off the district from various parts for marketing the finished products. Perhaps, it is for this, many units of the district operate at sub-optimal capacity and are unable to diversify. The whole scenario will change when the neglected coastal lines and inland waterways are restored.

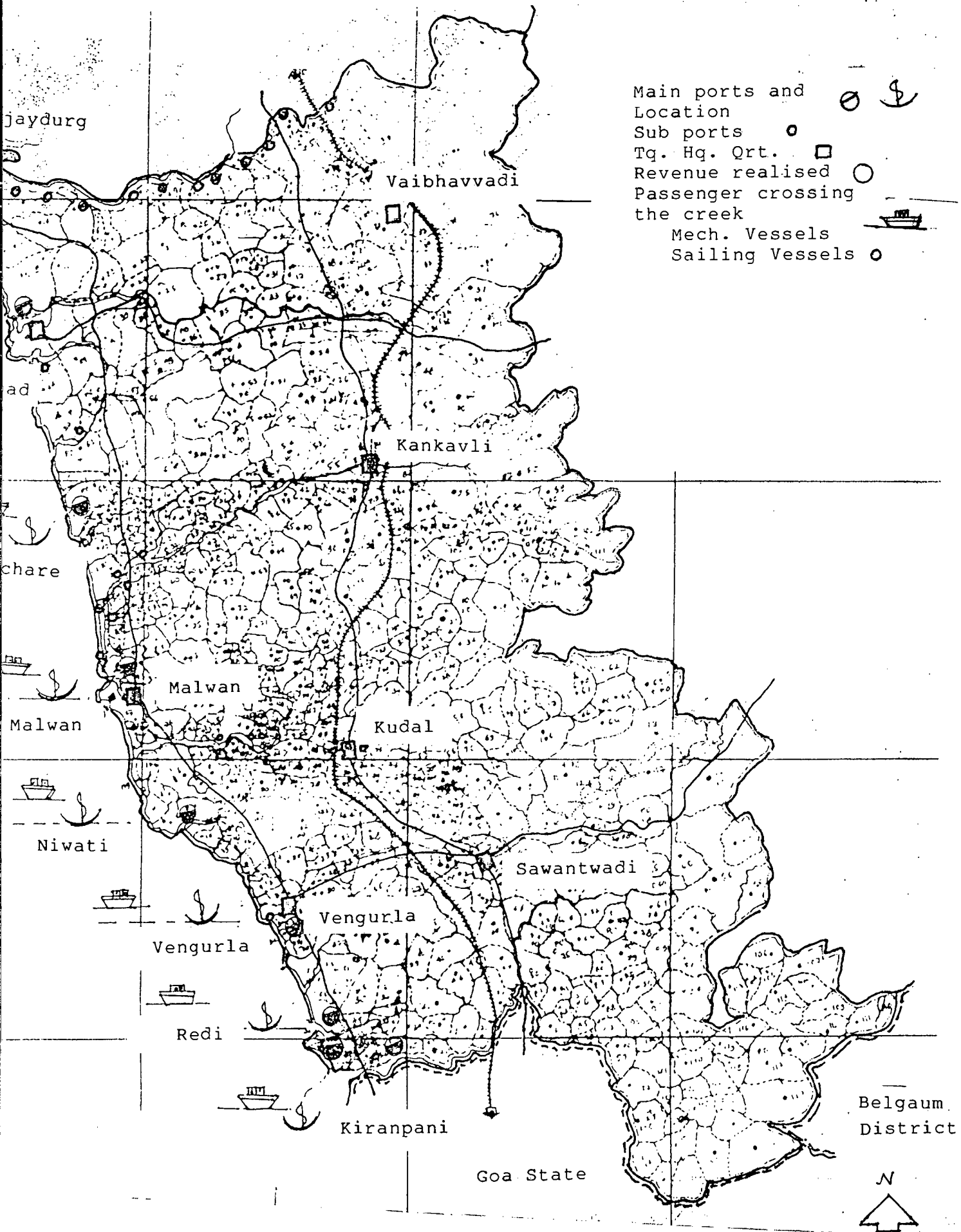
In all there are 78 small water transport routes in the belt, of which 42 are in Ratnagiri and 36 in Sindhudurg.

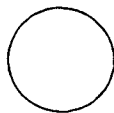
Building material is imported to the tune of 38,774 tonnes representing 86% of the total import. In addition, Dabhol, Bankot and Ratnagiri are three other important ports where from building material is imported in large quantities.

From Redi port, iron ore from Vijaydurg and Kiranpani bricks, sand and tiles; from Dabhol, Boria, Jaitapur, Vijaydurg timber; food grains and pulses from Bankot, from Jaitapur Vijaydurg, Achara, Malwan fish; salt from Harhai, Boria, Varoda and Bamboo from Vijaydurg are exported.

Following figures indicate the Revenue realised from ports in the region when Sindhudurg came into being.

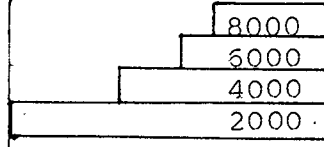
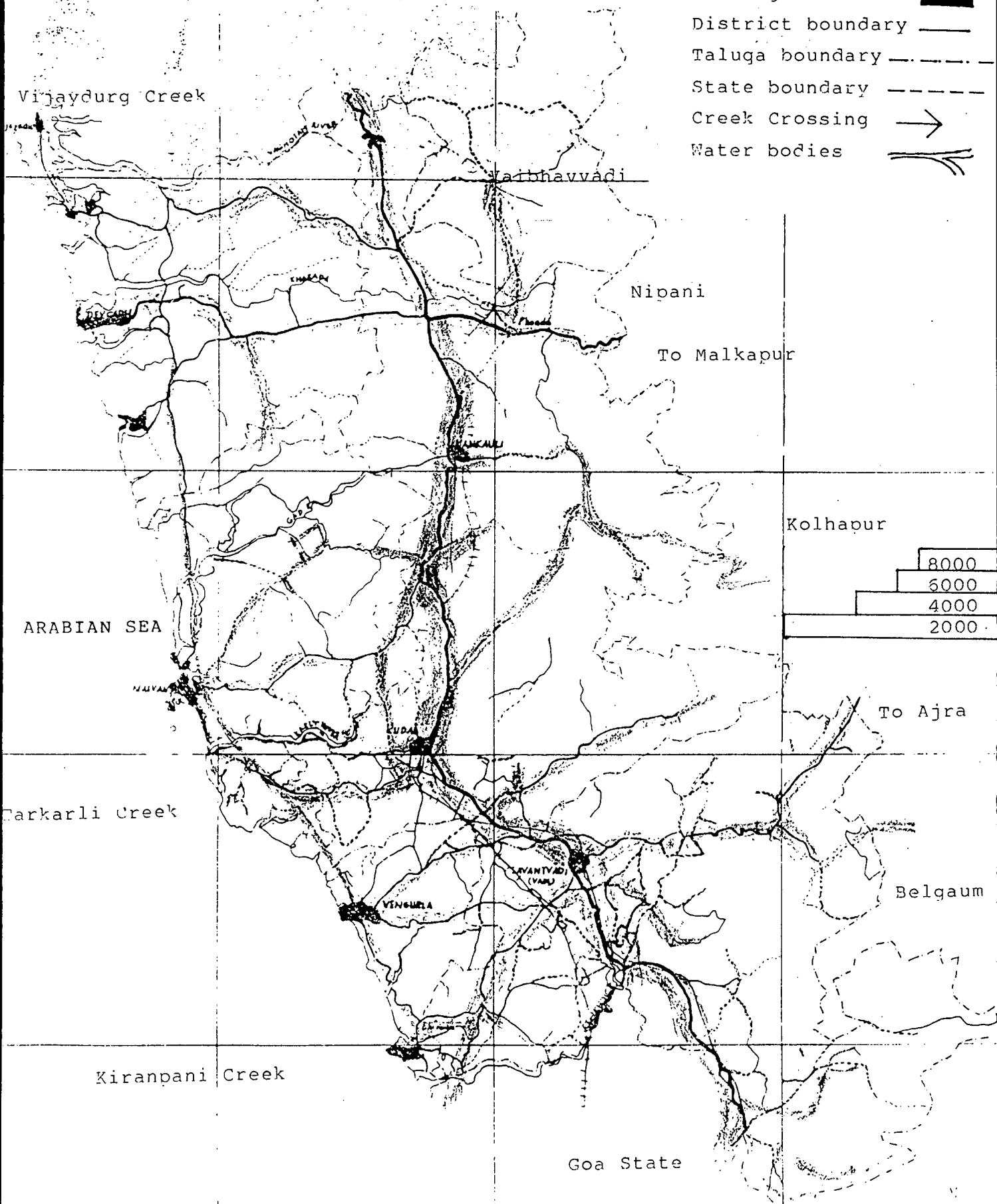
Name of Port/s	Port dues	Passenger Fares	Passenger Licence Fess	Jetty Cess	Ground Rent	Building
1	2	3	4	5	6	7
Bankot	2828.00	5425.30	420.00	-	1524.00	-
Kelghi	26.40	-	50.00	-	-	-
Harhai	998.50	-	150.00	-	-	350.00
Dabhol	4896.70	11200.20	1170.00	-	300.00	2464.50
Palshet	1.75	-	-	-	14.00	-
Boria	182.95	-	-	-	130.00	-
Jaigad	10930.60	4033.20	210.00	794.00	-	480.00
Tiwari (Varoda)	88.60	10.00	-	-	-	-
Ratnagiri	8953.60	-	880.00	-	6442.23	39406.00
Durnagad	221.30	-	50.00	-	-	-
Jaitapur	9761.24	-	950.00	17.90	450.00	18.00
<u>SINDHUDURG</u>						
Vijaydurg	1907.25	-	365.00	-	186.20	-
Devgad	2795.81	-	250.00	128.00	1267.93	-
Achara	150.20	-	120.00	-	-	-
Malwan	1486.97	-	580.00	-	-	15.00
Niwati	-	-	20.00	-	-	-
Vengurla	40.33	-	-	-	688.00	605.00
Redi	199511.60	-	790.00	-	8716.60	31889.90
Kiranpani	853.15	-	250.00	-	835.30	-





SINDHUDURG - INNER PASSENGER MOVEMENT AND TRANSPORT

- Passenger flow
- District boundary
- Taluqa boundary
- State boundary
- Creek Crossing
- Water bodies

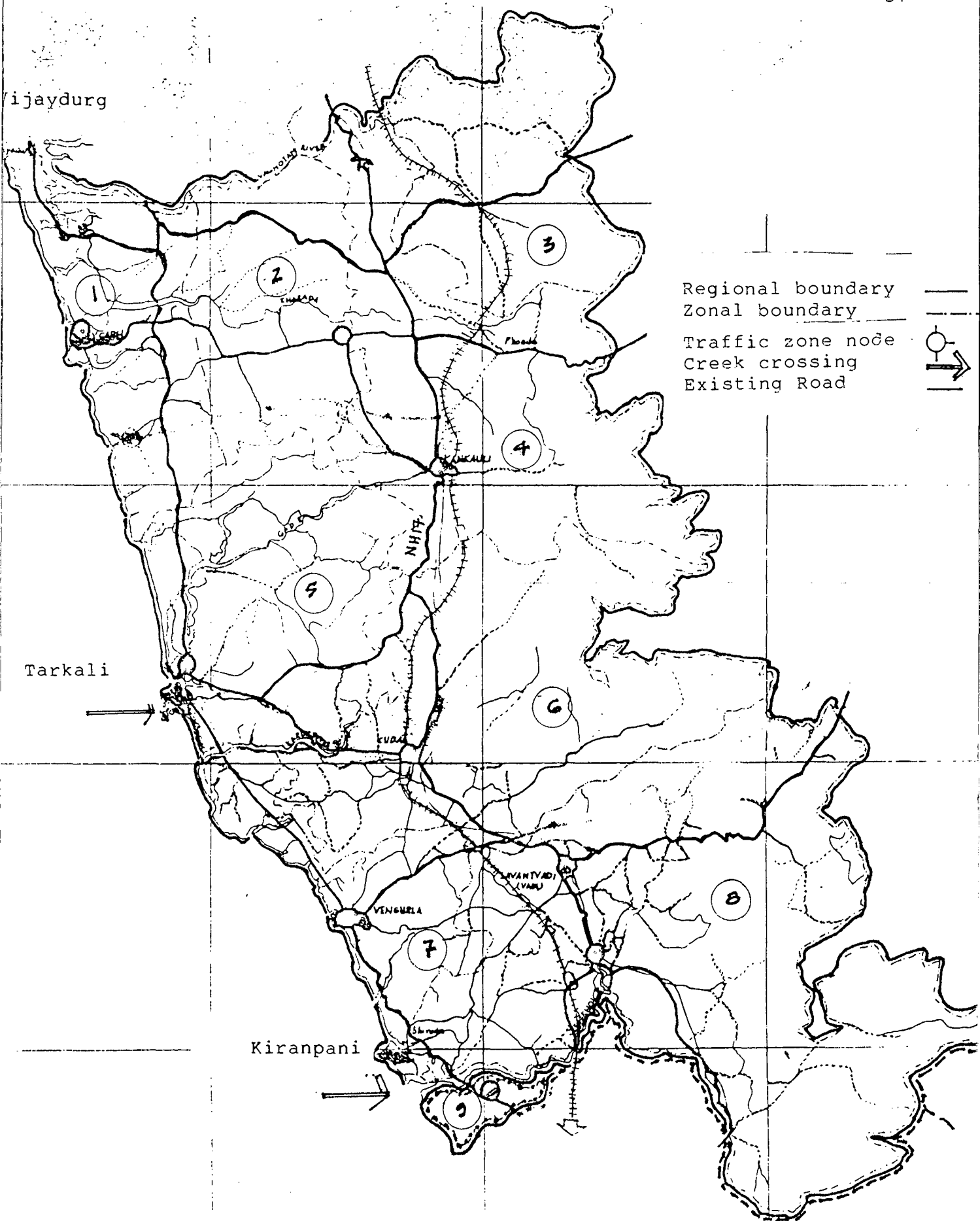


To Ajra

Belgaum

Goa State

SINDHUDURG - SURFACE ROADWAYS ZONES AND RAILWAYS



POWER SUPPLY AND INDUSTRY

The region was a major power generation source - Koyna Hydroelectric Project since 1962. Radhanagari and Kudal feeders pass through Sindhudurg towards supply to Panaji. Infact this promoted industrial activity at Kudal, head quarters of the district. The Divisional Headquarters of the Maharashtra State Electricity Board (MSEB) is located at Kudal with sub-divisions outside the district. 33 KV line was connected in 1980. Under rural electrification programme, the MSEB is making efforts to supply power to almost all the villages. The position of supply when the district was formed is as below.

Name of Taluq	No. of Villages electrified	No. of Villages not electrified	Total No. villages
Kankavli	362	5	367
Kudal	59	18	77
Sawantwadi	72	49	121
Vengurla	17	-	17
Devgad	52	12	64
Malwan	48	10	58
Vaibhavvadi	29	8	37
Total Sindhudurg Dist.	639	102	741

(Courtesy: Executive Engineer, MSEB, Kudal, Chiplun and Ratnagiri)

Attempt is in progress, to connect supply lines to all the villages but is under severe impediment due to 'Wadi' pattern which prohibits supply to all intending consumers.

It is really very disheartening to note that the district has no industrial unit involved in manufacturing or processing goods on an appreciable scale. The Units/ establishments that are functioning presently are of extremely small type and are of processing type. As a consequence the non agricultural sector depends on the village and cottage industry. Precisely, the village artisans are compelled to take up the traditional lines of producing goods/articles that are required by the local population using locally available raw materials.

Some of the Small Scale Industries of the district are processing of cashew nut, preservation of fruits and silica processing. Other units (registered) are Oil mills, Cement products, Saw mills, Sodium Silicate laundry soap, printing and book binding. Besides, manufacture of beedis products of cement products and construction also provides employment opportunities.

Oni, Rajapur and Sawantwadi are well known for handlooms. The 'Rajapuri Panckas' are famous all over. Decorative pieces of fine quality and wooden toys manufactured at Ratnagiri and Sawantwadi have their own uniqueness.

On the whole Sawantwadi, Malwan and Vengurla are the prominent centres of the district for trade.

MINERAL RESOURCES

The district Sindhudurg appears to be favourably placed with regards to mineral wealths which are important in their own way and undoubtedly would contribute to the prosperity, if explored and exploited properly. The value of the minerals of the district is on an average 7-8% of the total of the mineral produce of the State.

Manganese and iron deposits are found in Vengurla, Sawantwadi, Malwan, Redi, Danda, Tirwade and Aros (Southern parts). Near Vijaydurg and Devgad, deposits of bauxite are found (coastal area). At a small delineated area near Redi port, cluster of iron ore mines are located (about 1079 hectares) approximately 02.% of the district area. It is also found at Phonda, Netarde, Digwe, Talkat Morgaon, Adali, Dingane, Galel, Dongarpal and Talkat. The mining areas are relatively small which gradually merge with surrounding hard laterite exposures forming a barren, rocky waste sheet area.

Silica reserves are to the tune of 47 million tonnes which extend to the areas of Phondaghat Kasarcle,, Math, Vettore, Tendeli-Nevur, Walwal, Chendwan Paikaothi and Are. Large reserves of Sea sand also occur on the beaches of Shiroda, Aravali, Mochemad, Ubhadanda, Khanoli, Kalethay and Vayani area. Silica mines are also located very close to the villages of Karul and Banda.

A good quality of potash felspar is found near the Kadaval village in Kudal Taluqa (upto 1 million tonnes).

A poor grade soap stone occurs at various places like Kirlos, Asgani, Bidwadi, Akeri and Kudase villages of Malwan Taluqa. It is often used in the manufacture of insecticides and pesticides (as dust) pottery, mosaic tiles and ceramic industry. The total reserves are to the extent of 6 million tonnes.

China and other clays of sedimentary origin are found at Kumbharmath, Malwan, Telegaon, Otavana, Guramwadi, Chopekhol, Gaurai, Kudal, Anau, Bibavane, Terse, Bombavde, Valval, Pat, Kochara, Malpan, Takubhandana, Sawantwadi, Nemale and Talwade. Of all these deposits, the one found at Kumbharmath and Otavana are of importance and the deposits are to the extent of 94500 tonnes and 10700 tonnes suitable for white wares but can be used for the manufacture of glazed stoneware pipes and moderate low duty fire bricks. Also, after washing and blending with suitable plastic clays can be used for ceramic products (where final colour has no preference). The clay of Otavane need blending to make it more refractory and is used in heavy duty fire clay refractors (B-Group).

Areas like Kankavli, Janavali and Vagde have chromite deposits where the available grade of the ore is about 34.5%, 39% and 20% respectively. It is not suitable for direct use in chromium, refractory and chemical industries.

Mica deposits occur at Sawantwadi, Kudal, Kanakavli and Malwan (muscoite mica). Gresien mica, economically important with faint ruby, yellowish, greenish or colourless - is about 10-12" across and about 1" thick is also available.

Occurrence of lead and barite has been recorded from Sakpalwadi of Vaibhavvadi tahsil.

Three small deposits of lime stone are located in Kasarda, Navkarwadi, Kosisaye. The limestone of Kasarda is dark grey in colour.

Traces of copper deposits without feasibility of extraction have been recorded in Hodwada (Vengurla).

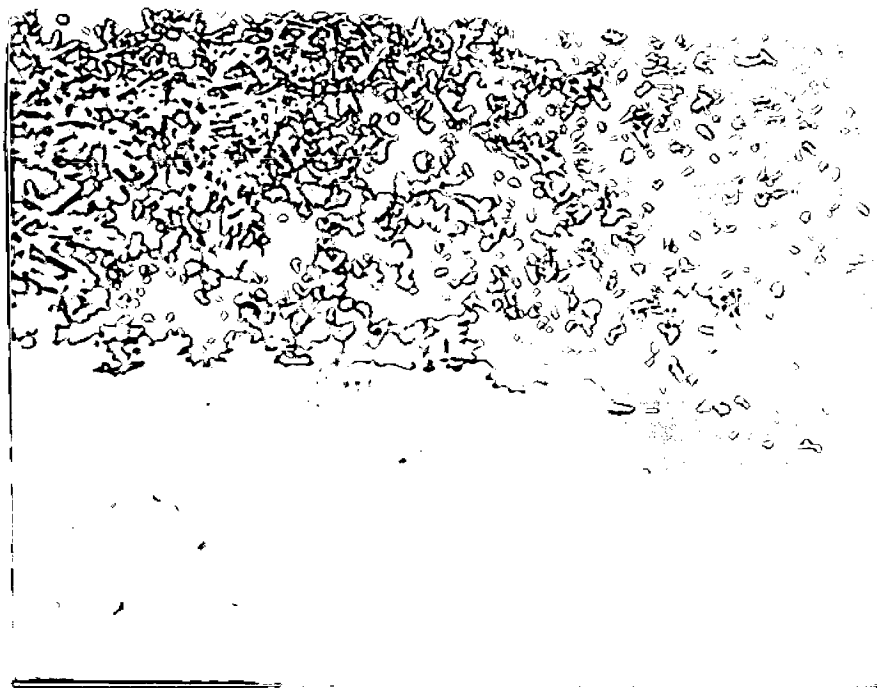
Laterite occurs as their capping on top of the Deccan trap plateau at an elevation ranging from few hundred mts to 900 mts. It is in plenty in the coastal area (Madangad in the north to Dodamarg in the south). On exposure, gets dehydrated and hardens. It is a good quality building material.



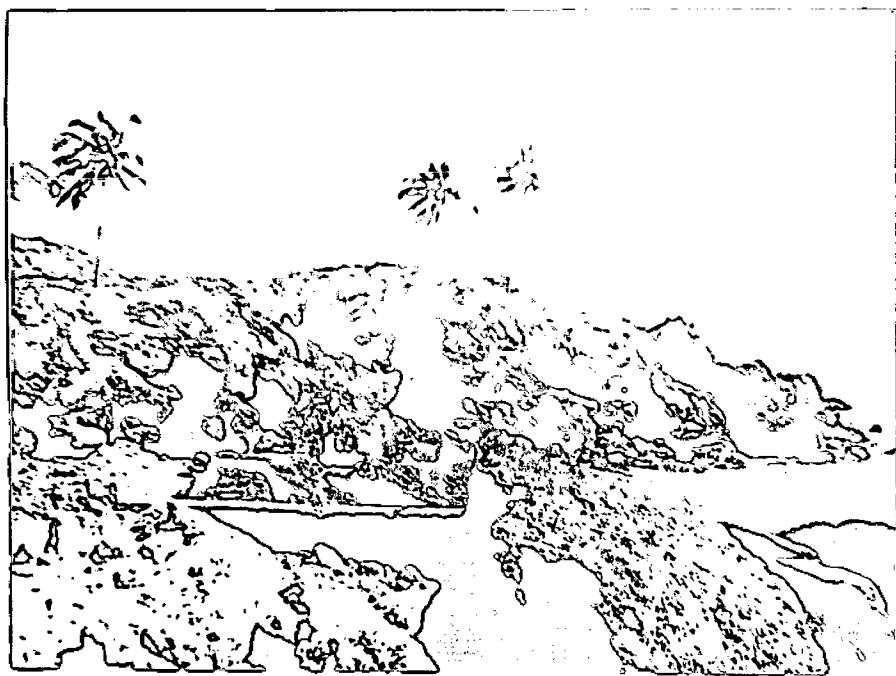
OPEN CAST IRON ORE MIXING AT REDI - POTENTIAL WATER SOURCE
SOURCE CREATED BY SUB SOIL WATER INTRUSION



ENVIRONMENTAL ILL EFFECTS OF MINING ON AGRO HORTICULTURE
DUST SEDIMENTATION - PROBLEM OF EROSION



NATURAL PROTECTION AGAINST COASTAL EROSION
VEGETATIONAL COVER OF IPOMAEA



ROCKY RIDGES ABUTTING THE SEA COAST, ENCHANTING LAND
SCAPE ALONG WITH COAST LINE

TELECOMMUNICATION NETWORK

In Sindhudurg 66% of the rural population of the villages have post and telegraphic facility. Kankavli having highest percentage of villages have about 82% facility. Infact, these villages are serving approximately 91% of the rural population. Post and Telegraph offices per lakh population correspond to 41.5 and 5 in number while telephones number to 9.13 per lakh population. Facilities in respect of telephones and telegraph offices indicate that the 7 taluqas have some facility or the other. Over all there are 15 centres with telephone facility and 10 centres with telegraph facilities of which Vengurla and Vaibhavvadi have the least numbers of settlements with telephone.

During the year 1989-90, it was estimated that Sindhudurg had 302 telephones per lakh population compared to 530 in Maharashtra (excluding Greater Bombay) and 622 for the nation. The poor telecommunication network of Sindhudurg is a reflection of its economic backwardness. Kudal, the District Headquarters is linked with the rest of the country and also outside through Electronic exchange with STD and ISD service.

SINDHUDURG - A TOURIST'S DELIGHT

The district has several spots which are attractive and many tourists visit places of interest from Goa.

Beaches of Devgad, Malwan, Vengurla, Redi and Kochare are very beautiful and comparable with those of Goa. Taluqa wise important tourists spot are summarised as below (Cf. Map).

Sawantwadi:

Terekhol - Creek fort

Amboli - Hill resort

Shirgaon - Ramgad - Scenic beauty of forests

Hiranyake - Origin of the river

Ujain - Temple of Lord 'Shiva'; Bamboo and cane centre,
Wooden idols of Phantom.

Insuli - Folk Art Collection

Banda Agriculture farm

Kolgaon - Fort and Religious place

Kiranpani - Creek

Tillari - Irrigation Project

Palye - Pal Forests

Choukul - Wild life sanctuary

Vengurla

Kochare Beach

Mivati - Beach Alphonso Marg Research Centre, Jetty and fishing Centre.

Vengurla - Harbour

Hedadi - Harbour, historical places, temple of Lord "Ganesha".

"Ubha - Danda", Woods and beach *and mango gardens.*

Netore - Hot springs and a temple

Arona Beach

Parale - Temple of Adi Narayana

Pakhale - Place of worship

Kudal

Walaval - Lake and Temple of God "Rama"

Shivapur Fort of "Rajangad"

Mangaon Basin - Fort of "Manohargad" and "Santosh Gad"

Pinguli - Folk arts (Chitra Kathi) Museum, folk dramas

Nerur, Bhadgar and Rasoli forests

Pavashi lake.

Malwan

Malwan - Historical Sindhudurg Fort and Beach

Devbag - Beach

Achara - Temple of "Rameswar"

Dhamapur - Temple, Lake and Forests

Revandi - Beach

Devgad

Girye - "Rameshwar" Temple

Devgad - Canes, beach, historical and worship places, and fisheries centre.

Kunakeshwar - Temple of "Kunakeshwar"

Wada padel - Ancient Caves

Mithbav Creek Beach

Kankavli

Phonda Ghat

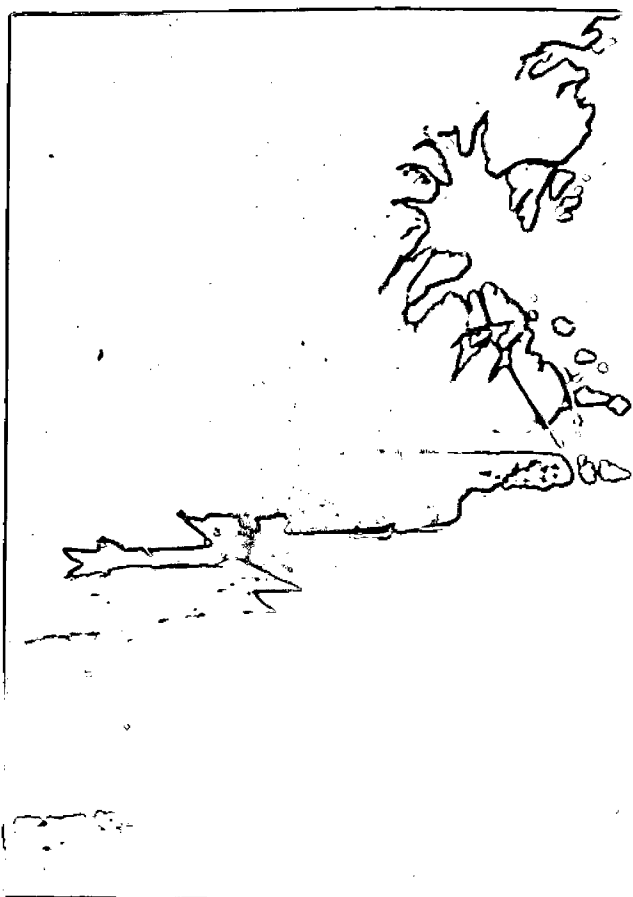
Nandgaon - Agricultural Farm

Kankavli - Ashram of Bhalchandra Maharaj

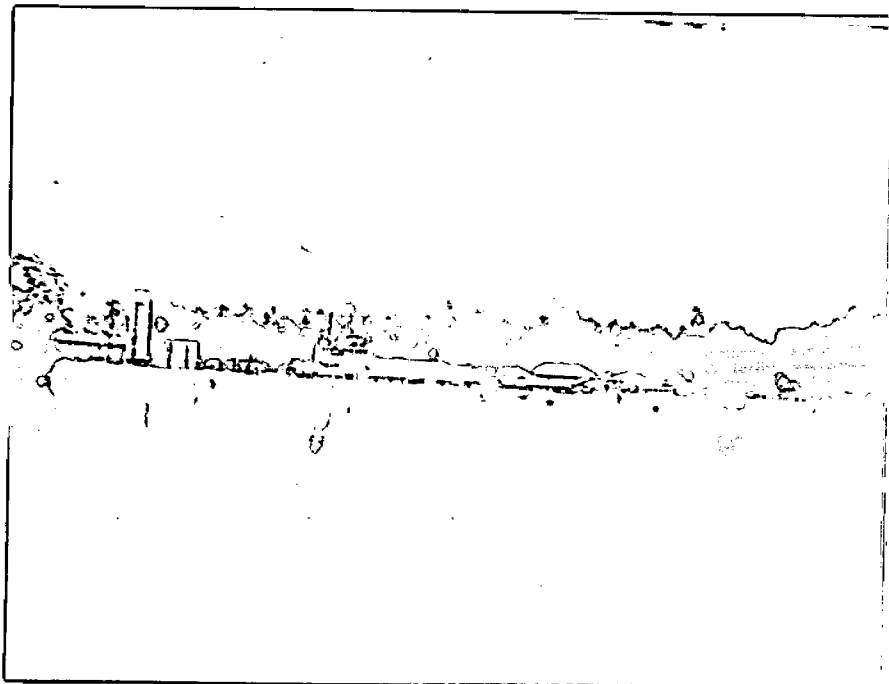
Bhirande - Temple of Lord 'Rama'

Gagangad - Gangagiri Ashram (Vaibhavvadi)

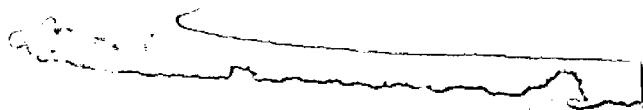
Kumbhavade and Digavale forests



TOURISM POTENTIAL OFFERED BY CREEKS AND ESTUARIES
IDEAL VENUE FOR WATER SPORTS



SAWANTWADI LAKE:
A POTENTIAL TOURISM SOURCE

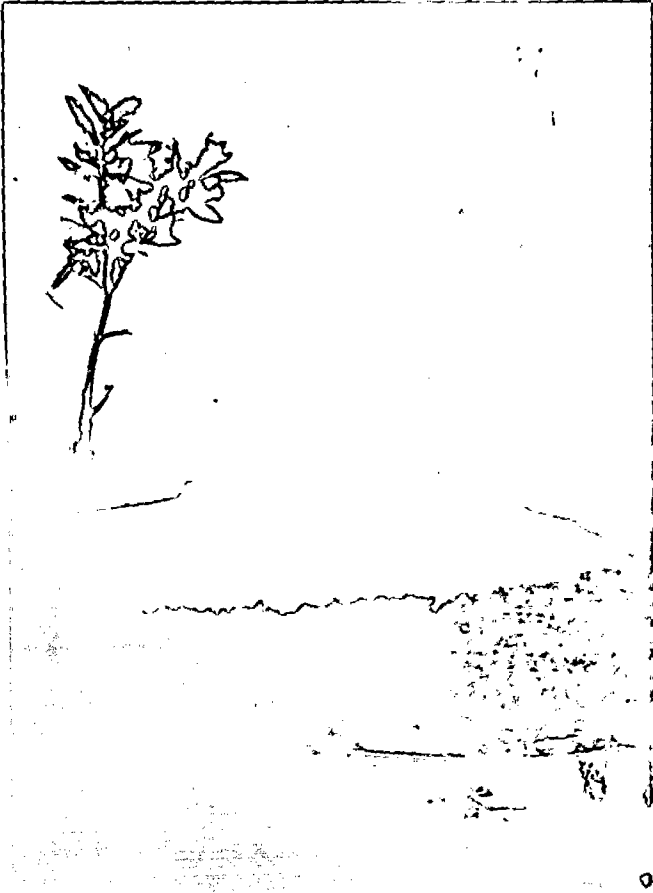


SANGAMESHWAR VALLEY - ONE OF THE SCENIC AREAS ALONG
NATIONAL HIGHWAY (17) OFFERING WIDE RANGE OF TOURIST
INTEREST

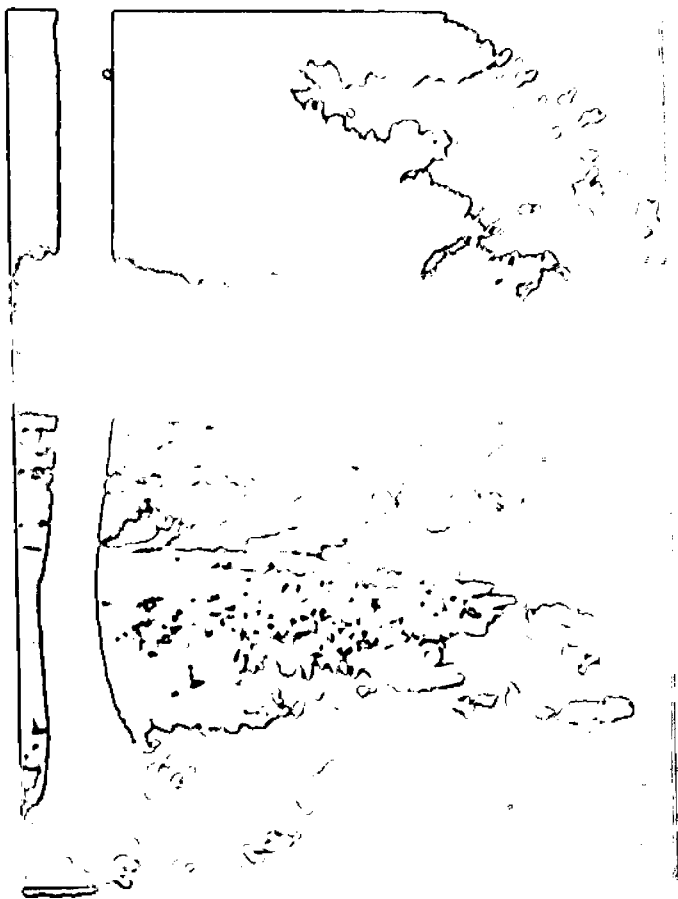
Plate 14



NANDHUDURG FORT AT MALWAN
HISTORICAL AND ARCHEOLOGICAL MONUMENT LOCATED
THE MIDST OF PROPOSED MARINE PARK.



NATURAL PROTECTION AGAINST EROSION OF THE ESTUARY BANK
MANGROVES AS BREEDING PLACE



NEED FOR LARGE SCALE PLANTATION
ALONG THE HILL SLOPES TO COUNTER THE EFFECTS
OF SOIL EROSION

DEMOGRAPHY

The total population of the district is 8,34,152 (Census, 1991) while it was 7,76,346 (Census, 1981) indicating an increase.

The population is distributed in 3 belts exhibiting social and physiographic subregions. Concentration is seen along the sea coast and Bombay - Konkan - Goa Highway (17). The urban centres have a population below 50,000 while the population in villages (smaller settlements) is in the range of 2000-5000. The growth rates of Kankavli, Kudal and Sawantwadi were some what higher during 1961-1971 where as during 1971-81, the population of Kudal had fallen. During the last 20 years Malwan had shown only decline. Large scale migration of male population in search of employment and for urban life in the industrial belt of Bombay had resulted in dependent olders and female population left behind in clusters is characteristic demographic feature of Sindhudurg. Another feature that deserves mention for all the seven talukas of the district mostly depends upon the terrain availability of potable water, employment or farming in the uplands and pisciculture in the low lands.

The area of the district is 5087.4 Sq. Kms and the details of population (Class wise) are :

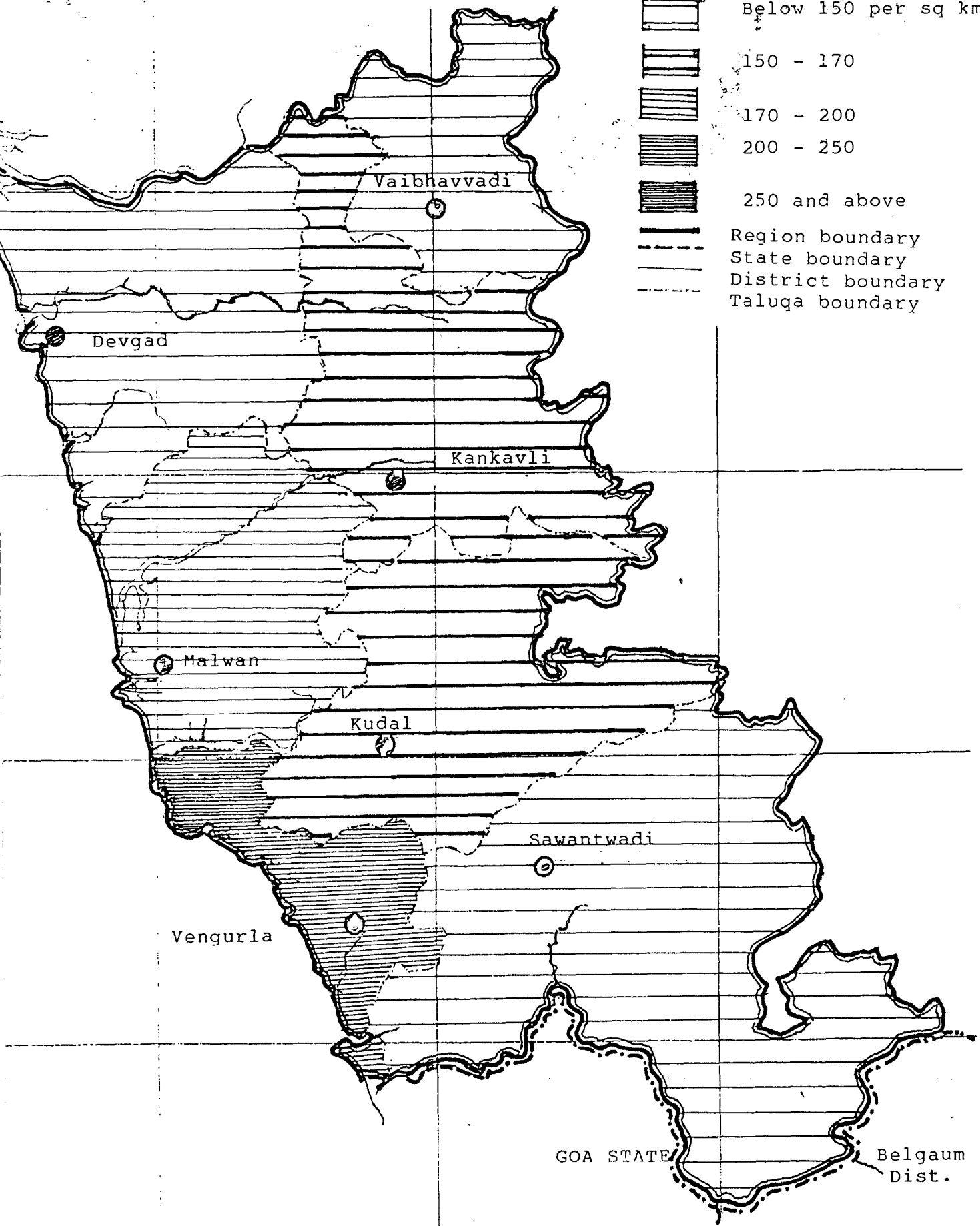
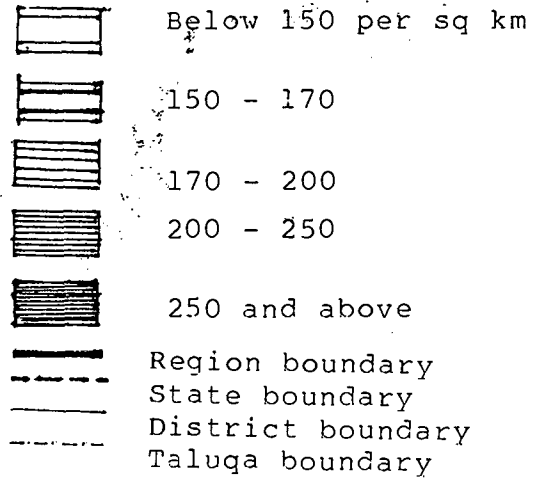
Characteristics	Resource Region	Maharashtra State	% with State
1. Area (Total (1991))	5,087.4 Km ²	3,07,690 Km ²	1.65%
2. Population (1991)	8,32,152	789,37,187	1.08%
i) Urban	63,243	305,41,586	2.07%
ii) Rural	7,68,909	483,95,601	1.58%
iii) Total	8,32,152	789,37,187	1.05%
3. Sex Ratio (1991) (Females per 1000 Males)	3,89,384 4,42,768	(Male) (Female)	
4. Literacy Rate (1991)	74.80 66.95 38.94	Total (Male) (Female)	
5. No. of Urban area (1991) Population	33.16 86.44 87.79	(Male) (Female) (Total)	
6. Proportion of urban Population	63,000	2061000	
7. Density per Sq.Km	160	225	
8. Urban area	4		

SOURCE: DISTRICT CENSUS hand book, 1975. SINDHU DURG.

Sex ratio was imbalanced in 1971 and still continues to reduce which is on account of male migration. The urban population of the district has reduced by 3.20% which perhaps may be due declassification of Redi from Urban to Rural. Kudal, Devgad and Vaibhavvadi represent rural while Kankavli has small new urban centre.

SINDHUDURG TALUQAWISE POPULATION
AND DENSITY

Population Density



EDUCATION AND MEDICAL FACILITIES

The villages of the district have primary education facilities through more than 1300 primary schools with one school exclusively meant for girls. There are villages which have more than one primary school (Devgad, Kankavli, Sawantwadi) while larger villages have even 3 primary schools. There are more than 500 middle schools. On an average there is one High School for every five villages. 16 Villages have Pre-University educational facility. It is interesting to note that the district has only one Degree College. The district is on the way to become cent percent literate (presently 97.79%). Devgad Taluqa appears to be the best with regards to educational facilities followed by Kudal, Vaibhavvadi, Sawantwadi and Malwan, Kankavli and Vengurla are next to these Taluqas.

There are 38 villages in the district which are devoid of any educational facility of these 20 villages fall in Kankavli and Vengurla. It may be concluded that Sindhudurg represents one of the best districts in the State in respect of Educational Facility and also Education, as far as literacy is concerned, the situation will be slightly different if age group 0-6 years is taken into account. Further, an individual who can read and write is classified as literate, whereas the one who can only read and not write is illiterate. To be literate no formal educational qualification is required. The number of literate persons for Sindhudurg is 548,276 constituting about 76% of the total population. The literacy rate for males is higher than that of the females. The rate of literacy for each Taluqa is different. Vengurla tops the list of huge taluqas, while Vaibhavvadi is at the bottom. The town of Sawantwadi with

89.41% literacy rate tops in literacy. The district as a whole exhibits 52.51% and 47.49% literacy rate for males and females.

Thus, there is a subtle difference between educated and literate. Apart from education, another vital aspect that deals with the health of the population is a Medical Institution of kind or the other. In all 399 villages out of 736 (inhabited) have institutions to cure the ailments. All the villages of Vaibhavvadi excepting two are provided with this facility, Kankavli and Vaibhavvadi have the highest and the lowest number of institutions ranging between respectively. The Primary Health Centres, sub-centres and dispensaries are not only serving the resident population of the village concerned but also those residing in the surrounding. This is because of their central location and are somewhat away from towns and tend to be large in population size.

Medical Institution of any type exists in more than 5 out of every 10 villages (in 1991) as against 3 in every 10 villages (in 1981). The villages account for 69% of the rural population of the district. Further 187 centres are situated at a distance of hardly 5 Kms with reference to nearest place having identical facilities. A group of 96 institutions are located at a distance of 5-10 Kms. With all these facilities, still there are 54 villages with 16% of the population in which it is required to travel 10 Km to reach a place having medical facility. Further, the big sized villages(+5000) are equipped with similar kind of medical facility within the village.

On an average the number of beds available for the 1000 patients is 8 in the urban area. Sawantwadi and Vengurla enjoy a better position and have comparatively well equipped hospitals.

The population of the region on the whole enjoys better health and records of epidemics are not common.

ECONOMY OF THE DISTRICT

In the light of the low resource potential of the District Sindhudurg, the relative contribution comes from agriculture, manufacturing (industry) and service sector. Of these, the contribution from service sector is greater than the other two components.

Despite this, the per capita expenditure is about Rs.718 which is higher than the per capita income because both Ratnagiri and Sindhudurg are major exporters of man power (to greater Bombay). The inflow of income was about 4-13% in the seventies and increased to 40% in the eighties. This inflow is excluding the money transferred through messengers. Taking into account the inflow, there appears to be 23% excess expenditure over the per capita income earned in the district.

The medium level input comes from mining, fishing, metals, engineering and non-metallic mineral products and power. The output of the sectors like forestry, textiles, chemicals, food, paper and miscellaneous industries is quite negligible.

There are about 1100 industrial units, both small and medium in this region of which 435 are not functional for various reasons but the production can be registered as Zero. The number of industries in Sindhudurg are 290 out of which 127 are servicing and the remaining being job work units like processing and

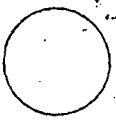
assembling. Infact, the industrial units are of recent origin having a total fixed assets in the working units to the tune of Rs.4 crores and about Rs 5.5 crores - the working capital.

As for Sindhudurg is concerned with reference to workers, the taluqa wise industrial position is: Kankavli (635), Kudal (1140), Sawantwadi (827), Vengurla (575), Devgad (186), Malwan (529) and Vaibhavvadi (Nil.).

It is pertinent to point out that the unskilled workers constitute 56% of the total population of workers with a salary range of Rs.150-400 p.m. (average yearly wage bill, Rs3.5 - 4 crores).

Information from post offices reveal that about Rs.25 crores are received annually in the form of Money orders which on an average works out to Rs.120 per capita (p.a). This appears to be deceptive as all the persons are not receiving such a support. Information from Banks about receipts and transfers of foreign exchange is not available. It is a fact that Banks are active and are willing to open branches both in the rural and urban sector only reflects the potential of deposits. The small savings target is often exceeded which is known from the cash incentives received by the Bank concerned.

The savings are coming from middle and higher income groups. In this context the comparative savings figures clearly show that Ratnagiri district receives more deposits(Rs.2.5 crores) and

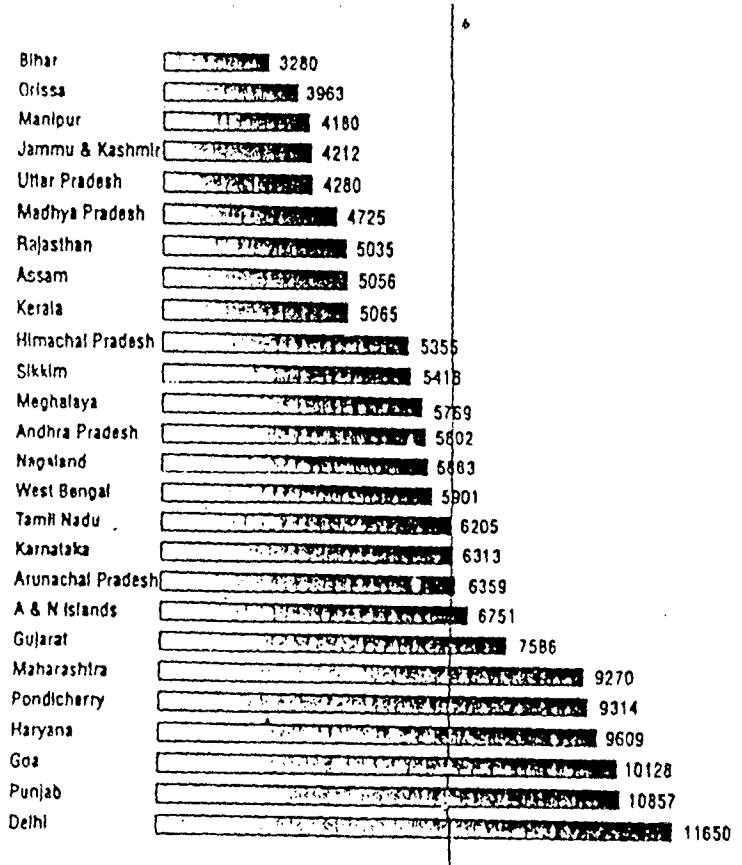


Income Disparity Among Indian States

Per capita income in rupees

While Delhi leads with its per capita income more than twice the National average. Bihar is at the bottom of the ladder with its per capita income barely half the all India average.

All India Current Rupees Average
= 6249



Sindhudurg (Rs1.25 crores).

Deposits to advance ratio of the banks is around 100:30. As such it is apparent that majority of the savings are being pumped back into national economy and hardly any direct investment is made for the development of productive or agricultural sector.

ADMINISTRATION AND SOCIAL SERVICE

It is during 1890, the South-Konkan was formed into a separate district which was a sub collectorate in Thane (1830). There were 10 sub-divisions viz., Devgad, Sangameshwar, Vengurla, Malwan, Rajapur, Chiplun, Khed, Dapoli and Guhagar (during 1931).

Presently, the Collectorate is responsible for Revenue Administration and the Zilla Parishads for Panchyat Administration. The other State Government Departments are; Town Planning and Valuation, Geology and Mining, Power, Social Forestry, Agriculture, Horticulture, Co-operative, Fisheries, Judiciary, Harbour Engineering, Public Works, Irrigation, Police, Ground Water Survey and Development Agency and Industries. They are located at the Headquarter Kudal (ORAS, upcoming new HQ) of Sindhudurg District.

The different subordinate offices are attached to their respective Divisional or Circle Offices for their Head Offices are located in Bombay, Kolhapur, Pune or Konkan Bhavans. Various special schemes: Rural Integrated Development, Western Ghats Development, and Horticultural Development implemented through their concerned Departments provide considerable effect on the development of the District. The Schemes may cover to the entire State or confined to local sector which function under the control of District Planning or District Councils. The State sector schemes are implemented by the Collector and Member Secretary who have direct control with an over all budgetary control of Planning and Finance Department.

Boards and Corporations like Maharashtra State Electricity (MSEB) Maharashtra Industrial Development Corporation, Development Corporation of Konkan have their functionary units in the District, Bank of India, a leading Bank and Central Co-operative Bank have their offices in the district.

Central Government establishments such as Postal Department, Telegraphs, Customs, Income Tax, Central Excise have their offices in the District for effective control.

Absence of All India Radio (AIR) for Sindhudurg District is very conspicuous.

Despite of the so many establishments both State and Central, still the District is under developed in the State. Such a situation can be attributed to factors like socio-economic condition, Physiography, attitude of the people, chronic neglect, fragmented and common land holdings, traditions and even blind faith. Eradication of these may result in the accelerated development and indeed they are the real impediments for any growth and progress of the area.

An optimum utilization of various improvement programmes of Government, Public and Quasi Government agencies for achieving targets can effectively be monitored for attaining the goals for which they have been established.

The level of Social Service and its extent can best be assessed by taking into consideration the factors like; Literacy, School education, Health, Medical and Social Welfare Schemes.

Quite often, the degree of literacy is an index of its economic status which facilitates economic development and social infrastructure. The percentage of literacy among males is 86.23 and 66.87 for females (together 75.81%) which is certainly above the State average (62.2%). Primary schools are fairly well distributed in the region unlike the other facilities like Primary Health Centres, telephone, Venterinary centres, Colleges both Junior and Degree.

Shopping complexes are also not evenly distributed for obvious reasons. Medical shops situated at different places also suffer due to minimum population and viability in terms of sale. Non-urbanisation and subsistence for economic activities virtually resulted in not having an organised market both for assembling and terminal.

The produce is sold directly to agents and end users who collect the products at the point of production. Because of this, the producers receive prices that are far lower than what they would have received in the organised regulated market.

Lack of finance like providing short term finance at a time when it is needed the most is also a cause for industrial sickness. Credit from Commercial Banks also do not come forward. Such a situation leads to borrowing from unorganised money market at high interest rates. The financial institutions in turn complain that entrepreneurs set up ventures without pre-investment feasibility study.

Among the labourers work ethics is lacking. Often they are farm labourers who seek seasonal employment and are content in earning subsistence. There are no checks, control or incentives and inducements. Lack of work culture is characteristic for the District.

SINDHUDURG ECO-DEVELOPMENT STRATEGY - PROSPECTS

Planning for Sindhudurg Resource Region needs consideration from several view points and more so from the ecological one for its fragile ecology. The economy of the region is closely dependent on the natural resources and their exploitation beyond reasonable means would undoubtedly not only disturb but destroy the balance and it is already going on for several decades. Against this background, mere efforts for ecological restoration cannot be taken in isolation unless they lead to economic development of the region and improved living conditions. Precisely, every effort should be made to make it a thrivable and livable part of Maharashtra State. This is possible only when a balance is struck between the ecological and economic aspects by evolving appropriate strategies keeping in view every sectoral development and its interlinking with each other.

No attempt should be spared to explore and maximise renewal, development, reclaim, reuse, redefine and reshape our depleted urban, suburban and rural areas for changing them into a new landscape within the grand topographical frame work of protected mountain slopes, river basins, shores, desert, forest and farmland.

In this context, conservation of living resources has three specific objectives i.e. (i) to maintain essential ecological processes and life support systems mainly based on recycling (ii) to preserve genetic diversity on which depends breeding and (iii) ensuring sustainable utilization of species/ecosystems.

The Sindhudurg resource aspects and the prospects for evolving strategies with regards to Eco-Development have been presented herein.

Based on the present study, Sindhudurg, the second smallest one in area and population, is a retarded district in every sense of its growth, but has untapped potentials and it is for this the following Eco-Development strategies have been proposed with a hope that may lead the expression of its latent potentials.

The strategies with regards to the parameters that have been studied are grouped into general and sector wise.

In the light of Sindhudurg resource aspects Eco-development strategies with regards to:

(I) Forests, (II) Demography, (III) Industry, (IV) Marine Resources (V) Water Management, (VI) Power, (VII) Integrated transport, (VIII) Agriculture (IX) Tourism, (X) Minerals, and (XI) Land Use, have been presented encompassing their prospects. Further, based on the present study, both general and sector-wise strategies have been proposed.

Forests

Excessive clearing of forests in SouthEast Asia has caused fluctuations in river flow thereby lowering the agricultural yield and hydroelectric generation (due to silting of rivers).

The problems faced by the forest department are; illegal cutting and denudation. There are vast tracts of private forests having no control over them. The forestry was not managed on scientific basis. Shifting cultivation results in excessive soil erosion.

Locals as well as organised gangs exploit forest for firewood and charcoal, which is not effectively checked due to lack of transport and communication. Specially in the hilly regions encroachment of forest area which was brought under control has again become alarming due to the relaxation of using forest land for cultivation. The degree of encroachment is more in tribal area than urban belts and need measures to effectively check it.

Several hectares of luxurious forest area got submerged under irrigation and power projects like Tillari and Talamba. In addition to the submerged forests, additional areas have been damaged for the rehabilitation of displaced population. There was a lack of attempt to compensate this two fold loss by development programmes either in the same watershed or elsewhere.

Illicit felling and soil erosion in Kankavli and Sawantwadi has damaged the flora and fauna. Stray and unproductive cattle are let loose for grazing in protected area pastures. Their over grazing leads to soil erosion and failure of germination of seeds.

Intentional forest fires are more frequent than accidental fires. In any case, the damage is extensive about which the inhabitants should be educated.

The weed Lantana occupies vast tracts - a meance for the development of forest which needs eradication by uprooting. Lack of funds prohibit undertaking its check.

The government of Maharashtra established an independent Social Forestry Department (1980-1983).

Under this scheme plantation work is in progress specially in Malwan and Vengurla. Massive plantation in community, open lands, and private wasteland would increase the scope of rural employment, containing migration of labour, in restoring ecological balance, to contain deforestation on government lands, and to improve the rural economy by creating infrastructure for the development of wood-based industry and dairy development.

Some trends that need consideration with reference to forests are; more income generated from fuel wood rather than timber reflects decline in the quality of forest land, and forests are developing in natural course and not by concerted planning.

The potential linked credit plan (1992-93 to 96-97), of the National Bank for Agricultural and Rural Development (NABARD) reported that the Social forestry scheme in Sindhudurg district has cultivated 3,800 hectares of watershed areas. Taking into account the fact that 75,000 hectares of cultivable wasteland is available, of which at least half ~~—————~~ can be brought under forest cover in the near future and the rest can be diverted for developing garden crops, coconut, cashew, rubber, arcanuts, cardamum, coffee and mango.

Preservation of evergreen and semi-evergreen forests of higher elevation, reforestation of degraded areas, plantation in catchment areas of rivers and reservoirs, in marginal agricultural lands should be taken upon priority basis.

For improving environment and maintenance of ecological balance, the evergreen forests of higher elevations along the Sahy^adrian scrap (around Amboli) need careful management and need no disturbance.

Another forestry programme is sponsored by USAID in the district and state wherein village panchayat will have a pivotal role in managing plantation and ensuring people's participation. The main thrust of the project is on planting mixed species of fuel wood, fodder, and timber wood with an express understanding that the infrastructure proposed be continued beyond the project period. It is proposed to develop 15 hectares (average) of forest for every identified village panchayat. It also envisages motivating public opinion in favour of Eco-Development and restoration. Further, it aims at preserving the original free cover of wild life, the flora the wild life. Precisely, it will serve as a natural general pool with every protection. For immediate protection, modern amenities of transport and communication will be provided at all important centres.

There are major hurdles with regards to exploiting the forest potential on private wastelands for dispute regarding ownership of land, lack of awareness among farmers about the economic feasibility of forestry and inadequate extention support.

In view of these points, the precise potential of forests in Sindhudurg cannot be readily assessed. Nevertheless, there has been growing realisation among people on harvesting forest produce for commercial purpose.

Ecological advantages, apart, the forest could create commercial opportunities for tourism. Such growth may provide an opportunity for exposing the backward areas within the Konkan region.

Demography

Sindhudurg with an area of 5207 Sq.kms, the second smallest district of the State, registered a population growth of 6.06% during a decade (1971-1981) which is low when compared to that of the State (24.54%). The cause for low growth rate is perhaps due to migration of population of reproductive age to more prosperous areas due to lack of employment opportunities.

Even within the district, there are different growth rates of population Vengurla had lowest rate of 1.64%. Kankavli, Kudal, Sawantwadi, Vengurla, Malwan and Devgad show a sex ratio of 1,233; 1192, 1155, 1139, 1266, 1233 females per 1000 males respectively (during 1981). As per census of 1981, the population of Sindhudurg was 7,76,346 and it increased to 832,152 (in 1991) with 389,384 males and 442,768 females.

It is apparent that the district has 1.05 percent of State's population over 1.69 percent of its area. Among 7 tahsils/ - Taluqas, the population of Sawantwadi is 186,215, the most populous and Vaibhavvadi with 48,536 has least population. The decadal population of 1971 and 1981 do not show any significant change. Thus the trend of 1971 to a large extent can be said to be relevant to the present.

Large scale migration from Sindhudurg was going on from 3-4 hundred years and was more pronounced during the British Rule when Bombay was transferred from Portuguese to British. 45% migrants are from this district. During the corresponding period the population of Bombay increased from 60 to 80 lakhs (leading to New Bombay). Still it is the main attractive destination of migrants particularly from Ratnagiri - Sindhudurg region and other parts in general. The migration is male dominant.

The growth and settlement pattern clearly reflects that for the entire Maharashtra, Bombay is the major growth centre for mass exodus from the backward Konkan region of which Sindhudurg is a part.

It is because of this migration, Sindhudurg is facing economic and ecological damage of alarming proportion.

The settlements generally follow a hierarchial system like development around growth system (Sawantwadi) or growth points or market towns which are often the Taluqa Head Quarters (Vengurla and Malwan). This is followed by service towns and service villages and weekly market centres (Kudal, Kankavli).

Then there are remaining villages and several wadis have the potential of becoming local points of development.

The urban growth centres of the district are located either along the sea coast or along National Highway - 17 connecting Goa and Bombay.

These urban centres are Malwan, Vengurla and Redi, Panvel. Mahuad - Panaji National Highway passes through Kankavli, Kudal and Sawantwadi. The villages nearby such as settlements have small hamlets. This distribution has some historic reasons which perhaps may be social basis like caste or occupation or availability of water and other desired facilities.

The average house hold size is of 5.35. In the high migration area, it is 4.87, in the low migration area 5.80 and in urban area it is of 5.80.

As far as sex and age ration is concerned it shows a high imbalanced sex and age pattern. Predominance of old and females with much lesser proportion of males belongs to working class.

Agriculture and horticulture is a predominant occupation which do not provide full time gainful employment. The occupation pattern and distribution of house hodls according to income groups have been indicated in the table.

S.No.	Name of Taluqa	Total Workers	Workers in		
			Primary Sector	Secondary Sector	Tertiary Sector
1	2	3	4	5	6
1.	Kankavli %	43,760 (100.00)	38,710 (88.46)	1,341 (3.06)	3,709 (8.48)
2.	Kudal %	45,140 (100.00)	39,724 (88.00)	1,768 (3.92)	3,648 (8.08)
3.	Sawantwadi %	52,056 (100.00)	40,942 (78.65)	4,197 (8.06)	6,917 (13.29)
4.	Vengurla %	25,141 (100.00)	18,472 (73.47)	2,263 (9.00)	4,406 (17.53)
5.	Devgad %	43,341 (100.00)	29,970 (87.30)	1,026 (2.99)	3,337 (9.71)
6.	Malwan %	38,632 (100.00)	30,627 (79.28)	2,516 (6.51)	5,439 (14.21)
7.	Vaibhavvadi %	17,542 (100.00)	16,338 (193.14)	436 (2.48)	768 (4.38)
TOTAL :		7,14,716 (100.00)	6,01,784 (84.20)	35,755 (5.00)	77,177 (10.80)

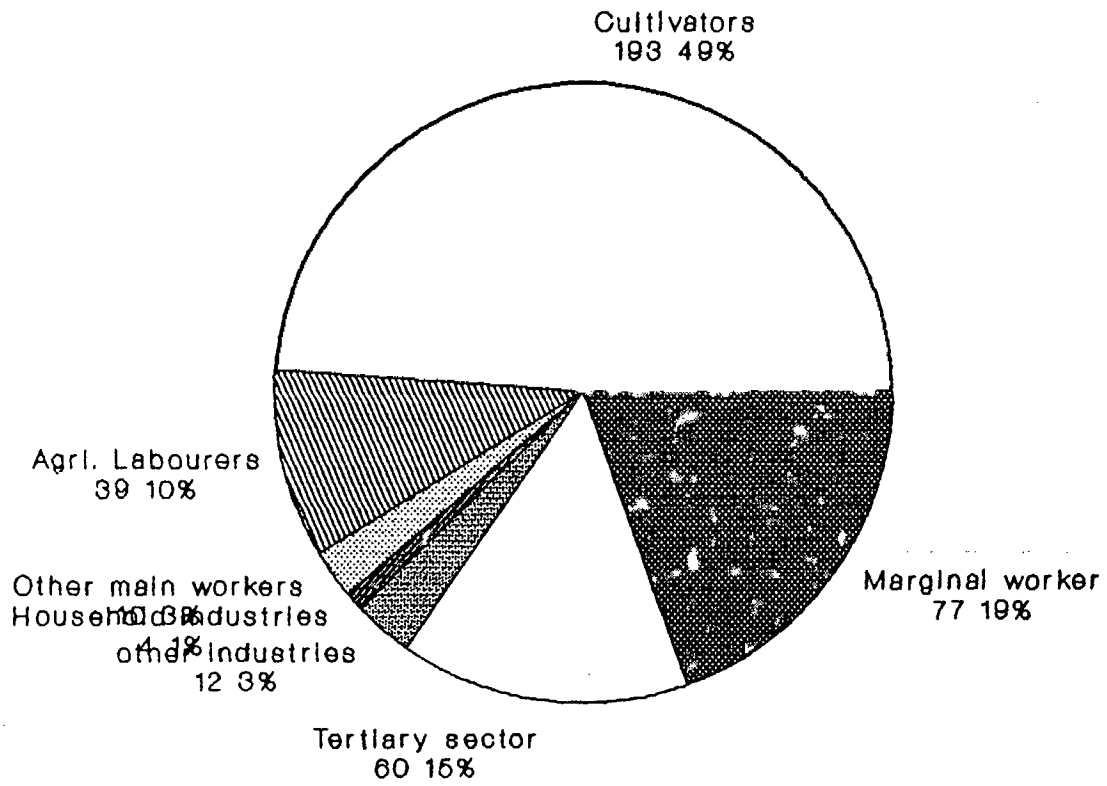
Source : Census of India.

Distribution of Households according to income groups

Income group (Rs per year)	LM Village	HM Village	Urban Areas	Region as a whole
1 to 100	1.4	3.1	0.2	1.7
101 to 200	3.7	5.3	0.5	3.5
201 to 500	12.4	15.1	0.9	10.4
501 to 1000	20.0	21.8	3.2	16.6
1001 to 2000	26.0	27.1	15.3	23.6
2001 to 5000	19.0	16.3	28.2	20.4
5001 to 10000	8.1	3.7	24.5	10.7
10001 to 20000	3.1	1.1	16.1	5.7
20000 & above	0.5	0.3	6.3	2.0
No Response	4.9	6.2	4.3	5.4

Source : Sample survey conducted by R-SRP Board.

DISTRIBUTION OF WORKERS

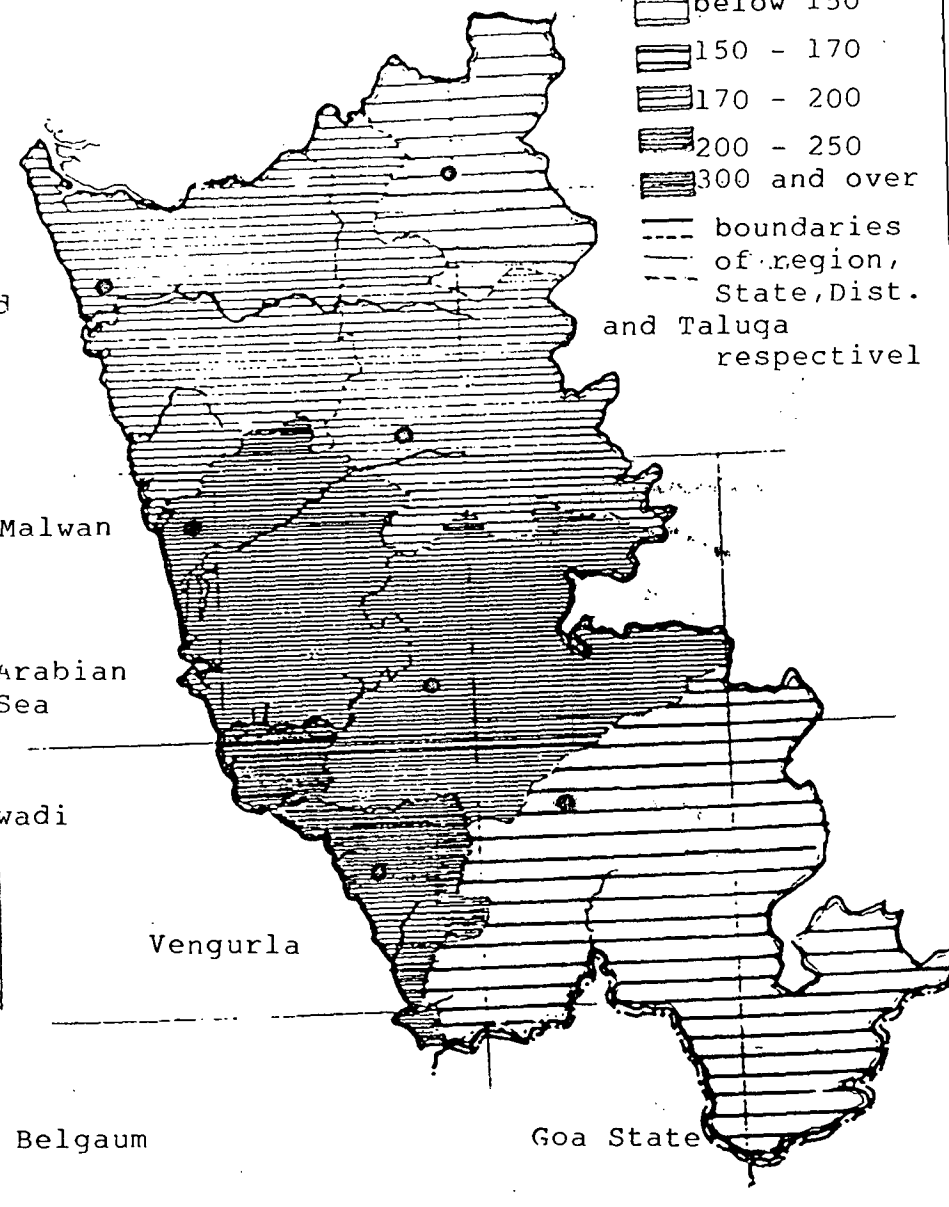
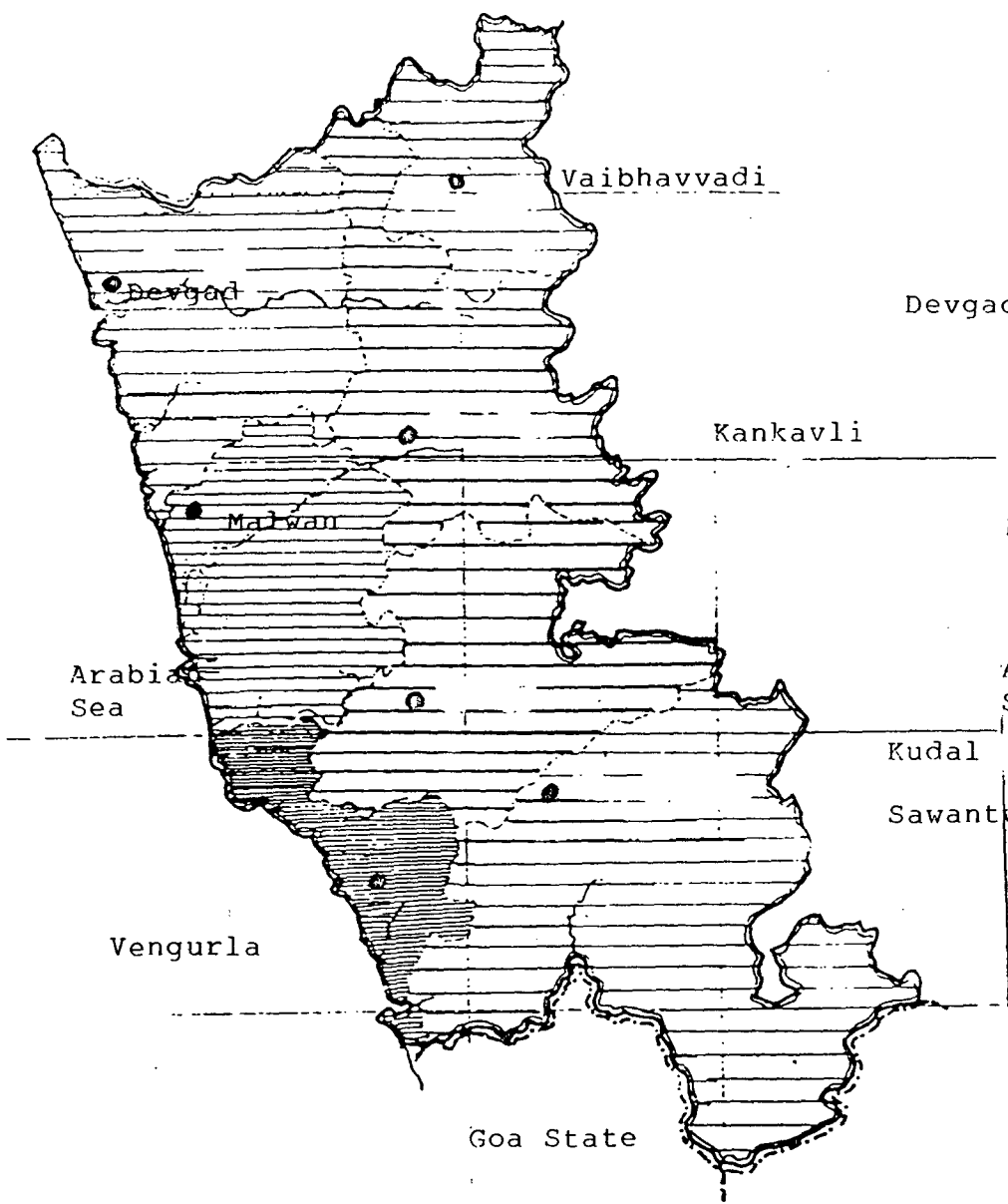
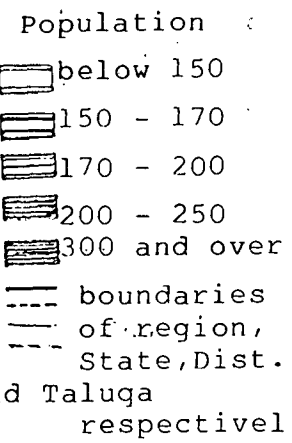


SINDHUDURG - TALUQAWISE POPULATION
PRESENT AND FUTURE

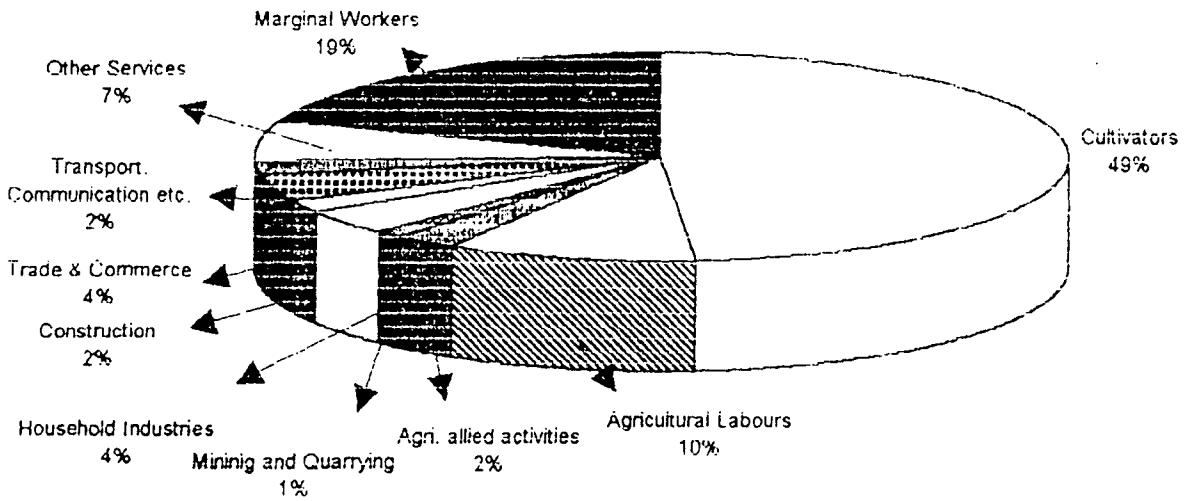
1991 A D

2001 A D and ABOVE

Per sq km



WORKERS CLASIFICATION OF SINDHUDURG DISTRICT



Industry

Industrial Units, Products, level of investment, market and constraints faced apparently reflect the extent of backwardness of the district.

The total cost of energy consumed by units using coal, and firewood is to the tune of Rs.15 lakhs and that of units using gas and oil is Rs.12 lakhs. In the case of units that are using power it is about Rs.35 lakhs. Thus the total energy bill exceeds Rs.62 lakhs.

The value of the raw material is worth Rs.5.6 crores. The total value of the products is about Rs.30 crores. The surplus from the industrial sector, value of the raw material, wage and energy bill, interest on capital, depreciation is not very impressive. Therefore, industry has not become a major driving force for the growth of the economy of the region.

Out of a total of 588 ^{Industrial} units, only 43 units have provided housing facilities to the employees. This number is only 327 in the entire region.

Marine Resources

In India with 7000 Km of coastline having several bays, inlets, and backwaters, and a biodiversity unequalled anywhere else in the world, fishing activity could be inducted as a profitable and at the same time socially acceptable and ecofriendly practice which develops in a relatively short span of time mainly to meet man's food and protein needs. Fisheries is a natural resource based industry as any other agriculture crop.

The state of Maharashtra has 1720 km long coast (9120 km by base line method) of which Sindhudurg has 21% of the coastal region (i.e. 120/121 km long coast (65 x 120/121 Sq.km). The total population of fishermen is 9835. There are about 159 village where in fishing activity is carried on having 250 trawlers.

Fish export has a potential of its own, for 60-70% population of Maharashtra eat fish (100 - 150 gm per day). There is a considerable gap between consumption and yield which needs to be enhanced. During the year 1981, Maharashtra's fish yield was 3,72,160 Kg.

Of all the fish catch centres, Devgad, Malwan and Vengurla have their own importance. Within infrastructure with more number of ports with a capacity to accommodate less than 50 boats in small ports and 51-100 boats in large fishing ports.

The important creek fishing centres of the district is below:

Creek	No. of fisherman working	Area Hectares	Fish production M Tonnes
Vijaydurg	200	10.11	198.0
Achara	20	2.43	15.4
Sarjekot	25	0.81	9.9
Kolamb	50	2.92	396.0
Tavkarli	500	23.10	594.0
Kochara	100	6.07	88.0
Mochemad	80	4.05	46.2
Redi	100	3.23	59.4
	1275	66.96	1703.9

For any increase, it is necessary to improve the road linkages with fishing hamlets.

Central Institute of fisheries provided details for 2 or 3 fold increase in the yield and profits for encouraging fishing activity IRDPO provided a list of authorised boat and engine repair centres, and net repair centres at subsidised rates. The yield from the mechanised trawlers and those from fishing boats (in the deep sea) is transported to Bombay.

There are certain shortcomings in the entire activity like lack of facilities for unloading the catch, uncertainty of catch for not having requisite information. Further, only 20% of the market is controlled by co-operative sector and the rest by private agencies due to which they are able to control the price. For a perishable commodity like fish, fast transport, and cold storage, are not available. Skilled labour for peeling, and salting is not available locally. Majority of the personnel engaged in this trade are uneducated and need professional training.

For making fast profits, very often they do not spare young fish and prawn's thereby disturb the biological equilibrium and future prospect of catches.

For the furthering the cause, Konkan Krishi Vidyapeeth^{Dapoli} in collaboration with Marine Biological Research Station and government departments are imparting necessary training at Ratnagiri and Malwan. In addition, Marine Products Export Development Authority under the aegis of Government of India has been established for controlling the quality of exports.

Poultry

The number of birds reared in Sindhudurg district is the highest when compared with other parts of the State. There are more than 7 lakh birds of which about 50% are egg laying one. The number of eggs available are much less with reference to local needs and also that of the Bombay and Goa. Eggs are being supplied from Kolhapur and Belgaum for local consumption .

In view of this demand, it is possible to increase the yield upto 200 per bird by rearing quality birds of good breed, supply of balanced poultry feed, well ventilated cages and farms, and developing an organised marketing network with proper transport facilities. Poultry birds could also be reared for meeting the table requirement (as a substitute for meat).

Encouragement and proper rearing of poultry birds would lead to generate poultry feed units, manufacture of boxes for transport of eggs, and also manufacture of cages - employment generation.

Cattle & Dairy Development:

The cattle and Dairy development programme of the district is not very sound and deserves attention. Lack of veterenary aid, inadequate grass and cattle feed, transport and finance are some of the impediments.

At present large number of cows yield half to one litre of milk which by any standard is not economical. The expected yield is at least 6 or 7 litres a day.

The milk yield was 72,400: 96,500 and 1,25,000 litres during the year 1984-85, 1990-91 and 1995-96 respectively.

1. Facilities for artificial insemination are not available leading to inbreeding. Introduction of new breeds for better yield and crossing the local breeds for better progeny is one of the priority areas.

2. As early as 1970, it was estimated that about 10 tonnes of green and 1.5 tonnes of dried grass is required for milching cattles. The estimates of the expert committee indicated a over all shortfall of about 16 lakh tonnes of grass for the cattle.

3. Stray cattle is another negative factor for the general well being of the cattle population. The problem of non-milching cattle needs to be sorted out (which are almost 50% or more). The cattle are not given proper sheds and as such are exposed to nature's vagaries.

Buffalo raising and Dairy can become supplementary as well as independant activity and needs to be organised on scientific basis. Also it would be more useful to domestic and small farmers for they are required for milk and farming.

Conservation measures by increasing the grass cultivation through high yielding varieties in waste land and also in rainfed horticultural areas, with have to be adopted.

Water

Despite abundant rainfall, no water storage facilities are available in Sindhudurg and several proposals for irrigation and harnessing rain water either by impounding reservoirs or by small bunds on water courses for increasing the ground water level and charging wells on the down stream remain unimplemented.

Water is supplied to the villages through MWSS Board, Zilla Parishad, wells and tube wells. The drinking water supply has been satisfactory to a great extent by harnessing the rain water. The Ground Water Survey and Development Agency can supply water to about 250 persons through a tube well incurring an expenditure of Rs.20,000/- annually. 200-250 bore wells are drilled and this holds good even for other agencies. With Wadis of a village with a population of 150-200, it appears to be difficult to organise supply by a separate scheme for each wadi. However supply of water through an irrigation project located near to a settlement is feasible, and boring of wells based on the availability of ground water in various water sheds appears.

There is a lopsided development of manufacture and it is not able to encourage large or medium scale process industries.

Energy Requirements

Altogether the power crisis in the district/state is the manifestation of deep malaise in the entire process of planning which appears to have divorced from hard - headed decisions needed to upgrade the system.

Power plants likethe Kaiga Nuclear Plant (Karwal); 1050 MW Thermal Plant (Mangalore), and 1000 MW Thermal Station at Dabhol port at the mouth of Vasisthi Creek are under construction.

The rural electrification programme has gained importance from Third Five Year Plan and has improved the power supply to rural areas (to the extent of 61.78 villages of the district).

The wadi pattern that exist is one of the major impediments for power supply. The agriculture study groups have recommended location of distribution network along the water courses for the convenience to supply power to agriculture pumps.

Taking into account domestic, industrial and agricultural demand needs, a new scheme is required for the region with adequate fund provision for electric supply.

It is pertinent to note that the 400 million tonnes of dung and crop wastes that rural community uses annually as fuel should be diverted to Gobar gas plant which would cater to the domestic needs.

The programme for utilization of wind mills for providing energy is in the initial stages and has been introduced recently. Its full exploitation would provide sufficient energy.

It is unfortunate that so far no attempt has been made for generating electricity from tidal waves (tidal energy). Likewise geothermal energy has not yet proved to be an established source for energy supply. The National Institute of Oceanography Goa, has taken up research projects on this line. A tie-up with the institution for exploring this source may prove very useful.

Integrated Transport

The infrastructure for transport by any means along the west coast is totally inadequate. The major modes of transport are Road, Rail, Water and Airways.

The National Highway -17 run parallel to the Konkan Railway. The Highway is very congested and intermittent damaged stretches are found all along due to damage by rains. Further, the roads of the district are not all-weather roads and quite a few are not usable during monsoons. Forest and coastal points which are important links for transport are not connected by roads. The existing road length (as on March 1985) of the district reveals only 3150 Kms, for which the PWD Konkan region has prepared guidelines for the whole of the State for 1981-2001 by revising the earlier proposals of 1961-1981 to overcome deficiencies like inadequate carriage way width, improvement of riding quality and upgrading the bridges and C.D. works.

The taluqa-wise distribution of roads in Sindhudurg is as below:

Taluqa	Road Length Kms	Road Length(Kms) per 1000 persons	Length per 100 Sq.km
Devgad	424.99	3.9	57.8
Kankavli	383.92	3.1	49.5
Vengurla	248.85	2.9	75.7
Malwan	360.11	3.0	54.3
Kudal	369.58	2.8	45.1
Sawantwadi	571.17	3.4	42.0
Vaibhavvadi	249.93	NA	NA

District and Village roads occupy the lowest position and are known as 'rural roads' which infact serve in connecting several villages - rural areas. Economic upliftment of rural population falling below poverty line is directly linked to accessibility to villages.

Precisely, all sectors like agriculture, forestry, education, health medical and postal service depend on these roads.

Adequate rural road network is prerequisite for socio-economic development of rural population. Laying of roads is labour intensive technology. Regardless of population every village should have atleast one metal road for providing better transport.

The information as given below very well elucidates the position of villages not connected by Road length.

Taluqas	Number of Villages not connected by Road	Length for constructing the missing link	Estimated cost (in Rs. lakhs)
Kudal	6	21	42
Malwan	7	33.5	67
Sawantwadi	18	75	150
Kankavli	6	14	28
Vengurla	-	-	-
Vaibhavvadi	1	4	8
Devgad	13	14	28

By no means this information indicate the precise overall picture for every village has 1 or more wadis. The average number of

wadis for a village is 6 to 7 (model survey) with a population of 150-200 per wadi. It would be misleading to conceive that if a village is connected to a road it does not mean that all its wadis are connected.

The situation needs serious attention for they (villages and wadis) are cut off from the main stream of the district which is acting as a disincentive. Based on these factors, it is desirable to have: a) 2 or 3 parallel north south roads with number of east west links (from sea coast to upghats), b) increase in the length of National and State High ways, c) length for the per unit area cannot be taken as a yardstick, d) road length per unit population alone should not be made criteria for judging the adequacy of Roads, and e) providing hume pipe culverts will provide access to the remote parts by bullock carts or other mean of transport like tempos. For this, local villagers, Gram panchayats and horticulturists are willing to contribute.

No doubt the lateritic structure of the ground is a sound surface for Kachá roads but small creeks and water courses do come in the way for year round connection.

There is a need to provide small bridges on water streams as the temporary constructions get washed away during monsoons.

Sindhudurg could not develop due to the absence of the vital rail transport link during British India. The priority was to connect the Bombay port for providing an outlet for the movement of rich minerals and raw materials (for shipment).

The north rail link between Thane to Roha has been interlinked to Konkan Railway at Roha. The Roha - Sawantwadi broad gauge line is operational for passenger traffic. In the southern most part, the rail passes through Goa, Karnatka and Kerala. The Roha - Sawantwadi section goes through Ratnagiri, Rajapur Road, Vaibhavvadi Road, Kankavli, and Kudal. The newly introduced Konkan Railway will reduce the transport cost thereby facilitating the bulk transport of primary produce.

East-West rail links like Karad - Chiplun, Ratnagiri - Kolhapur Vijaydurg - Phonda - Kolhapur, Vengurla - Sawantwadi - Belgaum, Malwan - Kudal, and Devgad - Kankavli/Vaibhavvadi need priority for providing facilities or the transport of goods and passengers.

Bhagwati Bunder is already in operation which is responsible for creating some industrial base at Ratnagiri, Kolhapur - Ratnagiri link could be considered as priority phase which will open the hinter land all along the Maharashtra - Karnatka² border and further towards Maharashtra, Andhra Pradesh border.

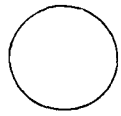
Absence of such a facility is resulting in the export of sizable cargo from south eastern Maharashtra to un-necessarily being routed through Bombay port. This is causing congestion. This could easily be dealt with by Ratnagiri - Sindhudurg ports just as Nagpur - Bombay and Sholapur - Pune.

The summary of the existing and proposed road network has been indicated in the table.

The coastal shipping and inland waterways for transport need further development in terms of loading and unloading of cargo at ports and desilting of rivers for efficient navigation. Precisely, infrastructure for its growth is not available. It is only through Redi port that iron ore is exported in significantly high quantities.

Air traffic and cargo facilities for Sindhudurg are completely absent and need air linking on priority basis.

In a recent base paper Deshpande (1995-1996) has admirably discussed the twin issues of approach to integrated transportation system and required infrastructure and transportation infrastructure post Konkan Railway Scenario. Approach to integrated Transportation System for Goa State, Oct, 1995. Environmental Planning And Design Consultants, Transportation Infrastructure required in post Konkan Railway Scenario, Feb, 1996, Goa Chamber of Commerce and Industry.

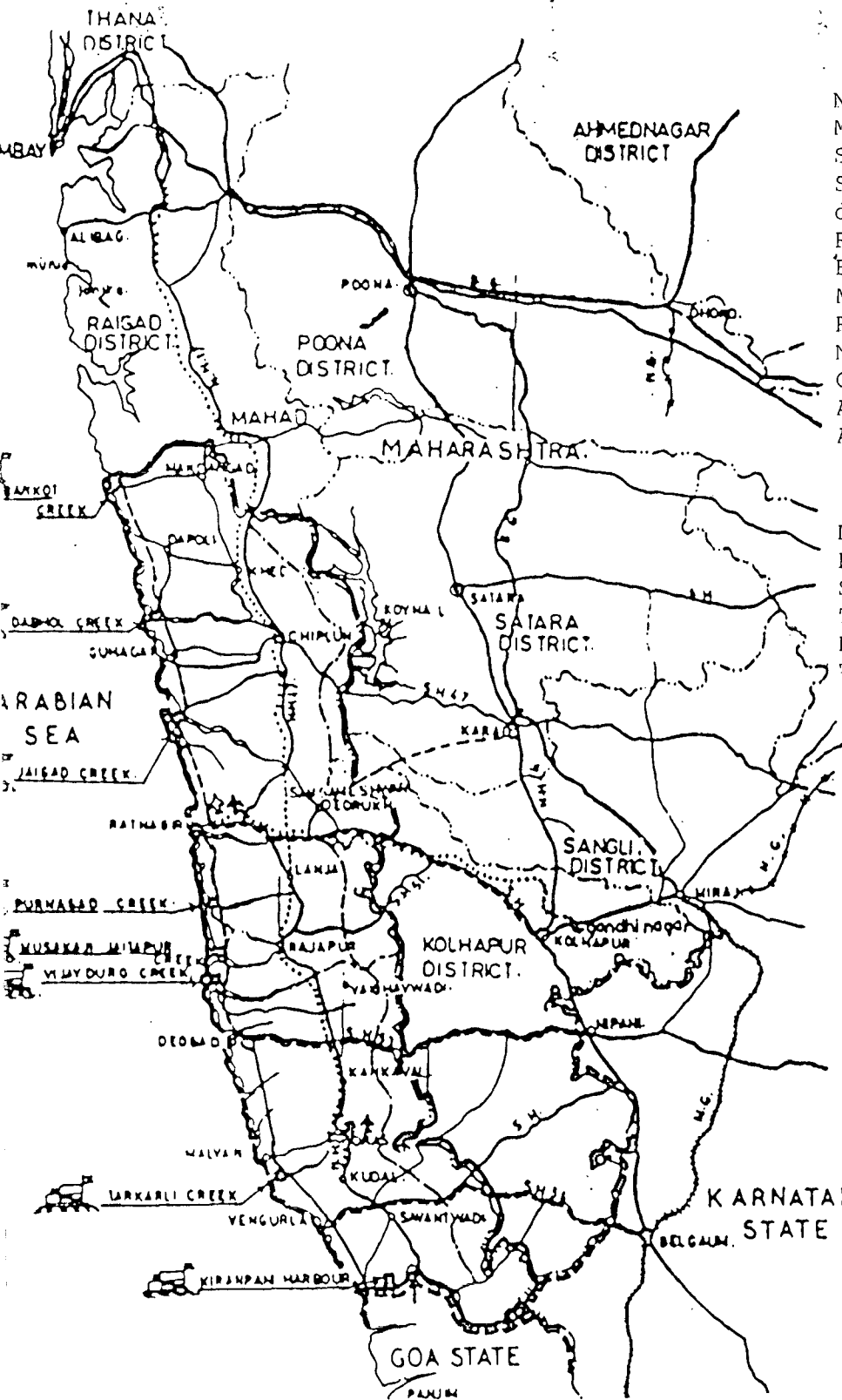


S E D S: Network of roads and Transport

Exist'g Proposed

- Nat. H'way ———
- Maj. St. H'way ———
- St. H'way ———
- St. H'way upgraded to Nat. H'way ———
- R'way line ———
- Br. Gau. R'way ———
- Met. Gauge ———
- Railway ———
- Nar. G.R'way ———
- Goa type Ferry ———
- Air strip ———
- Air port ———

- Dist. Boundary ———
- Region boundary ———
- State boundary ———
- Taluqa place ———
- Dist. place ———
- Water bodies ———



50 km

North



1981 - 2001 ROAD DEVELOPMENT PLAN (P.W.D.)

TALUKA-WISE AND CATEGORY WISE TARGETS AS PER 1981-2001 PLAN OF ACTUAL ROAD LENGTH AS ON 31-3-1985

CATEGORY OF THE ROAD	TARGETS IN KMS PER 1981-2001 ROAD DEVELOPMENT PLAN	ACTUAL ROAD LENGTH IN KMS. AS ON 31-03-1985 PLAN LENGTH ONLY			
		B.T	W.B.M.	UNSURFACED	TOTAL
1	2	3	4	5	6
NATIONAL HIGHWAYS	-	-	-	-	-
MAJOR STATE HIGHWAYS	-	-	-	-	-
STATE HIGHWAYS	81.90	42.93	38.97	-	81.90
MAJOR DISTRICT ROADS	51.40	-	21.50	20.30	41.80
OTHER DISTRICT ROADS	99.06	-	30.20	39.29	69.49
VILLAGE ROADS	181.72	-	27.46	38.70	66.16
TOTAL:	414.08	42.93	118.13	98.29	259.35

1	2	3	4	5	6
<u>II. TALUKA DEVGAD</u>					
NATIONAL HIGHWAYS	-	-	-	-	-
MAJOR STATE HIGHWAYS	66.55	35.20	28.35	-	63.55
STATE HIGHWAYS	54.77	54.77	-	-	54.77
MAJOR DISTRICT ROADS	185.80	8.00	139.35	14.38	161.73
OTHER DISTRICT ROADS	75.11	12.61	18.61	8.80	39.41
VILLAGE ROADS	317.69	1.00	144.43	28.66	174.09
	699.92	111.58	330.13	51.84	493.55

III. TALUKA KANKAVLI

NATIONAL HIGHWAYS	54.00	54.00	-	-	54.00
MAJOR STATE HIGHWAYS	-	-	-	-	-
STATE HIGHWAYS	88.57	74.17	14.40	-	88.57
MAJOR DISTRICT ROADS	103.17	27.71	30.58	19.46	77.75
OTHER DISTRICT ROADS	144.94	4.40	73.60	44.67	122.67
VILLAGE ROADS	221.41	3.00	40.85	62.28	106.13
	612.09	163.28	159.43	126.43	449.12

1	2	3	4	5	6
<u>IV. TALUQA MALWAN</u>					
NATIONAL HIGHWAYS	-	-	-	-	-
MAJOR STATE HIGH WAYS	32.30	21.30	-	-	31.21
STATE HIGHWAYS	52.90	52.90	-	-52.90	52.90
MAJOR DISTRICT ROADS	122.84	40.63	60.04	16.62	117.29
OTHER DISTRICT ROADS	154.60	-	82.08	39.23	221.31
VILLAGE ROADS	277.33	-	96.23	37.82	134.05
	639.97	114.85	238.35	93.67	446.85
<u>V. TALUQA KUDAL</u>					
NATIONAL HIGHWAYS	30.50	28.85	-	-	28.85
MAJOR STATE HIGHWAYS	-	-	-	-	-
STATE HIGHWAYS	84.88	57.26	8.40	8.22	73.88
MAJOR DISTRICT ROADS	114.10	34.40	42.94	17.54	94.88
OTHER DISTRICT ROADS	152.32	10.60	49.77	46.74	107.11
VILLAGE ROADS	340.75	5.97	38.05	89.21	133.24
	722.55	137.08	139.16	161.71	437.96

1	2	3	4	5	6
<u>VI. TALUKA VENGURLA</u>					
NATIONAL HIGHWAYS	!-	-	-	-	-
MAJOR STATE HIGHWAYS	57.60	40.40	10.80	-	51.20
STATE HIGHWAYS	37.54	37.54	-	-	37.54
MAJOR DISTRICT ROADS	54.79	11.15	3.80	23.61	38.56
OTHER DISTRICT ROADS	70.13	7.00	22.83	16.22	46.05
VILALGES ROADS	181.44	1.61	40.90	115.42	157.93
	401.50	96.70	78.33	155.25	331.28
<u>VII. TALUKA SAWANTWADI</u>					
NATIONAL HIGHWAYS	22.99	3.30	-	-	3.30
MAJOR STATE HIGHWAYS	15.80	15.00	-	-	15.00?
STATE HIGHWAYS	184.72	159.40	10.00	10.22	179.62
MAJOR DISTRICT ROADS	172.8	22.62	69.93	64.04	159.59
OTHER DISTRICT ROADS	183.49	10.00	35.43	67.40	112.83
VILLAGE ROADS	489.79	14.38	29.55	220.91	264.84
	1069.19	224.70	144.91	3622.57	732.18

Agriculture

Historically, the district is known to be progressive in agriculture which constitutes the main economic base. But during the last several decades it got degenerated ecologically. Well irrigation or medium or small rainfed tanks is the practice of farming. About 85% of the land is undulating.

The cultivable land falls into 3 categories viz., khar and paddy land and graden soil on the mountain slopes at the foot hills and the coastal plateau which is very suitable for horticulture. The khar land needs lot of attention and good deal of effort for making it suitable for better cultivation. The other category is meant for rainfed crops. The proportion of khar and waste land is about 59 and 41%.

Taluqa-wise area ~ under principal crops

S.No.	Taluqa	Horticulture	Rice	Other	Total Crop
1.	Kankavli (%)	2.72 (2.04)	69.16 (51.68)	61.32 (46.28)	133.22 (100.00)
2.	Kudal (%)	25.25 (19.57)	79.85 (61.88)	23.94 (18.55)	129.04 (100.00)
3.	Sawantwadi (%)	65.55 (24.36)	135.35 (50.30)	68.19 (25.34)	269.09 (100.00)
4.	Vengurla (%)	33.75 (33.93)	51.14 (51.41)	15.21 (14.66)	100.10 (100.00)
5.	Devgad (%)	22.90 (19.85)	66.25 (57.43)	26.20 (22.72)	115.35 (100.00)
6.	Malwan (%)	29.56 (17.68)	103.07 (61.60)	34.68 (20.72)	167.31 (100.00)
7.	Vaibhavvadi (%)	25.86 (29.23)	43.48 (49.15)	19.26 (21.62)	88.60 (100.00)
Total Sindhudurg District		205.59	548.32	248.80	1002.71
%		(20.49)	(54.65)	(24.85)	(100.00)

The Hill - millets and Rab method cultivation is in practice but it imbalances the entire ecology for soil cover is washed away thereby the basalt rock is exposed. Also, silting of the rivers takes place. For this, educating the farmers is a prerequisite to abandon the same and of necessary the cultivators may be given subsidy to the extent of the grains produced. Such lands should exclusively be put for the growth of the grass, rainfed horticulture or for forest. The farmers can be encouraged to grow hill millets on plain lands using high yielding varieties with modern agrotechnology.

Burning certain land masses for growing saplings disturbs the fragile ecology for the fuel used is not natural litter but the branches of green trees are cut down. Improved methods of cultivation like garden beds and campaign for community nurseries may preserve the ecology.

Wastelands, unrecorded tenancies, absentee land lords, stray cattle, and non-cultivation is another impediment for the agriculture. Studies of Konkan Krishni Vidyapeet (unpublished) on waste lands suggest steps like levelling the land, providing irrigation facilities, improving the fertility, financing, technical guidance, and checking the menace of the stray cattles may lead to bring 60-90% of the land under cultivation.

Consolidation of fragmented holdings, tenancy can be solved by Tenancy Act or legislation, if required.

Large tracts of uncultivated lands with disputes and common ownership conflicts are responsible in keeping the land barren for several years, which need consideration from the point of redistribution of such land to landless farmers - a proposition that would help in two ways i.e. increased production and providing means of livelihood to labour/landless.

Stray cattle vis-a-vis ecology has a profound harmful effect on the region for large scale grazing by animals disturb the top soil level.

Such a practice leads to waste of the dung which has multiple uses. For this, cattle should not be allowed to move freely and the dung thus collected would help in building 'Gobar gas' plants - solving energy and fuel crises which indirectly will protect the indiscriminate use of forest resources, specially as fuel.

Taluka-wise irrigation is as below;

Taluka	Irrigated area in hect.	Net Sown area	% of irrigated to Sown area
Kanakavli	212	24,700	0.86%
Kudal	390	21,300	1.83%
Sawantwadi	2573	27,500	9.36%
Vengurla	2765	10,300	26.84%
Devgad	339	13,800	2.46%
Malwan	1642	16,500	9.95%
	7921	1,14,100	6.95%

Jain Committee was appointed to examine the full utilization of the irrigation facilities that are existing within the State and the region, whole report is under consideration of the government. It envisages the promotion of watersheds through lift irrigation projects.

The problem of khar land formed by the creeks and the sea coast need consideration for rich soil flows from the upper reaches into the coastal belt but this land is uncultivable by the onslaught of the tides. The Bombay Kharland Act is taking care of this problem. In this scheme, a protection bund is provided with a suitable breach and arrangement to stop the entry of salt water but permitting the extra water to flow out from inside. The system has its own limitations for it involves economic and ecological factors as it effects fish farming. Bunding the creeks at their mouth is difficult and needs careful planning by taking into account the development of creek too for the land of both sides can be used for the cultivation of Kharland rice, coconut, grasses and fishing.

Developing sizable fresh water lakes in the kharlands appears necessary to enable to use the water during week, delayed monsoons for paddy cultivation. Such ponds can be used for second crop of paddy.

Special varieties of paddy suitable for kharland cultivation like M.K.47-22 and S.R. 3-9 may be grown for better yield. With availability of fresh water, sugarcane, beat, barley, karley and vegetables can be grown to add to the economy.

Sindhudurg is quite famous for horticultural crops and accounts for 23% of the gross cropped area. The major crops are mango, cashew, and coconut. Recently, rubber is under cultivation for its commercial prospects. Besides spices, vegetables, kokum and floriculture are finding their own place without assessing their full commercial potential.

The area under mango cultivation has increased to 10,525 hectares and like wise cashew to ~~—————~~ 13094 hectares (90-91) which reflect an increase when compared to the figures of 1986-87. This is because of the favourable soil and climate and under these conditions do not require more care. Infact, most of the cashew grows on mild hill slopes, sandy tracts or land that is not suitable for the cultivation of other crops. This is perhaps one of the reason that the yield of cashew is more than that of mango.

In anyway, the cashew in Kerala is grown in a more organised way and its yield is at least twice ^{compared to} as Sindhudurg.

The situation with regards to mango is different for the variety is the best 'Alphonso', highly priced for its flavour both in the domestic and international markets. Despite high price, the cultivator is not adequately compensated by the middle men. The present yield of mango is about 6 tonnes per hectare is comparatively very low.

Coconut plantation extend over an area of 6,000 hectares with an yield/output of 65,000 tonnes of nuts. As for coconut is concerned, commercial approach is lacking for it is consumed in the district and has not been pressed for extracting oil.

Rubber plantation over 125 hectares of land at Kalambist (Sawantwadi) on experimental basis hinges on the success of the experiment (around 98-99).

Tourism

Sindhudurg has tremendous potential for tourism. However, encouraging tourism is a prerequisite. The inventory of tourism interest in the region is long and impressive but the number of tourists attracted by the region is not very encouraging.

It is pertinent to point out that Gandhiji was a ecological tourist par excellence for he said : "I need no inspiration other than Nature's. She has never failed me yet. She mystifies me, bewilder me, sends me into ecstasies. Besides god's hand work, does not man fade into insignificance ? In nature there is fundamental unity running through all the diversity we see about us." (Gandhian Thoughts).

Encouraging tourism should involve to respect the natural frontiers, whether it is the core area of the sanctuary or the distance from the high tide in the coasts. Ecological tourism will follow a conditioning of the mind and awareness of the damage which the ecosystems or heritage sites can suffer if high consuming life styles intrude into them. If all this and more can happen, we shall have more ecotourists who will earn the silent gratitude of not only the future generations of tourists but also of local villagers, the scholars, and scientists studying these sites and above all that of the monuments, the fauna and flora all of us would like to set out to enjoy.

Temples of antiquity and certain forts play an important socio economic pattern of the district. The attraction is its natural scenery and historical places which can best be enjoyed while Amboli (in Sawantwadi), Kunkeshwar (1100 A.D.) built by a Muslim trader, Satam Maharaj Mandir and Bharati Maharaj Math (Swantwadi), Datta Mandir (Kudal) Bhalchandra Maharaj Math (Kankavli), Sonurli, Aganewadi and Hiranyakheshi are places of tourists interest.

Besides this, forts like Sindhudurg (Plate), ruined fort of Padmagad, Rajkot, Sanjekot, Rangna, Manohargad, Shivgad, Narayangad, Ramgad, Songad, Avra, Santoshgad, and Kharepatan attract the attention of tourists (cf. Map.)

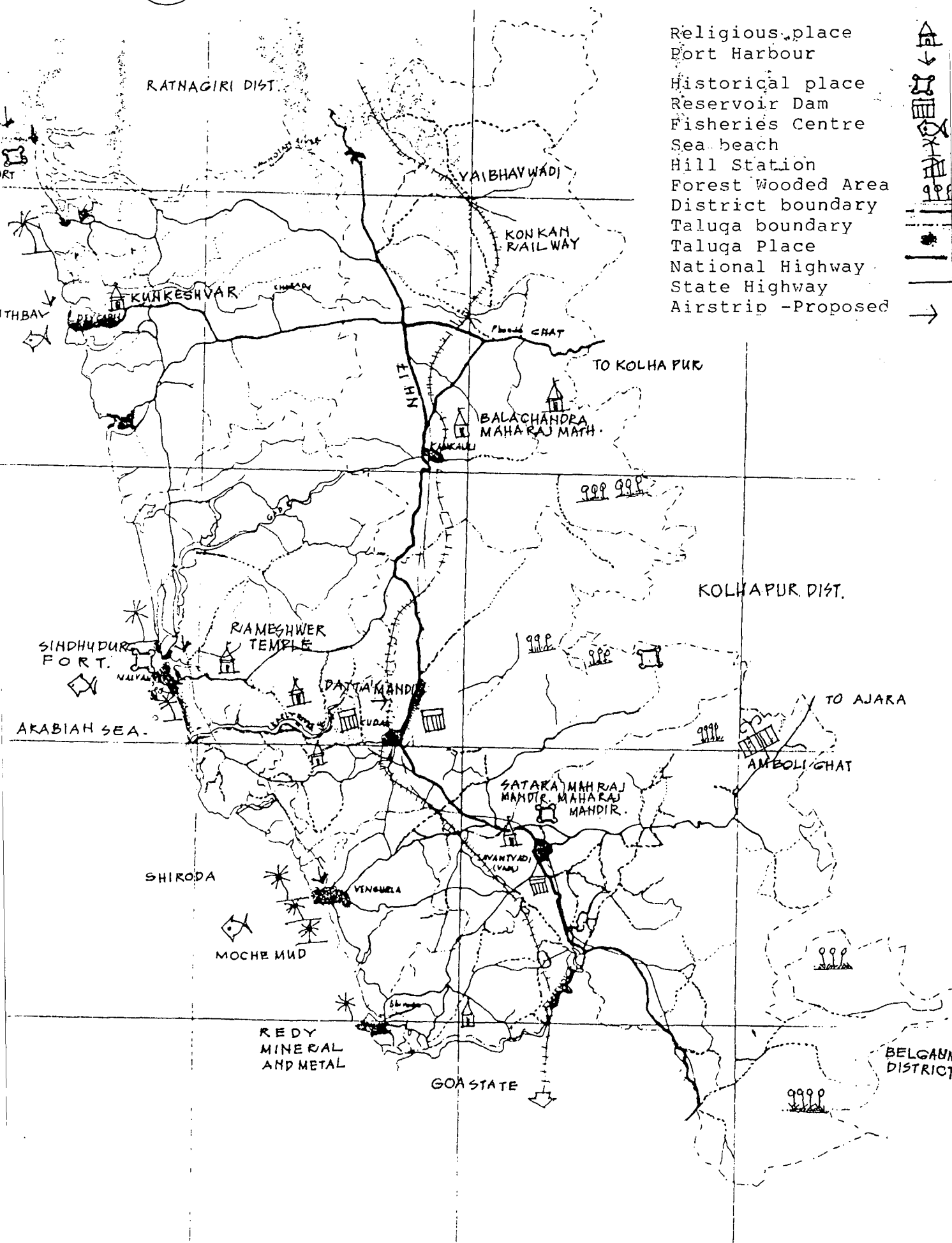
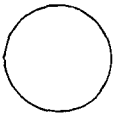
Despite the presence of such beautiful places in the district, tourism received no attention and its contribution to regional economy is very insignificant.

It is because of the lack of infrastructural support like easy accessibility, lack of viable development and amenities required by tourists.

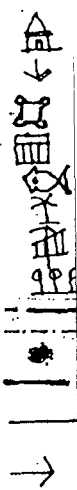
Unlike Sindhudurg, the neighbouring State of Goa attracts a strong stream of tourists from all over India (also World). A good number of tourists pass through Sindhudurg both by Road and Sea.

This inflow needs to be trapped by opening up the tourism interest of the region by providing adequate infrastructure to make it an intergral part of Bombay-Goa tourist circuit. The strategy for tourism development should lay emphasis on coastal tourism.

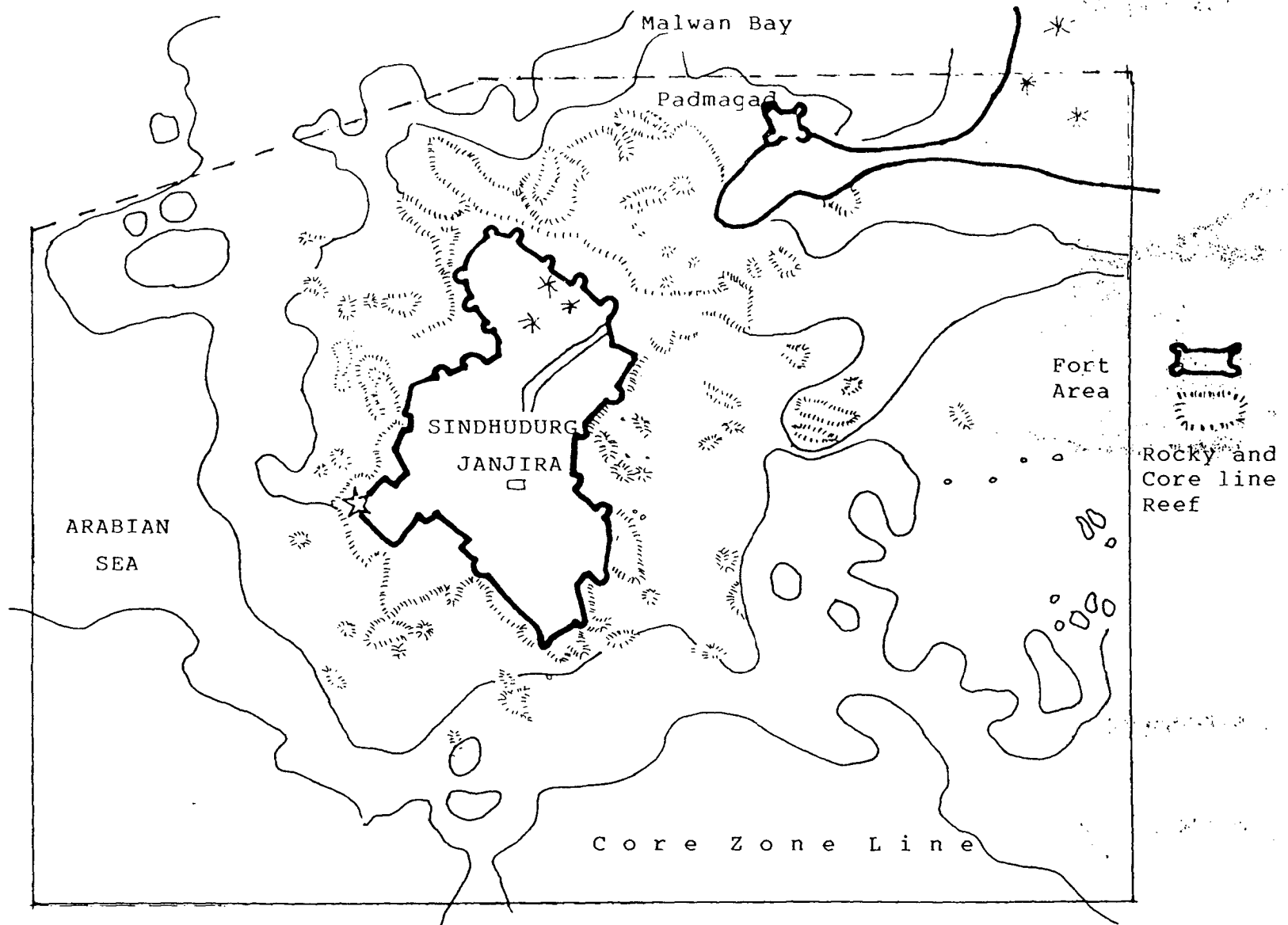
Tapping the Bombay-Goa tourists for visiting places of interest of the region with ease would undoubtedly enhance the tourism potential and economy.



- Religious place
- Port Harbour
- Historical place
- Reservoir Dam
- Fisheries Centre
- Sea beach
- Hill Station
- Forest Wooded Area
- District boundary
- Taluga boundary
- Taluga Place
- National Highway
- State Highway
- Airstrip - Proposed



S E D S: Proposed Marine Park
At MALWAN



Minerals

Material environment is based on the functional design and view point of environmental planner and how the people perceive their material ekistic environment and reach to it is infact the theme of the non material ekistic environment. The large reserves of sea sand silica are suitable for foundry. The sand deposits are mainly consumed by Sethinippon Foundry Industry, Shilpa Manufacturing, Sodium Silicate Factory, (Karul and Banda Glass factories are not functional). MIDC set up a plant at Phonda ghat with a capacity of 40,000 tonnes per year. Silica of this district is consumed by Menon & Menon Foundry (Amboli - Sawantwadi) Five Sodium Silicate plants have been registered in the small scale industry sector.

The total annual demand of Silica for the State is about 2.5 lakh tonnes per year, Of this, 1 lakh tonnes is made available by the region and the balance of 1½ lakh tonnes is procured from U.P., Rajasthan, Gujarat and A.P.

Despite the deposits, the State is not able to meet its own demand due to lack of transport facilities. This situation can be overcome by transport to Bombay through Sea for which the port is not well equipped and absence of local rail lines. Facilities for temporary storage and despatch are also not adequate. Also, there is a scope to cater to Pune, Kolhapur and Ichalkaranji if transport is improved.

The work started by GSI which is not in progress with regards to Bauxite deposits at Sateli - Satarda (Sawantwadi), may remain untapped.

There is a scope for developing quality "ceramic pottery industry" at Kudal and the work is taken up by the Maharashtra State Mining Corporation. Besides, Kudal Insulators, a private enterprise is also working for exploiting felspar. Presently, the export is to Taiwan and Rumania which can be enhanced if Redi Jelty loading facilities are improved.

There is a prospect to manufacture glazed stone-ware pipes, a ceramic product Unit.

Konark Minerals Ltd., are exploiting chromite deposits at Vagde and exporting to Rajanagarapur in Bihar for the refractory unit. High grade chromite is blended with the local one for the manufacture of refractory bricks.

The exploitation of Manganese ore available in low quantities was under private enterprise with less success.

Laterite quarries found all over the district in abundance are put to use in construction.

Clay bricks, roofing tiles, pantiles, decorative cladding tiles are manufactured all over Sindhudurg. Still there is scope for establishing more units for the manufacture of roofing tiles.

Setting-up of petroleum refineries at Mangalore and Devgad, and a gas cracker plant near Roha will improve the industrial development of down stream industries. Likewise the planned steel plant with a capacity of 2 million tonnes near Mangalore will change the complexion of the region in terms of industrial and other sectoral growth.

Land utilisation pattern of Sindhurg district has been studied on the basis of satellite maps obtained from National Remote Sensing Agency, Hyderabad during the year 1993. As per map data total area of the district is placed at 5087.70 Sq. Kms. This conforms with the official statistics on land use of Maharashtra with an insignificant variation.

In all, there are 15 categories of land use which have been broadly categorised into five groups. They are Habitation, Agriculture (agriculture crop, current fallow land), Forest (dense forest, degraded forest, open forest, plantation, mangroves), Water bodies (wet land area, surface water) and Waste Land (undulating upland with or without scrubs, sandy area, mining area baron rocky area).

In all, there are seven talukas in the district. While Sawantawadi is the biggest taluka of the district covering about one-fourth of the total area of the district, Vengurla is the smallest taluka of the district covering 5.47 per cent of the total area of the district. Remaining talukas are almost evenly distributed having area in the range of 10 to 16 percent of the total area of the district. Taluka-wise land utilisation depicted in graphs.

Habitation area read as per maps covers only the town areas which are densely populated. This forms 0.47 per cent of the total area of the district. More than 25 percent of habitation is found in Sawantwadi taluka followed by Devagad, Kankavali, Vengurla, Malwan, Kudal and Vaibhavvadi.

Agricultural area forms 23.88 percent of total area of the district. Of which area under agricultural crops covers 12.19% and the remaining 11.69 percent of the area falls at present under the current fallow land. Forest area covers 29.25 percent of which dense forest, open forest and plantation is 8.12 percent, 9.11 percent and 7.50 percent respectively. Area covered under mangroves is negligible. It is observed that about 44.71 percent of the area accounts for waste land. Majority of waste land is of the type of undulating upland with or without shrubs. Barren rocky areas form 13.73 percent. Water bodies covers only 1.68 percent of the total area of the district.

Sawantwadi taluka constitutes 26.56 percent of the total area of the district. Taluka-wise analysis reveal that, in Sawantwadi taluka nearly 45 percent of the area is under waste land, 32.5 percent land is under forest cover and 21.1 percent account for agriculture. Vengurla is the smallest taluka of the district with 5.47 percent of the total area. In this taluks land under agriculture is somewhat higher and is placed at 37.1 percent. Waste land constitutes 37.3 percent and forest area covers 21 percent. Malwan taluka forms 11.95 percent of total area of the district. In this taluka about 37.3 percent is waste land and land under agriculture forms 35.7 percent. Area under forest 16.6 percent. Area of Kudal taluka is 16.03 percent. In this taluka area under waste land covers 41.4 percent, forest area forms 35.9 percent. Area under agriculture is only 22 percent. Kankavali taluka constitute 14.81 percent of total area of the district. In this taluka, waste land is much higher and is placed at 50.3 percent. Area under forest is 32.4 percent and under agricultlure is 15.2 percent. Devgad taluka forms 15.71 percent of of the total area. Waste land in this taluka 45.8 percent and agriculture land covers 32.8 percent. Forest area is somewhat low in this taluka

covering 19.1 percent. Vaibhavvadi is the new taluka formed at the time of formation of the district. Area of the taluka is 9.47 percent of the district. Area under waste land covers 45.2 percent and that of agriculture is only 11.1 percent. The taluka has more forest area which forms 41.6 percent.

Taluka-wise and land use wise details are given in the table below;

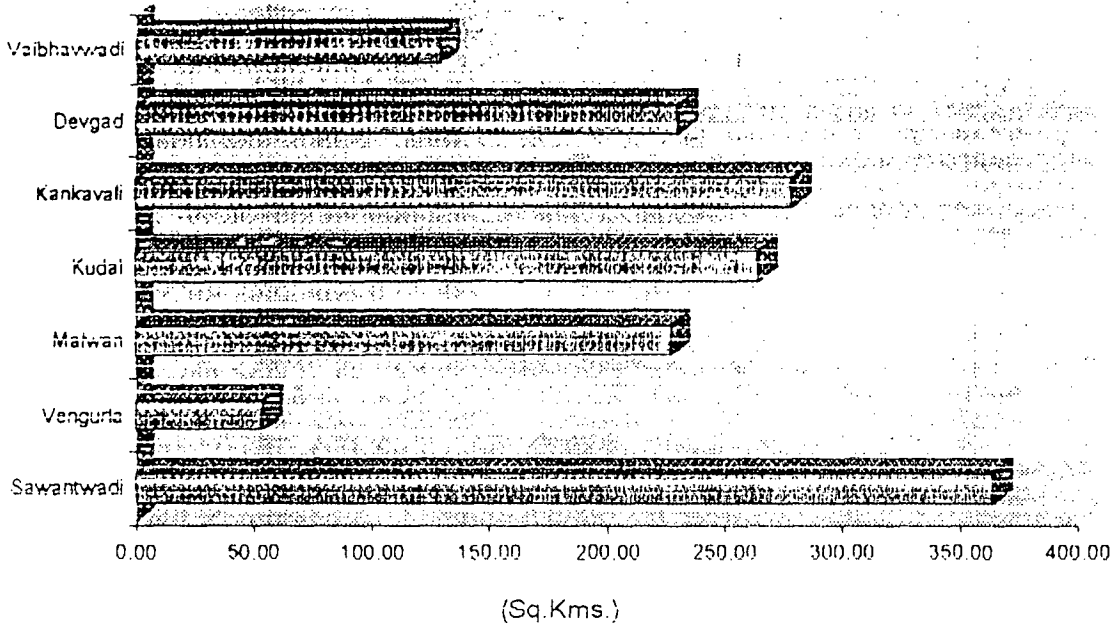
EXISTING LAND USE OF SIKCHUDURG DISTRICT

(Area in Sq

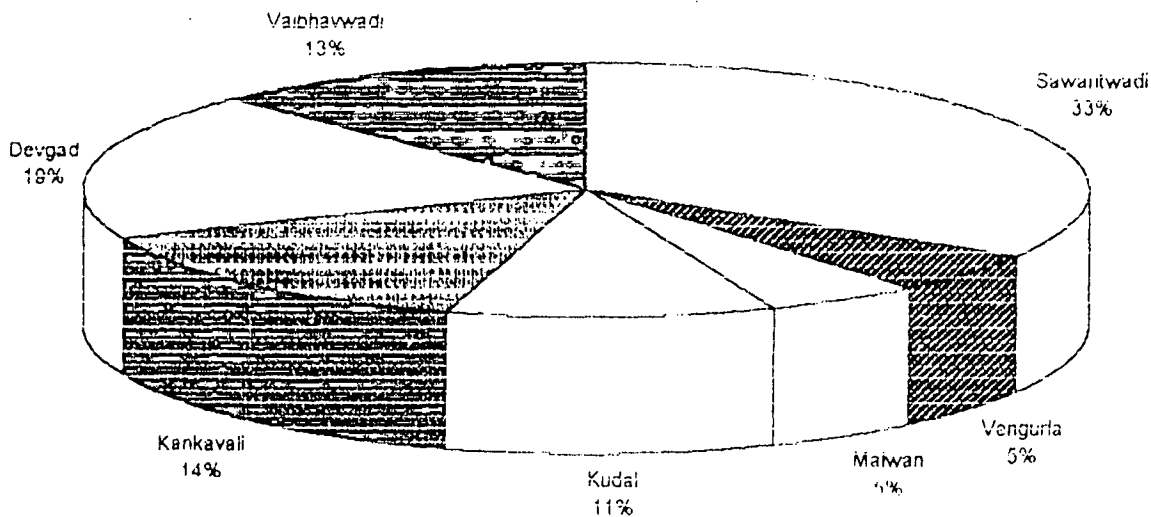
Items	Sawantwadi		Vengurla		Malwan		Kudal		Kankavali		Devgad		Vaibhavvadi		Total	
	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage
Habitation	6.79	0.13	3.65	0.07	1.94	0.04	2.00	0.04	3.90	0.08	4.34	0.09	1.43	0.03	24.05	0.4
AGRICULTURE																
Agricultural Crop	122.00	2.40	71.00	1.40	156.00	3.07	92.00	1.81	30.00	0.59	124.00	2.44	25.28	0.50	620.28	12.1
Current Fallow Land	162.94	3.20	32.20	0.63	61.12	1.20	87.34	1.72	84.82	1.67	138.29	2.72	28.13	0.55	594.84	11.6
Total	284.94	5.60	103.20	2.03	217.12	4.27	179.34	3.52	114.82	2.26	262.29	5.16	53.42	1.05	1215.13	23.8
FOREST																
Dense Forest	181.65	3.57	4.05	0.08	9.74	0.19	78.22	1.54	63.00	1.24	26.83	0.53	49.53	0.97	413.02	8.1
Degraded Forest	82.01	1.61	4.60	0.09	29.26	0.58	40.04	0.79	28.72	0.56	8.55	0.17	35.54	0.70	228.72	4.5
Open Forest	131.39	2.58	0.00	0.00	22.41	0.44	126.04	2.48	105.45	2.07	17.17	0.34	60.36	1.20	463.32	9.1
Plantations	42.73	0.84	49.06	0.96	39.78	0.78	48.29	0.95	46.82	0.92	100.35	1.97	54.48	1.07	381.51	7.5
Mangroves	0.84	0.02	0.66	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.50	0.0
Total	438.62	8.62	58.37	1.15	101.19	1.99	292.59	5.75	243.99	4.80	152.90	3.01	200.41	3.94	1488.07	29.2
WATER BODIES																
Wet Land Area	10.88	0.21	7.63	0.15	8.21	0.16	0.00	0.00	5.38	0.11	1.29	0.03	8.62	0.17	41.81	0.8
Surface water	4.58	0.09	1.58	0.03	14.75	0.29	3.69	0.07	6.71	0.13	12.43	0.24	0.00	0.00	43.74	0.8
Total	15.26	0.30	9.21	0.18	22.96	0.45	3.69	0.07	12.09	0.24	13.72	0.27	8.62	0.17	85.55	1.6
WASTE LAND																
Undulating upland with or without scrub	363.93	7.15	53.48	1.05	226.73	4.46	284.24	5.19	278.39	5.47	230.13	4.52	128.89	2.53	1545.79	30.3
Sandy Area	0.00	0.00	11.08	0.22	3.23	0.06	0.00	0.00	0.00	0.00	5.13	0.10	0.00	0.00	19.44	0.3
Mining Area	6.28	0.12	3.11	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	0.03	11.07	0.2
Barron Rocky Area	235.50	4.63	36.07	0.71	34.84	0.68	73.70	1.45	100.18	1.97	130.82	2.57	87.49	1.72	698.60	13.7
Total	605.71	11.91	103.74	2.04	264.80	5.20	337.94	6.64	378.57	7.44	366.08	7.20	218.07	4.29	2274.91	44.7
Grand Total	1351.32	26.56	278.17	5.47	608.01	11.95	815.58	16.03	753.37	14.81	799.33	15.71	481.94	9.47	5087.70	100.0

Source: NRSA, Hyderabad.

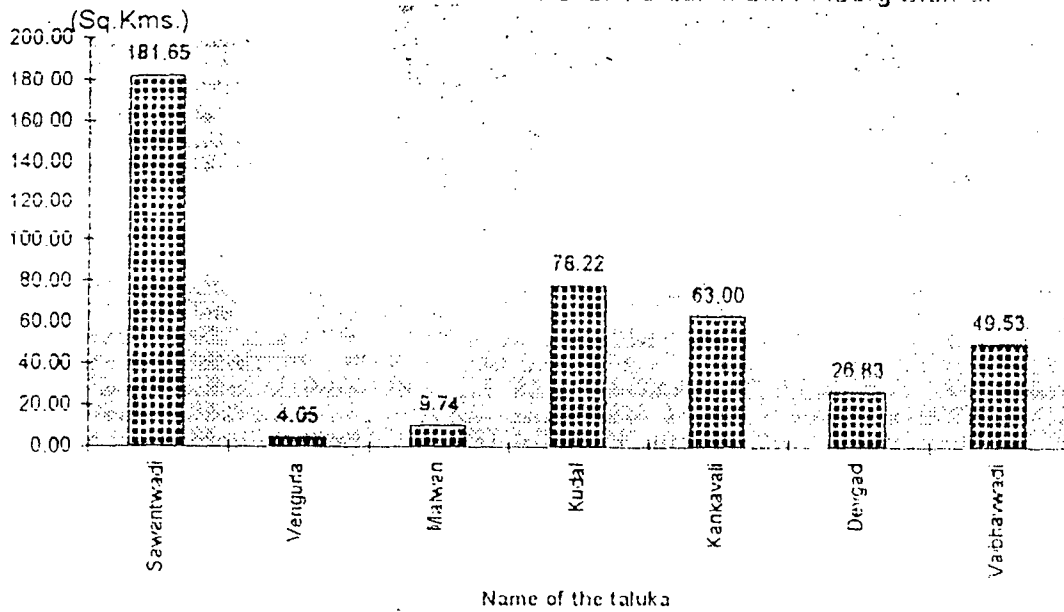
Talukawise distribution of Undulating upland with or without scrubs of Sindhudurg District



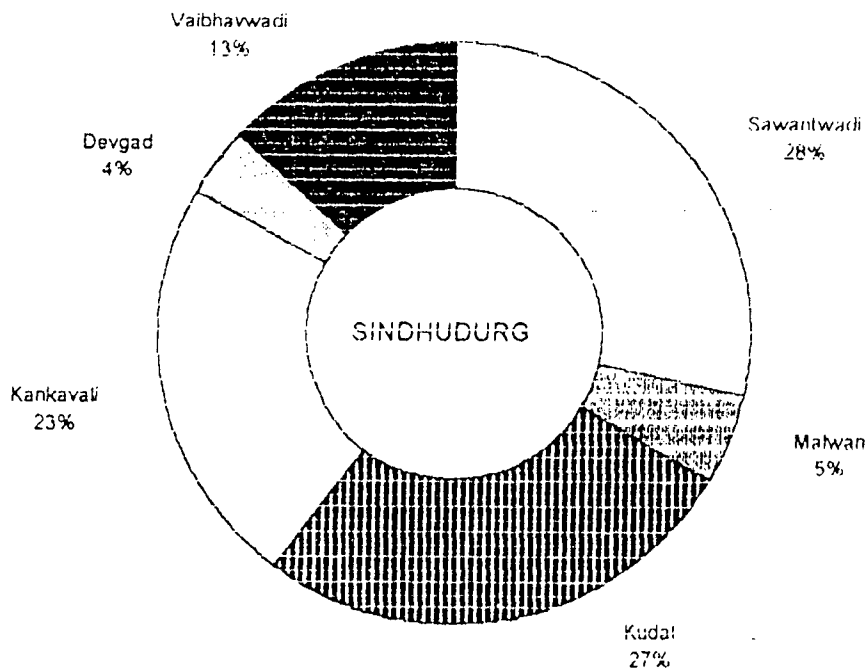
Talukawise Per centage distribution of the Rocky land in Sindhudurg District



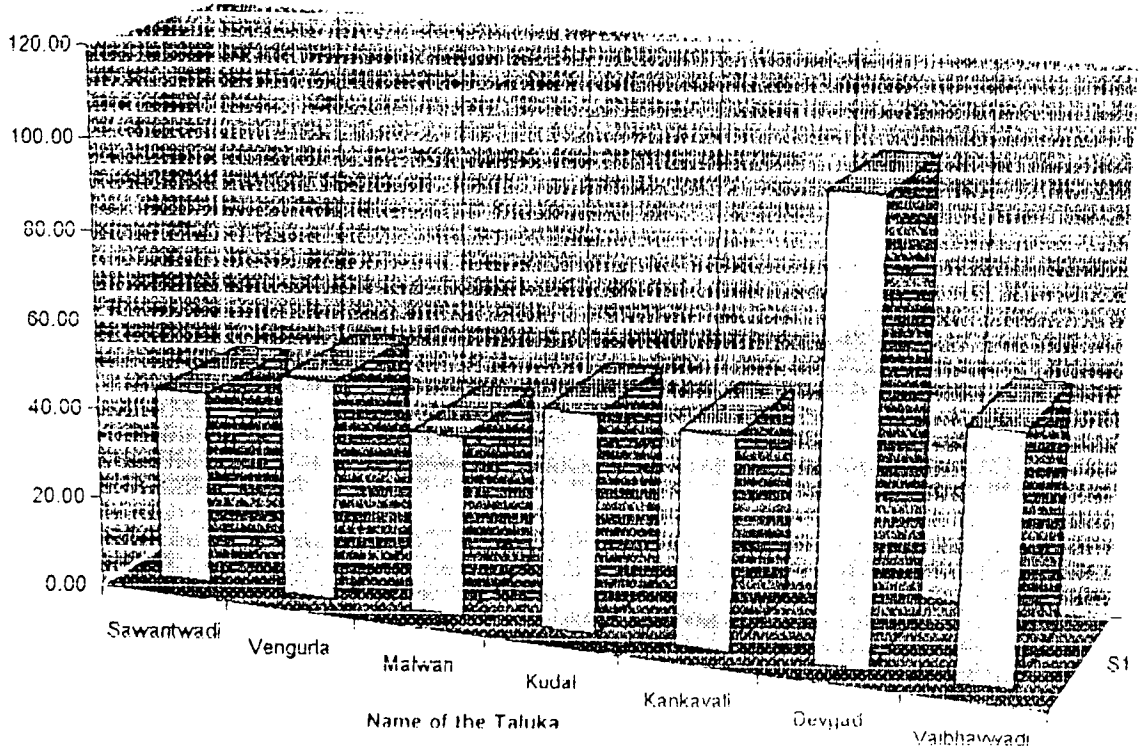
Talukawise distribution of Dense Forest in Sindhudurg District



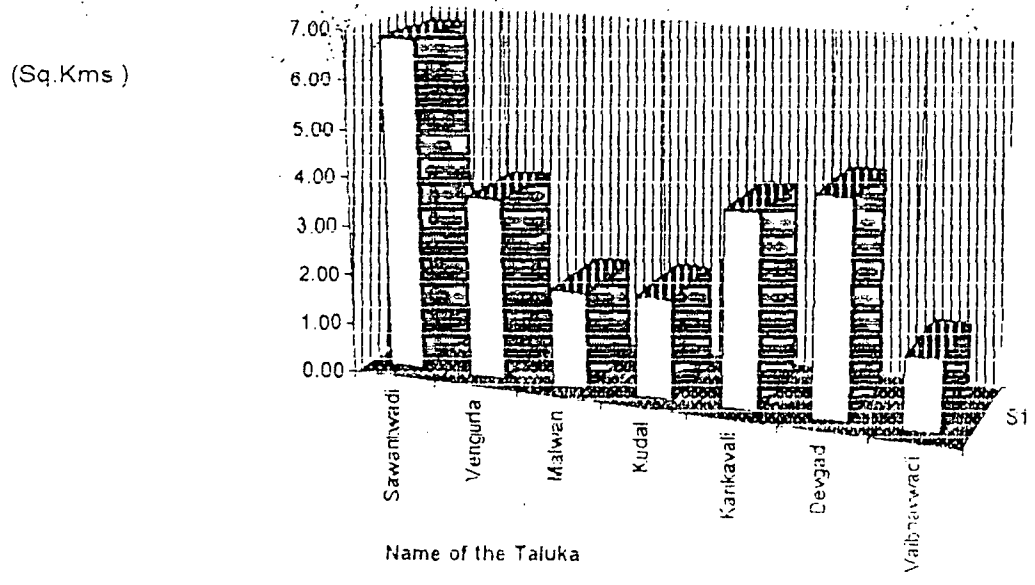
Talukawise distribution of the Open Forest in Sindhudurg District



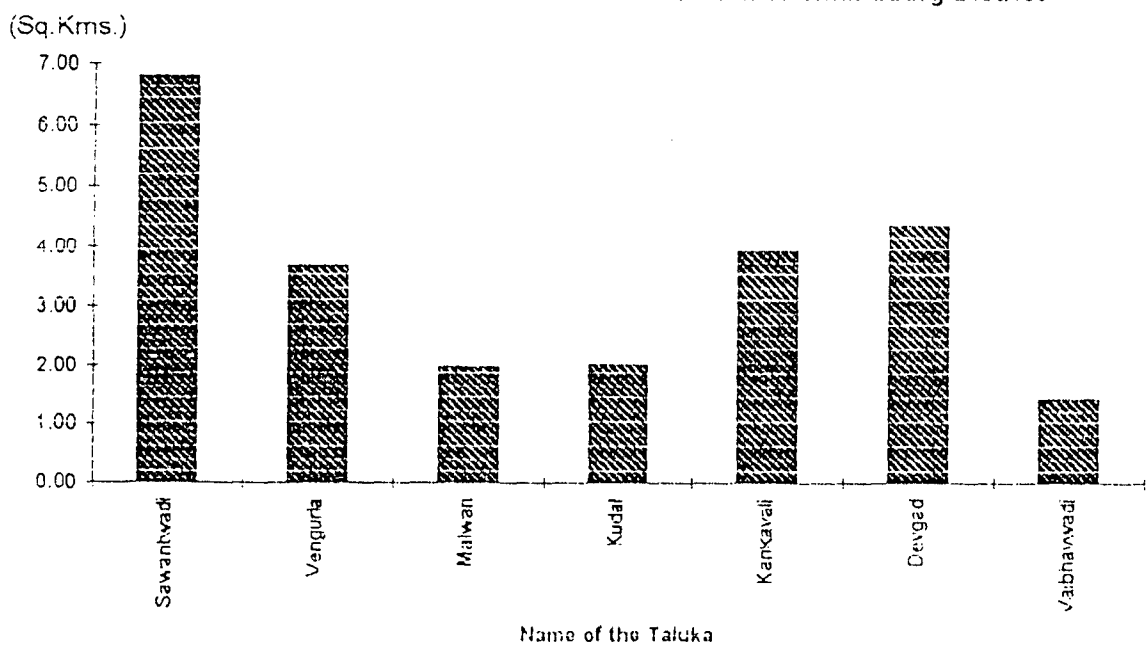
Talukawise distribution of Plantation of Sindhudurg District



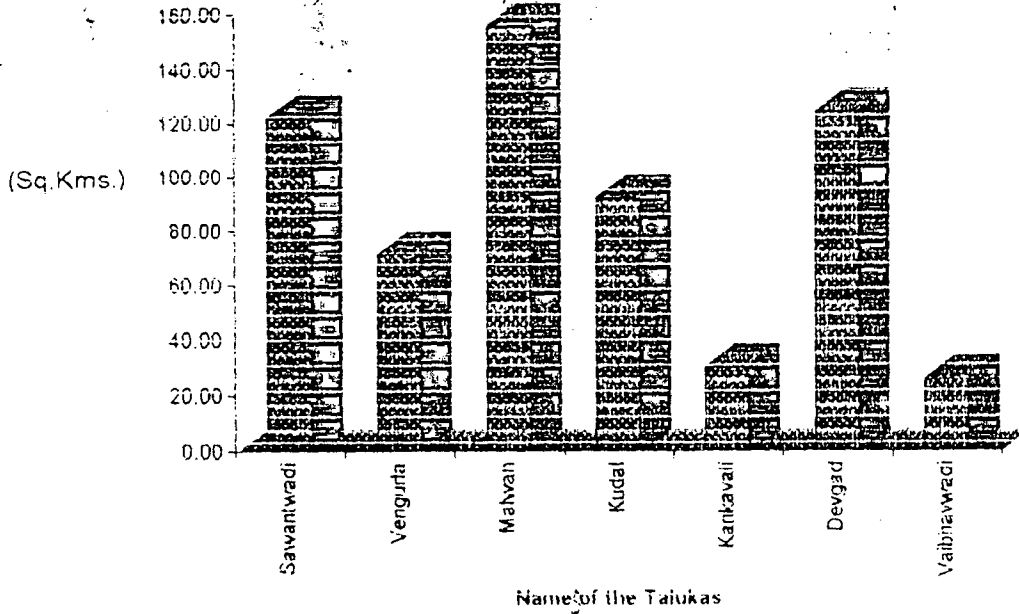
Talukawise distribution of wet Land of Sindhudurg District



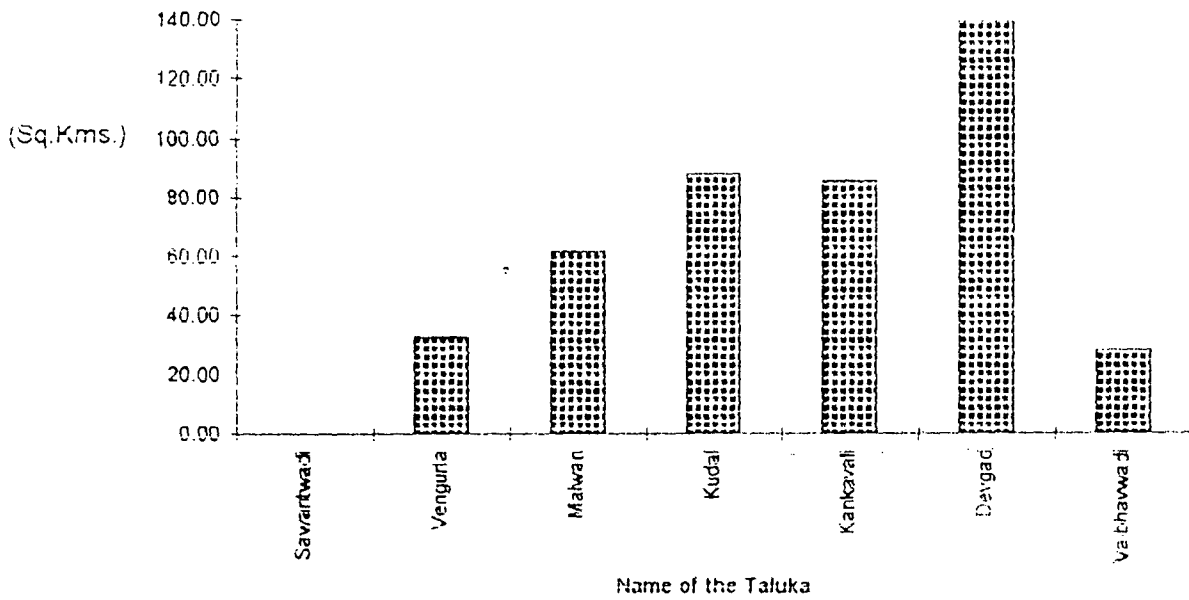
Talukawise distribution of Habitation of Sindhudurg District



Talukawise Agricultural land utilisation of Sindhudurg District



Talukawise Current Fallow Land Utilisation of Sindhudurg District



The land utilization pattern reveals : (i) poor forest cover (16%), (ii) very low net sown area (29%), (iii) large area not available for cultivation (31%) and (iv) a large proportion of uncultivated cultivable land including fallows (15%).

The forest cover is low for it does not include forests of privately owned lands. Some of these areas are under horticultural or plantation and accordingly are not classified as forests.

Attempts are being made to break the slopes by terracing to use the area for mango plantation. Using IRs data, the area under this category is to the extent of 44930 hectares.

The total area under forest is about 58,563.66 hectares and that of social forestry area is 4057 hectares.

Extensive afforestation under social forestry programme is taken up but the plantation is restricted to roadside along major roads. The vegetation under this scheme is represented by Eucalyptus, and Acacia planted in two rows.

The proportion of the area not available for cultivation is considerable because of coastal region and hill slopes. The absence of efforts to reclaim and develop, land remains

uncultivable. The net sown area is low. There are lands that are cultivable but not cultivated presently for lack of land development efforts. This land alone gives some hope for the district.

Large cultivable tracts are left fallow for man power is not available for farming. This is due to the migration of the local population to Greater Bombay or neighbouring districts for gainful employment and lure for urban life style. Land with or without scrub and barren rocky areas caused by destruction of vegetation is commonly found. At various places bunds are constructed for protecting agricultural land from inundation i.e. sea water encroachment. Attempts are made to check soil erosion. Concrete efforts are being made to bring more and more area under mango and cashew plantation.

Hardened and Weathered barren rocky area without soil cover are found near the coastline and wherever there are depression,s the layer of soil accumulates and dry crops like Ragi are sown in small patches.

STRATEGIES GENERAL

- All the irrigation wells need to be constructed in the coming 10 years.
- For exploiting mineral potential, infrastructure like transport, licensing policy and industrial location should be taken up judiciously.
- Dumping of waste material on land and sea should be scientifically organised.
- Water pumped out of mines should be put to use for agriculture.
- Water supply scheme for the entire settlement including Wadis needs to be implemented.
- The agricultural development programme should envisage increase in agricultural productivity and bringing all agricultural land to its optimum use.
- Cultivation of Medicinal plants should be encouraged for the district has potential for the same.
- Creation of suitable environment for dairy development and 'White revolution'.
- Intensive forest development programme should be made as a popular movement along with Social Forestry.

- Fishing centres are required to be developed with the necessary infrastructure and should be kept free from pollution.
- Improving the present condition of roads will increase their utility.
- Proposed two road links: Matond to Asgani (Malwan) and Kasal to Digave (Sawantwadi) along with road link to other districts should be implemented on priority basis.
- Development of feeder roads to connect inaccessible and unconnected talukas to the National Highway as well as the new Konkan Railway.
- Goa type of Ferry service on atleast 3 creeks viz., Tarkarli, Vijaydurg and Kiranpani should be made available.
- It is necessary to restore the inland navigation in important creeks/rivers with particular reference to Vijaydurg, Tarkarli and Kiranpani by dredging and desilting.
- All the existing 3 Municipal towns need an improved water supply scheme for the projected population of 2001 A.D.
- Schemes for supplying electricity should be completed on priority basis to cater to the needs of agriculture, industry and domestic.

- Creating improved employment opportunities would check the migratory trend of the population, and this would set in trends for return migration.
- The Soils of Western Konkan Coast region (agroclimatic zone) have great potential for growing export-oriented horticultural crops (Chikku and pineapple, mango etc.).
- Also they are suitable for establishing hydroelectric/thermal stations (congenial sites) and high rainfall.
- Saline patches of the area could conveniently be brought under rice cultivation by leaching of salts through ponding.
- The mine spoils formed due to dumping of waste materials need to be stabilised to avoid further degradation of the catchment areas.
- A few recreational spots can be developed where rock out crops enclose the crescent shaped beaches.
- Sindhudurg, ^{which} falls under Agro-Ecoregion 19, has a great potential for development of agricultural and horticulture.
- All kinds of lands should be critically examined for judicious use.

- The housing development programme need to be maxmised with the avilable resources.
- for providing major facilities attempt should be made to locate one or more nodal settlements identified as village growth centres.
- Tourist complexes need to be developed with required infrastructure at Malwan, Phonda, Vijaydurg etc.
- It is required to develop wayside facilities at Kharepatan, Kasal and South of Sawantwadi.
- Wild life, Bird and Snake, sanctuaries and Marine parks need to be developed.
- Land use pattern need consideration:
 - a) High hill ranges should be used for afforestation along with grass having quick growing character.
 - b) Use of elongated ranges for plantation crops mango, pineapple, cashew , coconut, and arecanut.
 - c) Upper and lower plateau be put to use for agriculture.
- For controlling Floods, natural forest pattern of Western Ghats needs restoration which will also maintain the ecological balance.

- Uncultivated waste and rocky lands on the plateau should be exploited for agrobased industries.
- Every attempt should be made to conserve cultural heritage including natural and environmental conservation.
- A situation bordering on frustrated expectations of the Farming Community in the district has arisen after what looked like a fairly satisfactory performance on the agricultural front is all the more a matter of serious introspection by policy makers.
- Integrated approach for development and conservation of infrastructure in all forms of economic activity, education/ health facilities to obtain the environment friendly ecological balance.
- There is a necessity to develop public gardens for recreation of people at District and Taluqa level.
- The present area of 286 hectares under industries be expanded to 1209 hectares for creating 3205 employments by the end of 2001 A.D.
- Precautions for avoiding air and water pollution should be made mandatory.
- Industries based on agriculture and horticulture products and minerals be started on priority basis.
- There is a need to constitute new Municipal Councils for Devgad, Kankavli, Kudal/Oras and Arawali (Shiroda).

- An inbuilt system of flexibility should be introduced while implementing zonal regulations in Coastal areas keeping in view the local topography, habitation, demands and needs without disturbing the natural ecological balance to provide sustainable development.
- For spatially contiguous regions common strategy should be evolved based on macro-level generalisation.
- Due ~~to~~ encouragement should be given to promote large scale active participation in the development activities by private sectors, investors, corporate, cooperative sectors etc.
- Urban, suburban and rural area for changing them into a new landscape within the grand topographical frame work of protected mountain slopes, river basins, shores, desert, forest and farmland.

In this context, conservation of living resources has three specific objectives i.e. (i) to maintain essential ecological process and life support systems mainly based on recycling (ii) to preserve genetic diversity on which depends breeding and (iii) ensuring sustainable utilization of species/ecosystems.

AGRICULTURE & HORTICULTURE

Existing Crop land
fallow land

Agricultural lands are under missuse
excess use of fungicides and pesticides

Agricultural lands need protection
from excesses.

Excess use of Fertilisers rather than
manu ure.

Crop Cultivation:
Mango, Jack Fruit,
Chikko, Coconut,
Arecanut, Pepper,
Cardamum, Pine apple,
Spicies, Rubber,

Soil Erosion: Predominantly laterite
moisture retaining capacity gets reduced
in summer season affecting the cattle
sheep and Goat grazing, resulting in
reduced milk yield.

Prevention of erosion by affore-
station, improvement and
redevelopment of water front areas,
bunds, tanks, rivers, ponds and
lakes . .

Western ghats:

Impact of industries on horticultural
crops , lack of technical inputs.

Alteration in native arrangement
for cattle and sheep and Goat
grazing introduction of mix
cropping.

Coffee, Cardamum, Pepper,
Arecanut (Cash crop),
Rubber.

Single species planting, low density.

FOREST:

Ever Green (Dense Forest)
Semi Ever Green
Degraded Forest
Open Forest
Plantation
Mangroves

Disappearance of dense forest affecting
micro climate. Eg:Wheather specially
rainfall, accordingly flora and fauna is
effected.

Dense forest need preservation and
conservation to maintain the micro-
climate and the natural secnery,
forest, wild life, natural resource
and land-scape need development.

Readily available increase in firewood
demand for domestic as well as industrial
use.;

Bird Sancturies, Wild life sanctur-
ies be proposed. and ^{also a} snake park.

Exploitation of forest for timber purposes
teak, sal, variety of wood, jack fruit -
(Building) resulting in shifting of culti-
vation to degraded forest like waste land areas.

In coastal areas new marine life
sancturies be proposed.

Eco-Tone ecology is affected due to lack of mangrove along water belts (Coastal belts).

Forest Fire.
affecting the rare species of Western ghats.
Due to heavy rainfall chances of land slide are more - open forest.

Minor mining activity destroy habitat for flora and fauna.

To maintain Ecosystem, ecology, existing mangroves be protected with planting of more mangroves.

To protect forest fire alarm system and other scientific methods should be adopted or by satellite monitoring system.

The rare species should be protected in Western ghats area.

Accepted measures should be taken to avoid land slide in open forest by buffer plantation.

Social Forestry system should be encouraged to avoid this.

In hilly areas 50% of the forest land area should be allowed to be converted into Rural area.

2½ Hectares of land per person concept be encouraged.

Strict measure should be implemented on the existing (as well as proposed) polluting industries to curb pollution.

In future only the industries which are compatible with the existing land uses and activities should be permitted.

INDUSTRIES:

Exploitation of natural resources to its maximum capacity.

Industrial development results in pollution of air, water, noise, adversely changing micro-climate of the place.

Heavy industrial development forces the changes in land uses. (Agriculture and Forest).

Flora and Fauna get affected due to industrial pollution.

Lack of infra structure to support the man power attracted by industrial development(unhygienic conditions).

Discharge of toxic effluents in coastal areas alter ecosystem.

Socio - economically as well as environmentally, it is better to encourage small scale units/ related to the local activities like agricultural and horticultural.

Non polluting industries such as agro-based industries should be encouraged by giving incentives (tax relief, subsidies and infra-structure).

SETTLEMENTS:

Rural

Due to increasing demand for housing lot of agricultural/productive land is converted to non agricultueal area thus affecting natural resources, like Forest, Water, Flora and Fauna.

In rural and urban areas Agricultural/Horticultural land should be protected.

Urban

Due to above mentioned reasons there is tremendous load on National resource - Water and Firewood.

For settlement better infrastructure should be provided and hilly areas to be promoted for Residential areas.

The Wadi system of rural settlements, and integral part of the Socio-economic system of the villages - try to avoid the small wadis by giving adequate incentives.

The balanced and self contained Township should be well planned rather than to develop on its own, with necessary infra-structure for services, and social amenities such as health, education post offices recreation centres with basic amenities.

Encourage to move big wadies.

Provide basic amenities like drinking water, street lighting and approach roads.

Preservation of objects, feature, structure or places of historical, natural, architectural and educational values.

Forming a rural and urban healthy linkage to avoid more urban-istation.

A deep study is required for evolving appropriate healthy habitat planning strategy on scientific basis for mode/village/model (town) and Taluka.

TRANSPORT NETWORK:

Surface
Rail
Waterways

Poor infrastructure and poor net work of surface transportation linking system within the region as well as the neighbouring areas. Konkan Railway has made big impact on Natural resources like topography, vegetation, agricultural areas etc. It divided the existing settlements in two divisions thus affecting infrastructure and the network of the settlements.

Air and Noise pollution.

Sagging of embankments of rail tracks in Khar lands.

Flora and Fauna is affected.

More accessibility should be achieved through an improved net work of surface transportation, utilising optimally all the existing and proposed modes of transportation net work.

The inter regional movement using the National high way and Konkan Railway should be transformed into a system of intra regional movement through other modes:

The water ways can be more effectively utilised for intra regional traffic as well as linkages with neighbouring areas.

MINING:

Iron Ore and Manganese
(Sawantwadi)
Pig iron - Silca, Chromate
Lime stone, copper
(Vengurla)

Open mining areas cause severe damage to environs, such as;

Crop cultivation.

Habitation

Air pollution.

Instability of soil

Vegetation is affected due to dust pollution.

Forest areas are damaged due to open surface.

To prevent the damages caused by open mining areas can be reduced by buffer plantation or developing green belt.

Surrounds of the open mining areas stepped system - retaining wall should be constructed by providing systematic drainage with sluice gate to allow the storm water to flow into the stream or river sea.

Drainage causing a heavy soil erosion
Pollution of water (river streams and
sea) is caused due to discharge of
metal ingredients. The Ecosystem of
coastal area gets severally affected.,
With the result of heavy mining
activity the land form and topography
changes affecting natural
resources.

TOURISM:

Exploitation of Resources Natural:
Coastal belts - Sandy beaches and
conversion of Orchard and agricul-
tural lands;

Water resources, lagoons, lakes,
ponds, streams, creeks, Serene
sceneries, Forest,

Man made resources:

Load on infrastructure like, power,
water supply, transportation network,
domestic needs etc. Tourists and
Religious places, historical
monuments, ports irrigation projects,
dams.

Introduction of tourism projects
leading to privatisation of coastal
areas is adversely affecting common
man - lack of access to beach, open
fishing and recreation.

Disposal of unattended waste and
untreated means of waste disposal
from Hotels etc.

Eco - system of the coastal area
should be preserved to a great
extent.

Precisely, the natural resources
should be preserved.

Ecologically integrated tourism
development master plan for
ecofriendly and hospitable
approach.

Policy Proposals:

Land uses and its various
distribution aspects, (low - middle
and high income groups), domestic
and inter National tourists.

Use of Natural resources to its
optimum value, like infrastructure
facilities.

Need to preserve forests, for
wild animal/bird sancturies.

Rule C.Z.2 in coastal area
marine park should be made
flexible for its optimum use.

A scientific Network system
should be implemented strictly for
disposal of garbage and its
treatment at strategic location.

Disposal of medical wastes (Syringes) on the beaches.

Discharged effluents in coastal as well streams, river, ponds etc.

Because of false notions and ill conceived ideas are entertained by socio-cultural set up.

Chances of epidemics are more.

Due to vandalism, feeling of in security for environmental tourists.

Erosion of soil and saline silting oceaning along the coastal area.

Strict vigilance along the coastal areas to avoid drug, abuse and drug traffic-king.

Eradication of tourism related adverse public opinion by evolving.

Suitable awareness measures.

Water related activities like fisheries, in trade trawlers, Jetties, recreational water boating sports with safety measures for tourists and also providing health care, cure and check-up.

Introduction of tourist protection cell (quarantine cell)

Stability of land along water fronts to be developed by scientific soil retention techniques.

Eg. Cluster of Vegetation, stone pitching, retain wall, sluice gates jetties, access to the water.

WASTE LANDS:

Soil Erosion

Should be used for productive purposes.

WATER BODIES:

Rivers

Creeks

Ponds

Tanks

Bundaras

Rivers are shallow and rainfed rivers carry silt/sand/loam. Rivers erode/Corrode resulting in not allowing the mangroves to grow in natural way.

River ecosystem is subject to change due to several factors.

For transportation jetties are not available, same holds good for fishing Kiranpani and Devgad Rivers get silted and obstruct-navigation.

Across the rivers dams are being constructed effecting natural course of flow of rivers.

This effects both flora and fauna. As a consequence normal water level goes down. It increases the extent of barren land.

Dampness is reduced or disappears, because of the streams and rivers that carry silt and sand, the depth of major and minor dams is reduced. During the summer they dry away, earthquakes are the result of the presence of major dams (Koyna) Due to dams epidemics like malaria, filaria and other water borne diseases are common.

Drainage water enters into the stream due to ill maintained streams, rivers, tanks, bunds and creeks.

The climate of the region is adversely effected.

Along the river banks tree plantation should be raised.

At various required places retaining wall need construction.

Effluents from industry should be treated before they merge into river.

Transport and fishing jetties be made available across the river, small bunds be constructed to avoid flooding, the excess water should be reused for agriculture without disturbing the normal flow.

Due attention be paid while constructing major dams to avoid catastrophies like earthquakes. Dam sites should be converted into recreational places.

Control of epidemics by public health care system should be adopted.

Every effort should be made to instal hydroelectric power generators around the major dams.

A F F O R E S T A T I O N

S E D S : Land use and Topography



H O R T I C U L T U R E
& F O R E S T R Y

THIN SOIL COVER

AGRO-HORTICULTURE

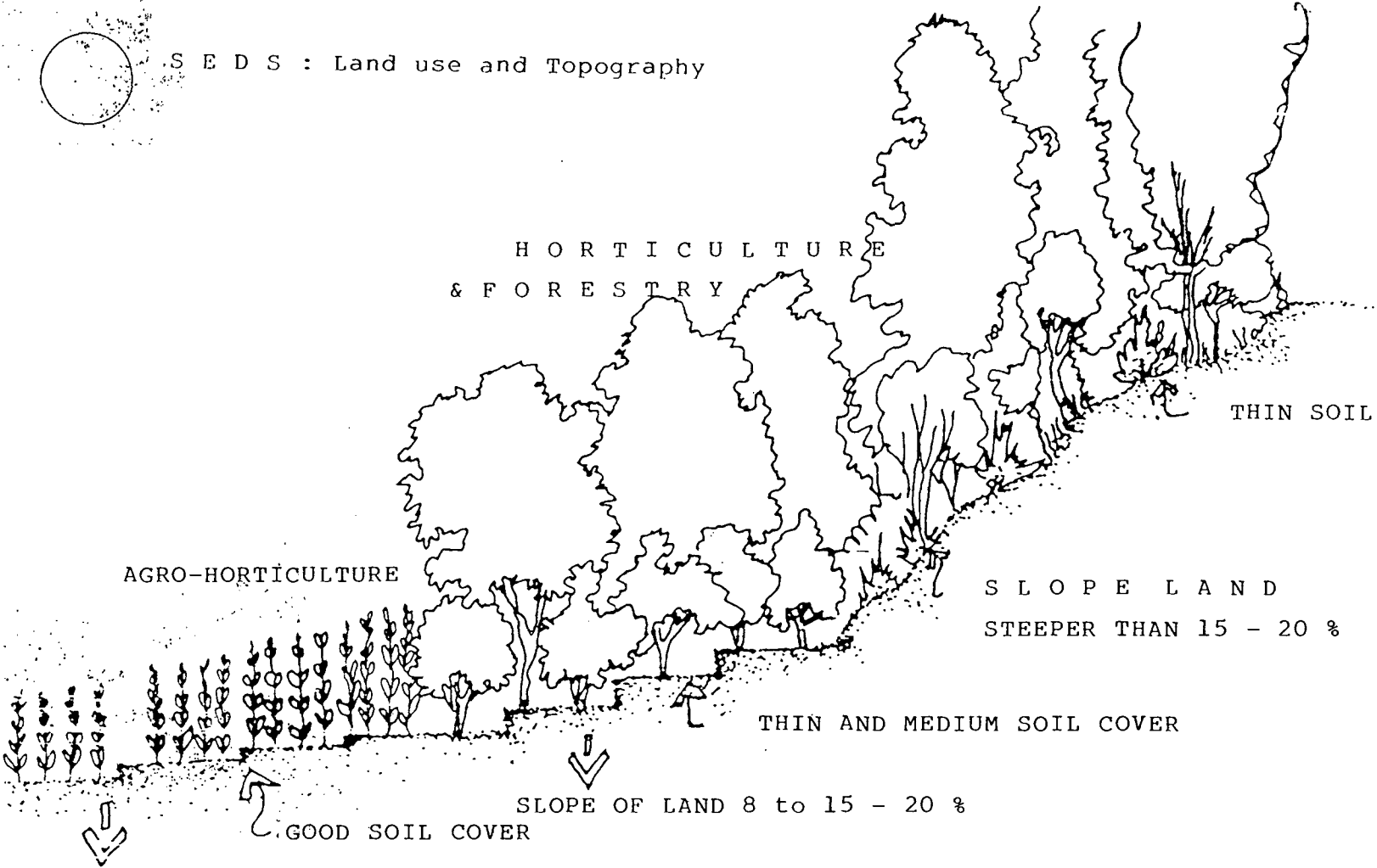
S L O P E L A N D
S T E E P E R T H A N 1 5 - 2 0 %

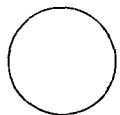
THIN AND MEDIUM SOIL COVER

S L O P E O F L A N D 8 t o 1 5 - 2 0 %

G O O D S O I L C O V E R

S L O P E L A N D L E S S T H A N 6 - 8 %





SEEDS : Common Dune Vegetation

COCONUT ZONE



ANACARDIA ZONE



CASAURINA ZONE



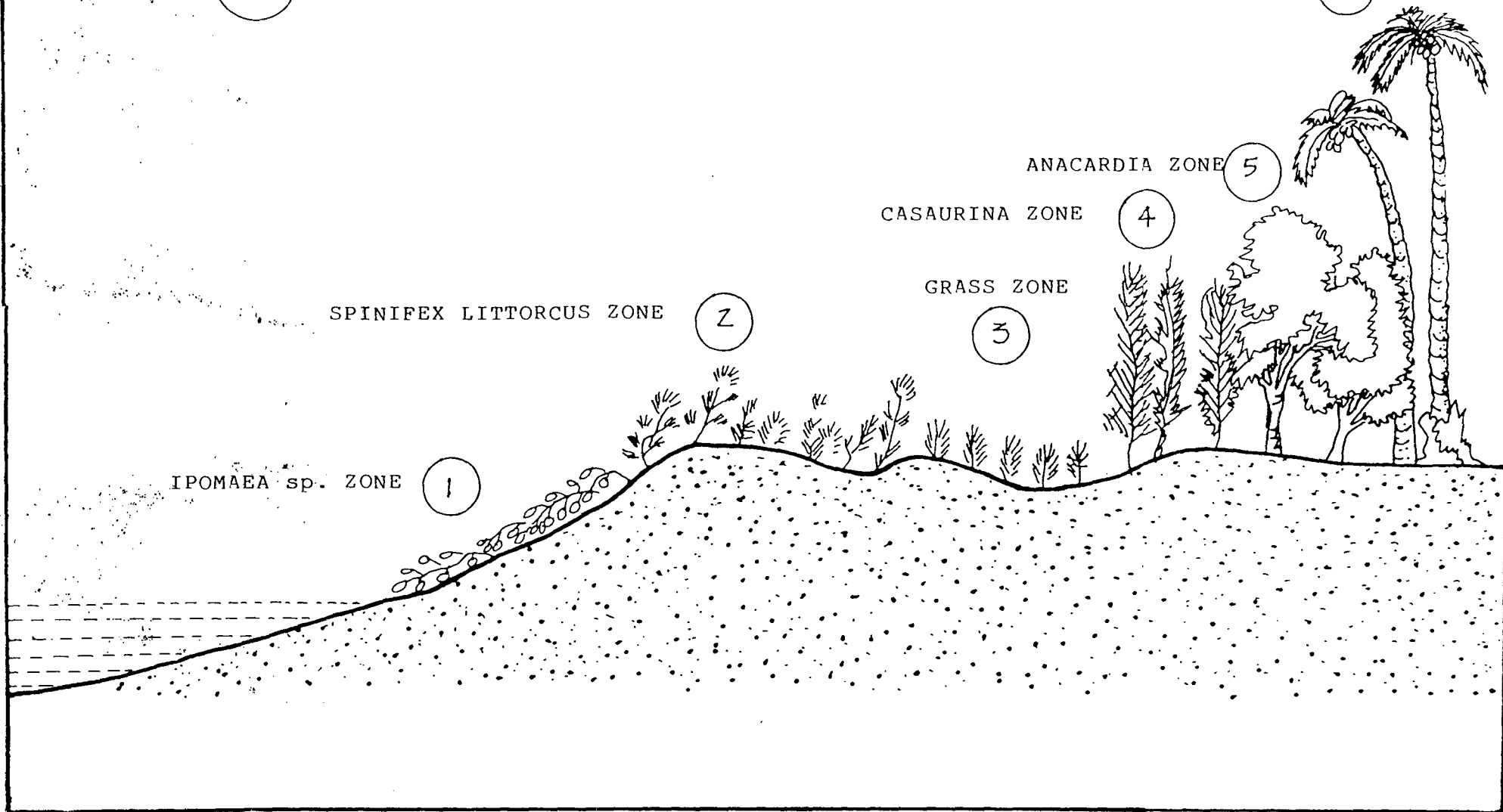
GRASS ZONE

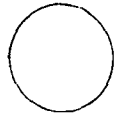


SPINIFEX LITTORCUS ZONE

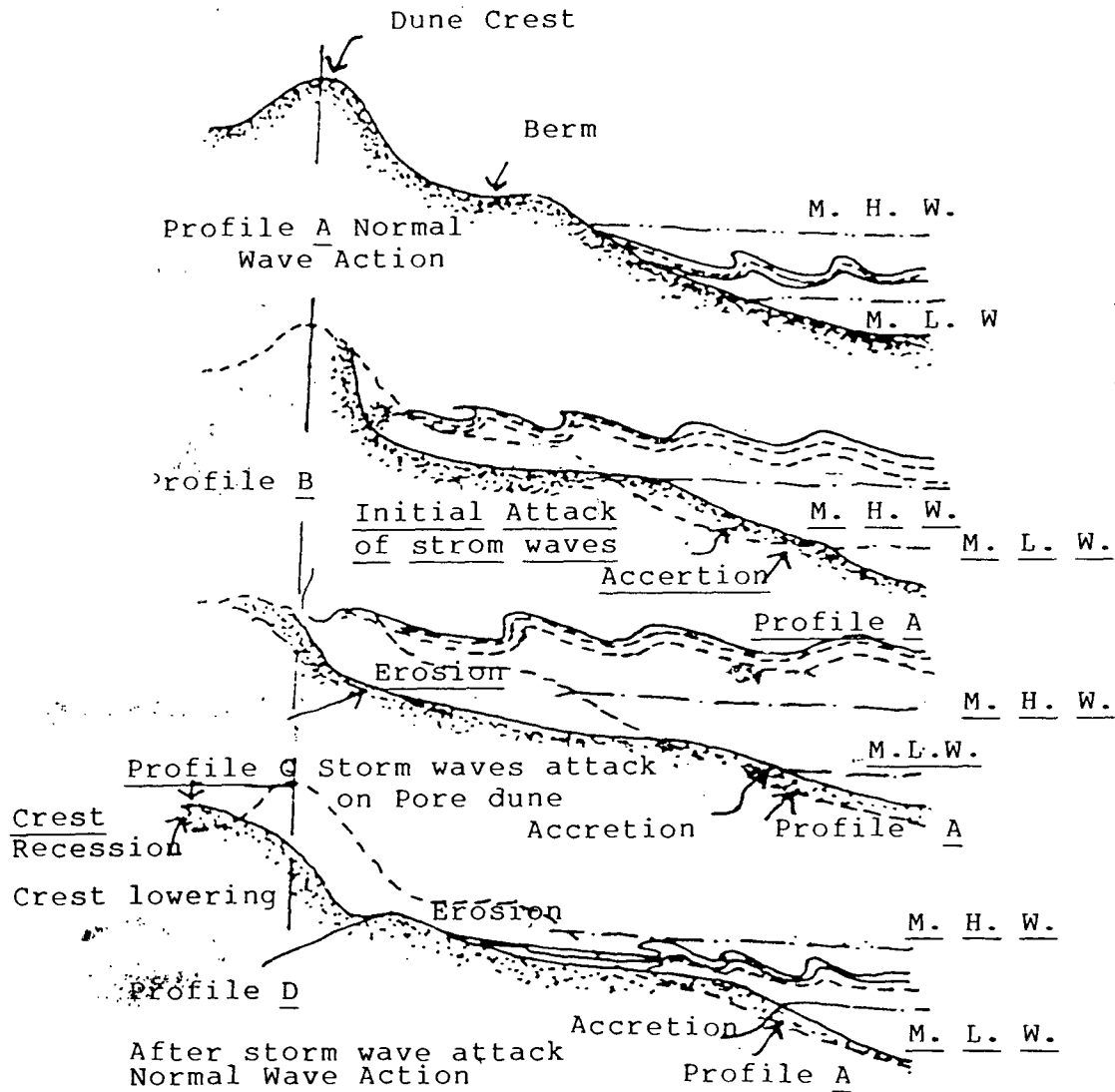


IPOMAEA sp. ZONE





S E D S ; Wave action and coastal Erosion



M.H.W. = Mean hightide water level

M.L.W. = Mean lowtide water level

Courtesy: Manual on Protection and Control of Coastal Erosion in India

(Brun & Nayak, 1980)

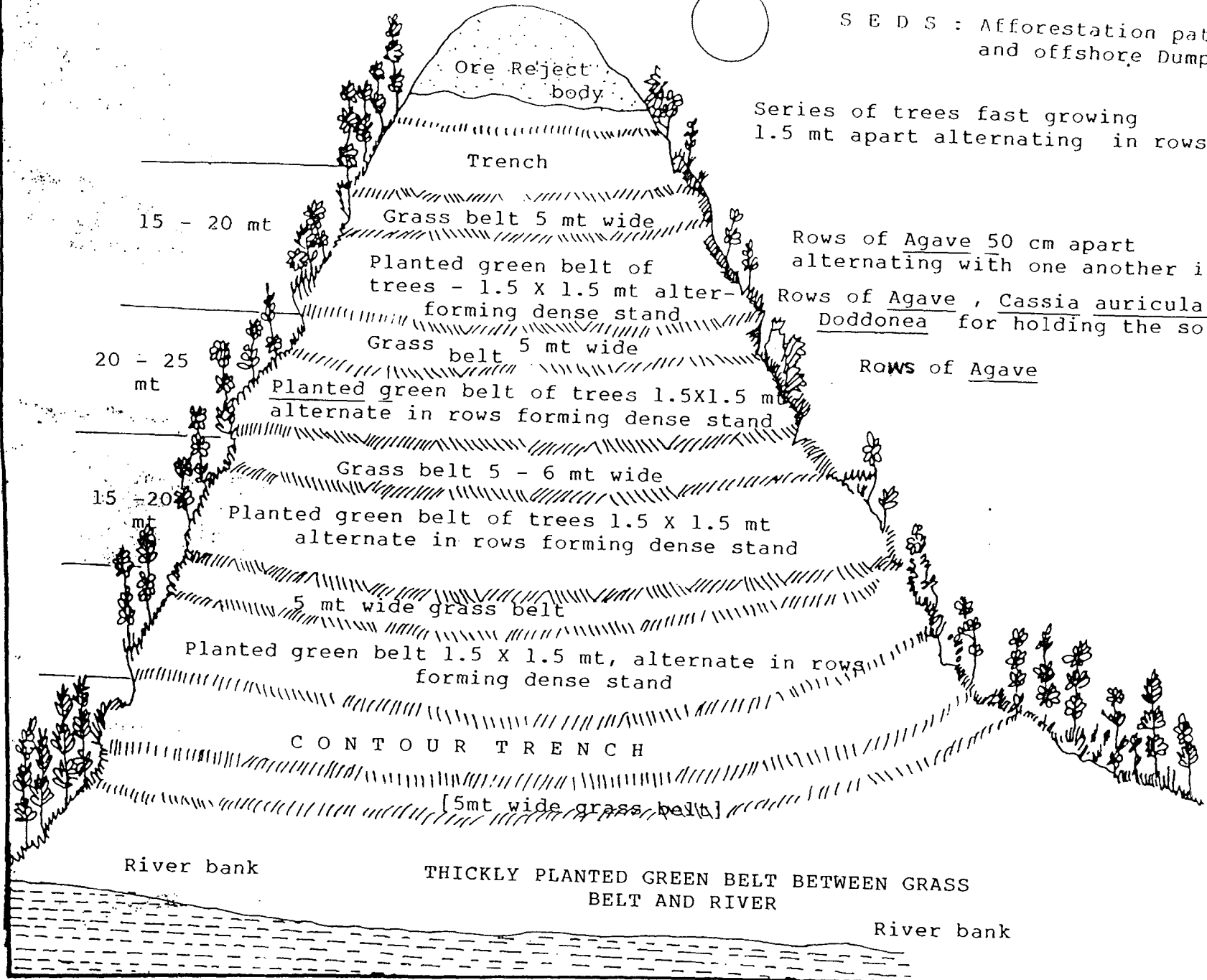
WAVE ACTION AND COASTAL EROSION

S E D S : Afforestation pattern and offshore Dumping

Series of trees fast growing 1.5 mt apart alternating in rows

Rows of Agave 50 cm apart alternating with one another in rows
Rows of Agave , Cassia auriculata and Doddonea for holding the soil

Rows of Agave



15 - 20 mt

Grass belt 5 mt wide

Planted green belt of trees - 1.5 X 1.5 mt alternating forming dense stand

20 - 25 mt

Grass belt 5 mt wide

Planted green belt of trees 1.5 X 1.5 mt alternate in rows forming dense stand

15 - 20 mt

Grass belt 5 - 6 mt wide

Planted green belt of trees 1.5 X 1.5 mt alternate in rows forming dense stand

5 mt wide grass belt

Planted green belt 1.5 X 1.5 mt, alternate in rows forming dense stand

CONTOUR TRENCH

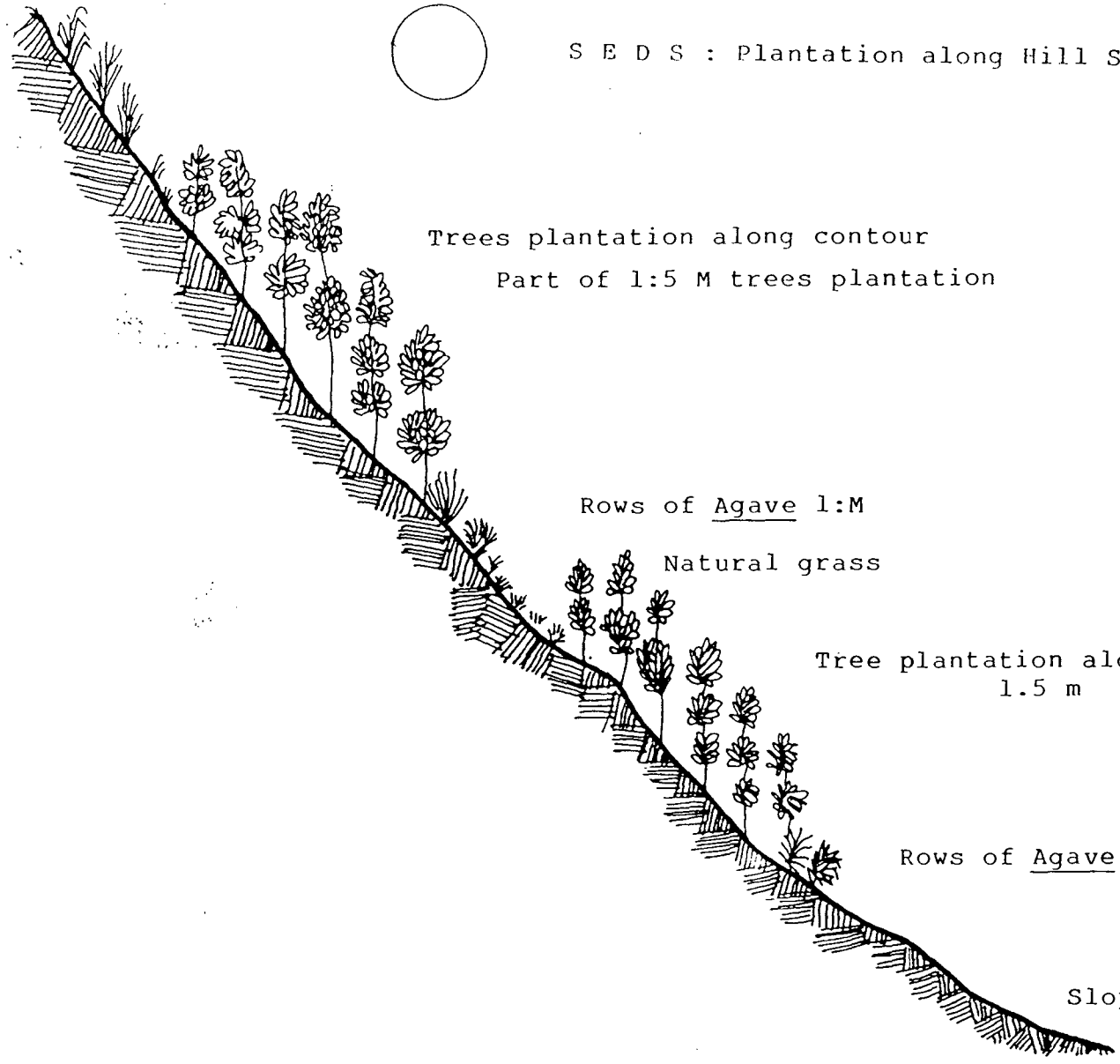
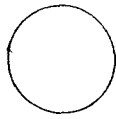
[5mt wide grass belt]

River bank

THICKLY PLANTED GREEN BELT BETWEEN GRASS BELT AND RIVER

River bank

S E D S : Plantation along Hill Slopes



Trees plantation along contour
Part of 1:5 M trees plantation

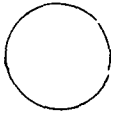
Rows of Agave 1:M

Natural grass

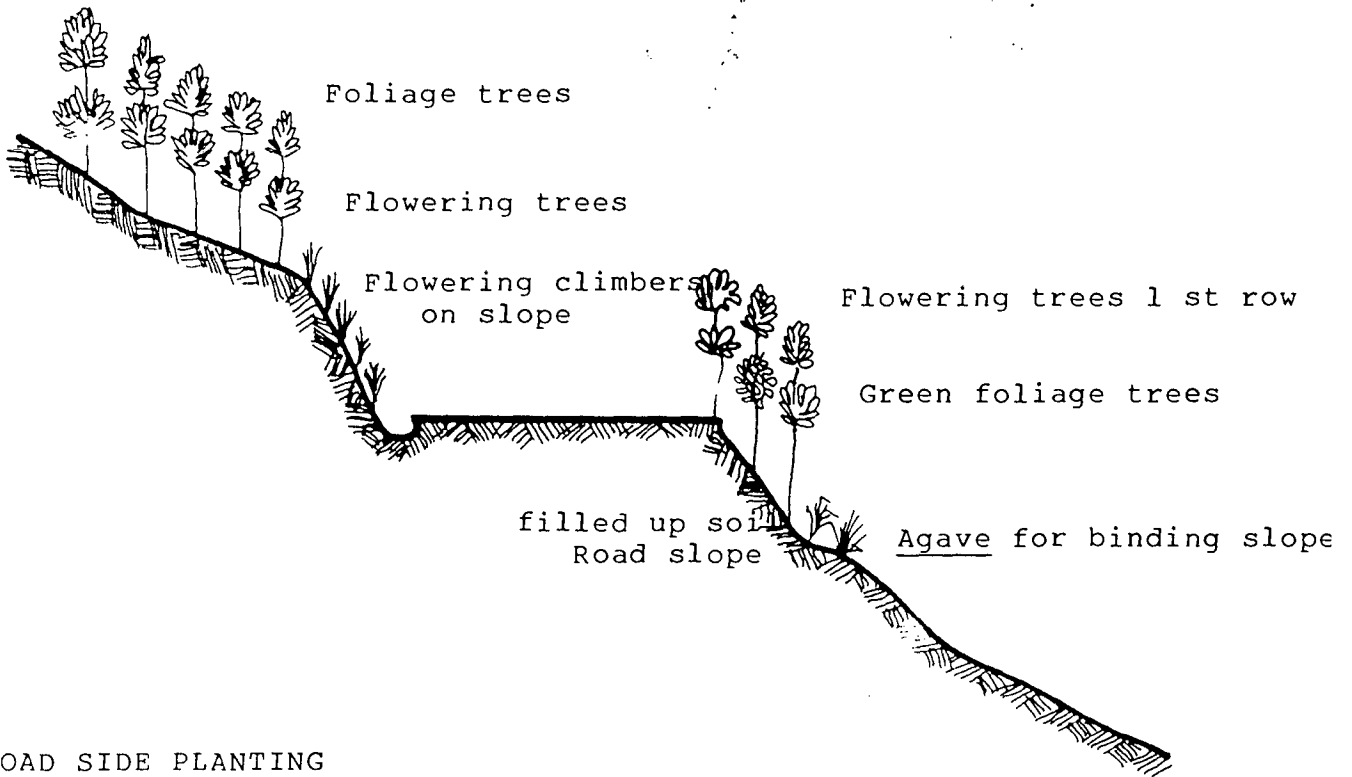
Tree plantation along contour
1.5 m

Rows of Agave 1.5 m

Slope



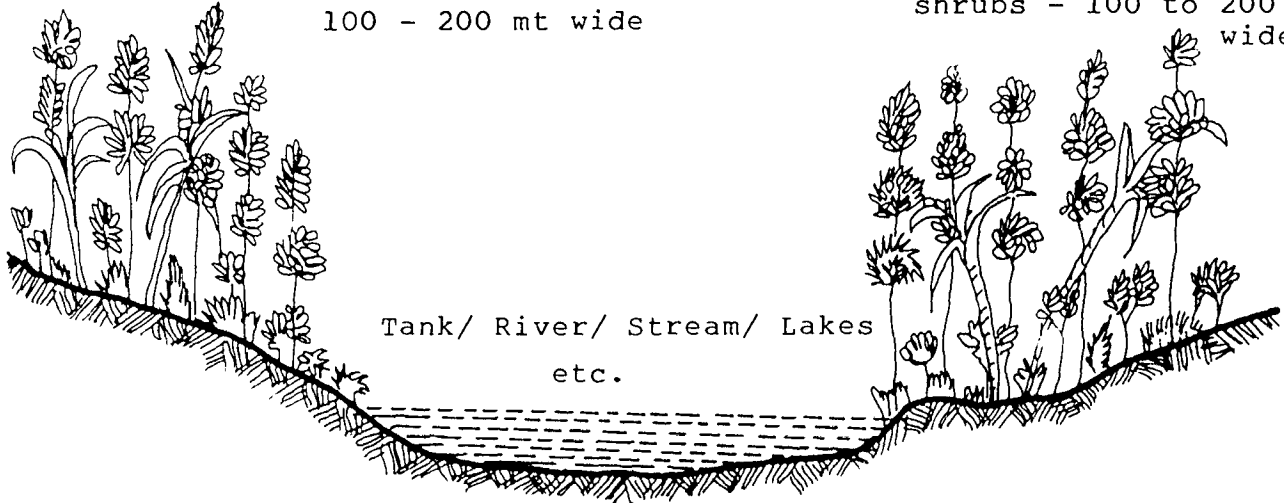
S E D S ; Roadside and River Bank Plantation.



ROAD SIDE PLANTING

Mixture of trees and shrubs
100 - 200 mt wide

Mixture of trees and shrubs - 100 to 200 mt wide



River - Stream or lakes - protection

It is the dictate of the wheel of change based on the trend that in the recent past emphasis has shifted from mere survival to good quality (of life) including variables which collectively contribute to a life worth living in a balanced environment including both 'closed' and 'open' which collectively form the 'reality'.

SUMMARY

'Evolution of an Eco-Development Strategy for Coastal Area: A case study of Sindhudurg Dist., Maharashtra' is a study of Eco-development of Sindhudurg, a coastal district of Maharashtra, *for a period of thirty years.*

It was carved out from Ratnagiri District of the Konkan belt and came into being on 1st May 1981 with Kudal as its Headquarters (Oras - going to be new Headquarters). The district has 7 talukas viz., Kudal, Malwan, Devgad, Kankavli, Sawantwadi and Vengurla. Later, a part from Kolhapur district was annexed as seventh taluka i.e. Vaibhavvadi (Bawda).

The name 'Sindhudurg' for the district has been adopted from the famous seafort Sindhudurg situated near Malwan. The district is second smallest in the State of Maharashtra both in terms of population and area. The population is 832152 persons and the area is 5207 sq.km. It lies between 15°37' - 16°40' north latitude and 73°19' - 74°13' east longitude. The district is bounded by Sahydri range in the east, Arabian Sea towards the West, State of Karnataka (Belgaum) in the South and Ratnagiri in the North. The climate is moist and humid with summer, monsoon and winter seasons and a temperature range of 15°-34°C. Soils are laterite, salty and of coastal alluviums type. The economy of the district is mostly ^{based on} agriculture.

It is pertinent to point out that the district Sindhudurg is not a god-forsaken land and its poverty is not a curse of nature but is essentially a reflection of the dismal failure of the State apparatus, *due to regional disparities.*

Nature has endowed it with bountiful resources, land for the cultivation, long coast line with plenty of resources, unexploited mineral reserves, abundant rainfall, virgin beaches, historical sea forts and picturesque slopes of Sahyadri range.

It is against this background, still the district remained one of the most backward.

The present work consists of Retrospect, some Aspects and Prospects of the resource region Sindhudurg district in terms of Eco-development and evolving a strategy for its prosperity by not disturbing or destroying the fragile ecosystems.

The retrospect part provides a comprehensive account of Sindhudurg district wherein different aspects have been dealt with.

Some aspects of Sindhudurg resources takes into consideration the various resources (biotic and abiotic, and social). The work deals with the soils of the district and their geomorphology, for soils are important from every

point of view. An account of land use and its spatial distribution has been presented.

Water is an important natural medium that sustains life. As such the management of water other resources have been dealt for making the region prosperous both agriculturally and horticulturally for its potential.

Forests play a significant role in controlling the economy and ecology of the region. The forest wealth of the region has been presented. The new developmental trends like fish, live stock and poultry that have become important contributory factors to the economy have been considered taking into account the local needs and potential for export.

An account of the mineral reserves has been given for they are the backbone of any future industrial development. In terms of reserves and Electricity supply, the scope for industrial development of the region has been considered.

Sindhudurg as a tourist's delight is being presented, for the region has number of places which are important from religious, social and scenic beauty.

Other components that contribute to development of any region are the amenities enjoyed by the people, their

well being in terms of health, social activities, economy and administration of the district .

An integrated approach for Transport has been dealt with for it constitutes a major infrastructure for any developmental activity. In addition, demographic profile and the trend of migration have been presented.

Based on these resources, a prospect for Eco-Development strategy has been evolved by striking a balance between the eco-components and their optimal use.

Aspects of Eco-Development have been considered for all the parameters accounted in the resource section. Accordingly, several recommended eco-development strategies have been presented with a hope that these will not imbalance the sectoral interest.

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APPENDIX TO

**EVOLUTION OF
AN ECO-DEVELOPMENT STRATEGY
FOR COASTAL AREA**

**CASE STUDY OF
SINDHUDURG DIST. MAHARASHTRA**

by

RAPARTHI REDDIAH

Handwritten signature and date: 6/9/2000

*Office of the Chief Architect, Public Works Department,
Althino, Panaji, Goa - 403 001.*

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1997



THE FAMOUS SINDHUDURG FORT

The State of Maharashtra leads the rest of India in industrial investment and employment potential. However, its economic development conceals wide regional disparities in terms of income/s and industry. With the exception of Mumbai, Thane, Pune and some districts of Western Maharashtra, the rest of the State has been left high and dry by the State's planning processes. For this most districts are economically and industrially backward even after more than four decades of planning.

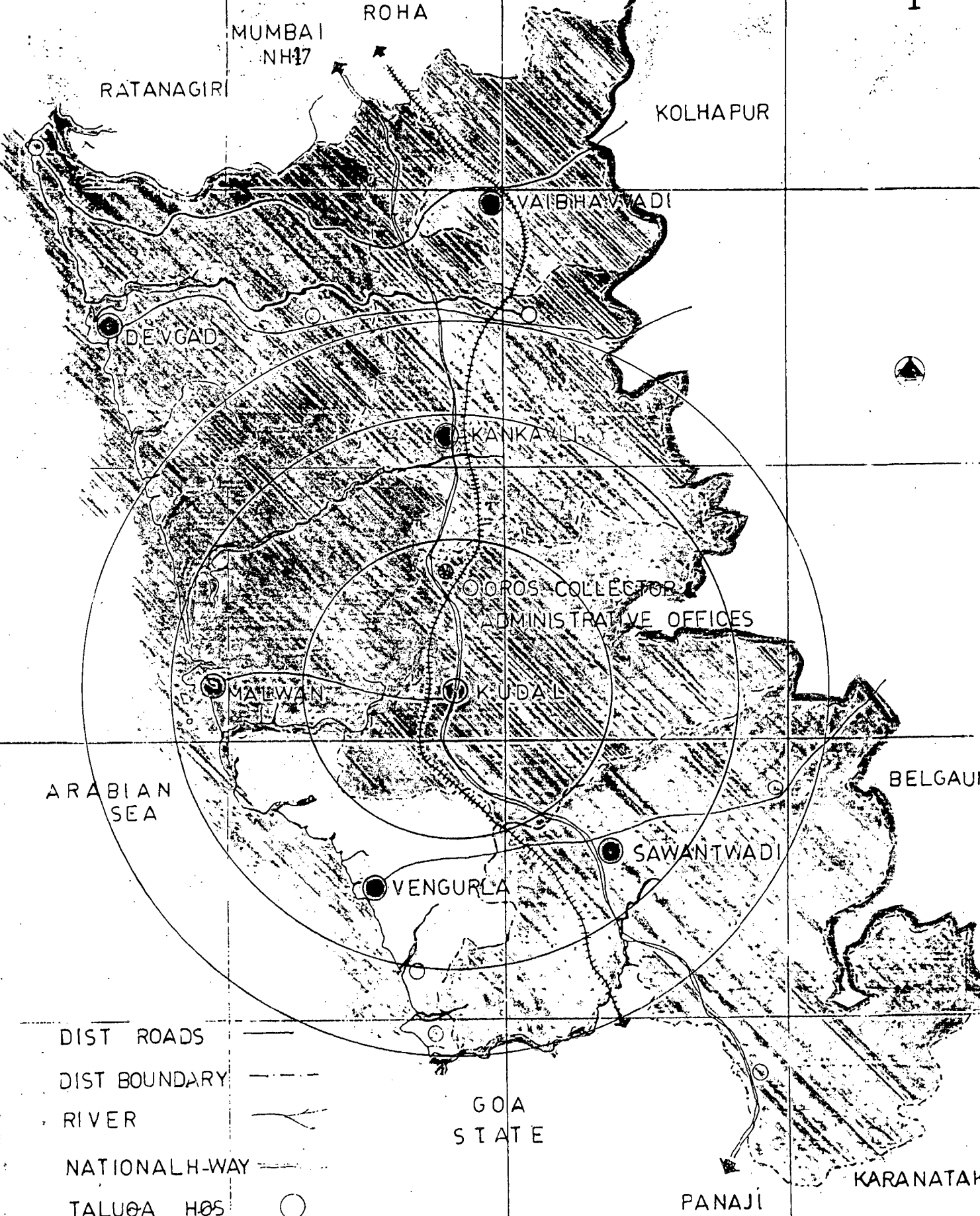
Sindhudurg situated at the Southern tip of West coast of Maharashtra is one of such neglected districts. Though paradoxically it is the first tourism district in India declared by the government. Un-economic farm holdings, absence of industry and services sectors and migration of man power contributed to such situation. For almost a century now, the economy of Sindhudurg has been described 'money order economy' ie., surviving on meagre money order remittances of its emigrant population. The percapita income (Current prices) is just Rs.2709 as against Rs.9270 of the State and Rs.6249 of India in itself reflects the general condition to include the rate of its development, planning and strategy that has been put in.

'Evolution of an Eco-development Strategy for costal area - A case study of Sindhudurg district : Maharashtra' has been presented with a hope to evolve eco-development strategy for Sindhudurg about which even now very little is known to fall back upon.

The present appendix to this theme is a further extension of some of the ideas over what has been presented for making them more

ADMINISTRATIVE BOUNDARIES

2
1



DIST ROADS

DIST BOUNDARY

RIVER

NATIONAL H-WAY

TALUQA HQS

GOA
STATE

PANAJI

KARNATAK

pragmatic: The twin processes of planning, if any and evolving strategies appear to merge imperceptibly which indeed is difficult to visualise without the other. They are complimentary and need consideration jointly.

Case study of Sindhudurg with 7 talukas which are geographically located at higher altitudes from the sea level on one hand and having higher reaches of Western Ghats towards the East. The coastal talukas are Vengurla, Malwan, Devgad while Sawantwadi, Kudal and Kanakavali are contiguous with the Western Ghats.

Vaibhavwadi belongs to neither of this category. This is a unique feature of Sindhudurg for it has every resource but that remained untapped. The demography, cultivable land vary from place to place and accordingly any study needs to be essentially carried out for Sindhudurg as a whole composite entity. Study of a single taluka hardly serves the desired purpose for lack of common elements among them.

The District or Regional plan for Sindhudurg is formulated as per the Ratnagiri - Sindhudurg Regional Planning Board (Konkan 1982) as envisaged by the Maharashtra Regional and Town Planning Act.(1956). The planning lays emphasis on agriculture, horticulture, fisheries, cattle, poultry and dairy, industry and mining, municipal problems, and socioeconomic surveys.

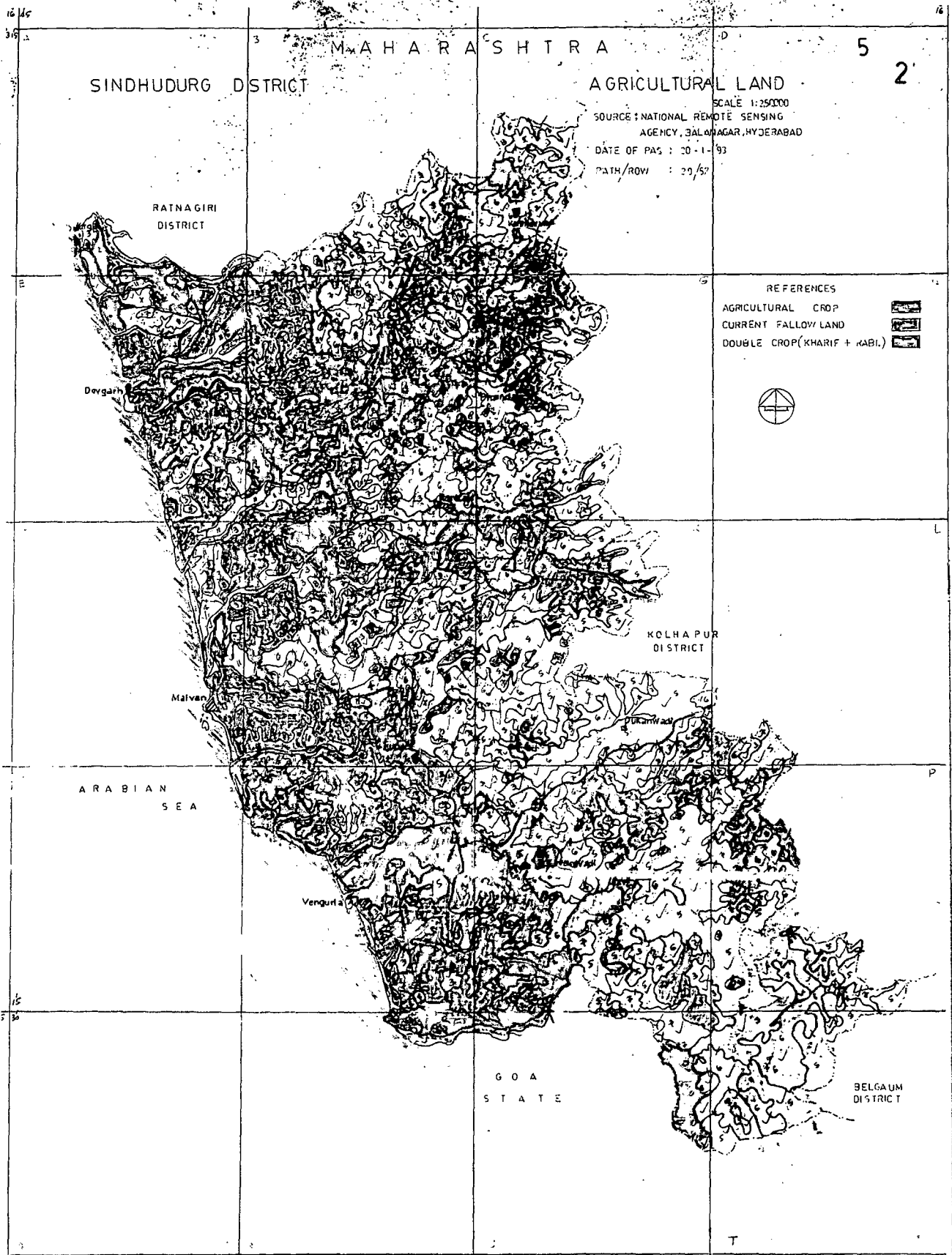
The administrative boundaries of Sindhudurg have been shown in the map (1). The important features of the district have already been presented (main text).

The land use pattern of Sindhudurg falls into 1-15 land use categories, taluka wise (maps 2,3,4,5 & 6) show the extent of Agriculture land, Soils, Forests, Waterbodies and waste land respectively. Further, use like built up area (to include urban settlements, farm house constructions and roads) ; agricultural land (agricultural crop, current fallow land) ; forests (dense forest, degraded forest, open forest, plantations, mangrows) ; waterbodies (wet land area, surface water) ; and waste lands (undulating upland with or without scrub, sandy area, mining area, barren rocky area) have been pointed out.

The soils types belong to laterite, salty and Coastal alluviums which have been indicated in map (6) along with their description.

The land investment pattern of Sindhudurg is as follow:

1. Habitation - 24.05 sq kms / 0.47%



M A H A R A S H T R A

SINDHUDURG DISTRICT

AGRICULTURAL LAND

5
2

SCALE: 1:250000
SOURCE: NATIONAL REMOTE SENSING
AGENCY: BALAKRISHNAN, HYDERABAD
DATE OF P.A.S.: 20-1-93
PATH/ROW: 29/57

RATNA GIRI DISTRICT

REFERENCES

- AGRICULTURAL CROP
- CURRENT FALLOW LAND
- DOUBLE CROP (KHARIF + RABI)



Devgarh

KOLHAPUR DISTRICT

Malvan

Dukarwadi

ARABIAN SEA

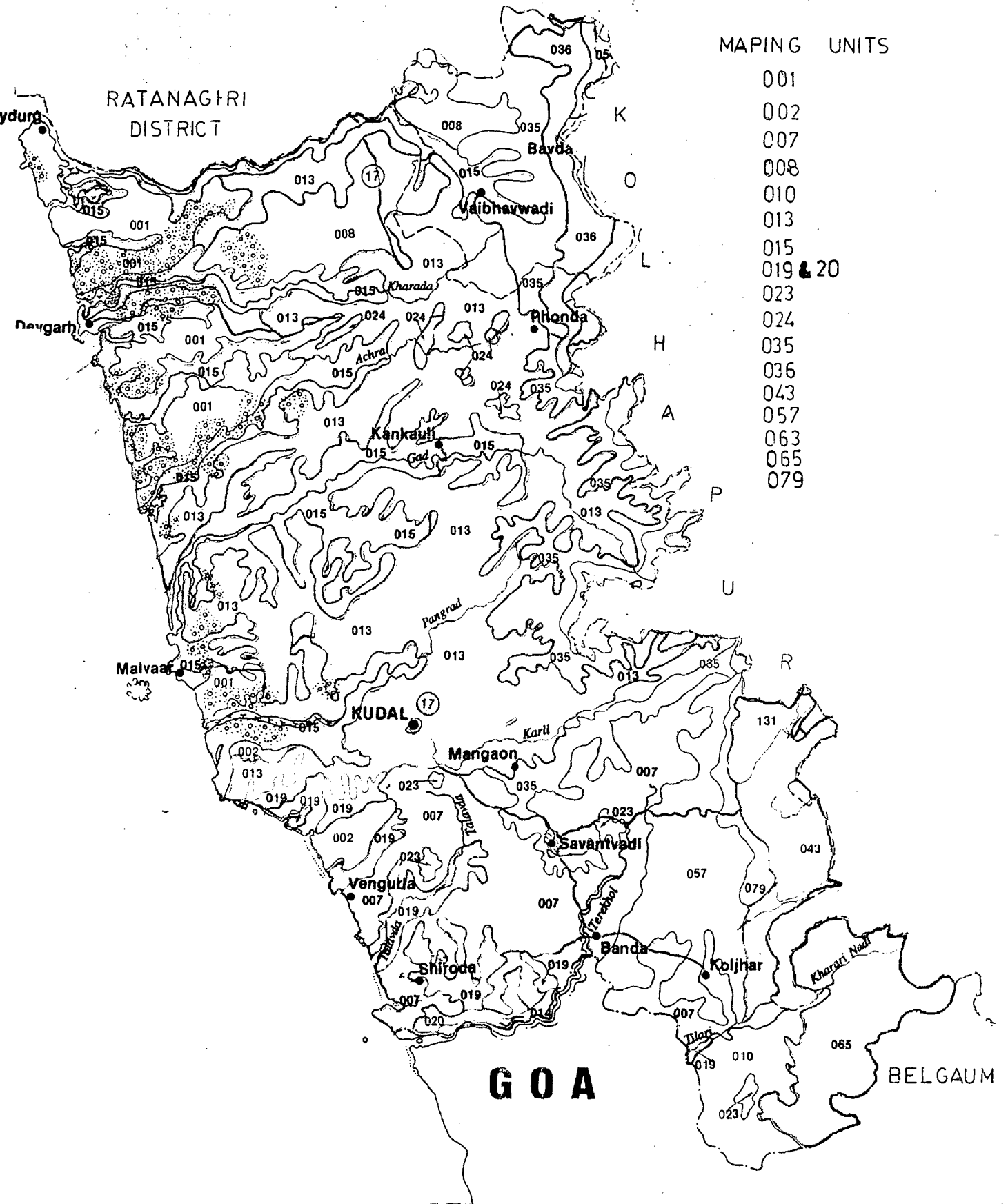
Vengurla

GOA STATE

BELGAUM DISTRICT

M A H A R A S H T R A

SINDHUDURG DISTRICT SOIL MAP



Mapping Unit	Description	Taxonomy	'000 ha (%)
1	2	3	4

SOILS OF WESTERN GHATS

SOILS OF UNDULATING WESTERN FOOTHILL SLOPES AND NARROW VALLEYS

035	Very shallow, somewhat excessively drained, loamy soils on moderately steeply sloping undulating western foothill slopes and narrow valleys with severe erosion and strong stoniness; associated with shallow, somewhat excessively drained, loamy soils with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents ○ Loamy, mixed, Isohyperthermic, shallow Typic Ustropepts 	102.73 (0.333)
036	Shallow, somewhat excessively drained, loamy soils on moderately steeply sloping undulating western foothill slopes and narrow valleys with severe erosion and strong stoniness; associated with very shallow, well drained, loamy soils with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy-skeletal, mixed, Isohyperthermic, shallow, Typic Ustropepts ○ Loamy-skeletal, mixed, Isohyperthermic, Lithic Ustorthents 	27.38 (0.068)

SOILS OF SPURS

043	Moderately deep, well drained, loamy soils on moderately sloping spurs with moderate erosion and strong stoniness; associated with deep, well drained, loamy soils with moderate erosion.	<ul style="list-style-type: none"> ○ Fine-loamy, mixed Isohyperthermic, Typic Ustropepts ○ Fine-loamy, mixed, Isohyperthermic, Udic Rhodustalfs 	18.44 (0.059)
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SOILS OF DISSECTED HILLS AND NARROW VALLEYS

057	Shallow, somewhat excessively drained, loamy soils on moderately steeply sloping dissected hills and narrow valleys with severe erosion and strong stoniness; associated with shallow, somewhat excessively drained, loamy soils on moderately steeply sloping lands with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy-skeletal, mixed, Isohyperthermic, Lithic Ustorthents ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents 	23.33 (0.075)
063	Shallow, somewhat excessively drained, loamy soils on moderately steeply sloping dissected hills/narrow valleys with severe erosion and moderate stoniness; associated with very shallow, somewhat excessively drained, clayey soils with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy-skeletal, mixed, Isohyperthermic, shallow, Typic Ustorthents ○ Clayey-skeletal, mixed, Isohyperthermic, shallow, Typic Ustorthents 	111.93 (0.363)
065	Shallow, somewhat excessively drained, loamy soils on moderately steeply sloping dissected hills/narrow valleys with severe erosion and strong stoniness; associated with moderately deep, somewhat excessively drained, loamy soils with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustropepts ○ Fine-loamy, mixed, Isohyperthermic, Typic Ustropepts 	49.51 (0.160)

Mapping Unit	Description	Taxonomy	Area (In '000 ha) (%)
1	2	3	4

SOILS OF KONKAN COAST

SOILS OF COASTAL LANDS WITH RESIDUAL HILLS

001	Extremely shallow, somewhat excessively drained, loamy soils on moderately sloping lands with residual hills with severe erosion and strong stoniness; associated with extremely shallow, somewhat excessively drained, loamy soils on gently sloping lands with severe erosion and strong stoniness.	<ul style="list-style-type: none"> ○ Loamy-skeletal, mixed, Isohyperthermic, Lithic Ustorthents ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents 	83.71 (0.272)
002	Very shallow, well drained, loamy soils on moderately sloping lands with residual hills with moderate erosion and moderate stoniness; associated with rock outcrops.	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents ○ Rock outcrops 	4.69 (0.015)

SOILS OF UNDULATING LANDS WITH MESAS AND NARROW VALLEYS

007	Moderately deep, well drained, loamy soils on moderately sloping undulating lands with mesas and narrow valleys with moderate erosion and moderate stoniness; associated with shallow, well drained, loamy soils with moderate erosion and strong stoniness	<ul style="list-style-type: none"> ○ Fine-loamy, mixed Isohyperthermic, Ultic Haplustalfs ○ Loamy, mixed, Isohyperthermic, Lithic Ustropepts 	55.64 (0.180)
008	Very shallow, well drained, loamy soils on moderately sloping undulating lands with mesas and narrow valleys with severe erosion and moderate stoniness; associated with very shallow, well drained, loamy soils with severe erosion and strong stoniness	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents ○ Loamy-skeletal, mixed, Isohyperthermic, shallow, Typic Ustorthents 	84.64 (0.275)
010	Shallow, somewhat excessively drained, loamy soils on moderately sloping undulating lands with mesas and narrow valleys with moderate erosion and moderate stoniness; associated with shallow, well drained loamy soils with moderate erosion and moderate stoniness	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents ○ Loamy, mixed, Isohyperthermic, Lithic Ustropepts 	9.76 (0.031)
013	Slightly deep, well drained, loamy soils on moderately sloping undulating lands with mesas and narrow valleys with severe erosion and moderate stoniness; associated with shallow, well drained, loamy soils with severe erosion.	<ul style="list-style-type: none"> ○ Fine-loamy, mixed, Isohyperthermic, shallow, Typic Ustropepts ○ Loamy, mixed, Isohyperthermic, shallow, Typic Ustropepts 	148.80 (0.483)

SOILS OF VALLEY LANDS

015	Moderately deep, well drained, loamy soils on gently sloping valley lands with moderate erosion; associated with deep, well drained clayey soils with moderate erosion	<ul style="list-style-type: none"> ○ Fine-loamy, mixed, Isohyperthermic, Ultic Haplustalfs ○ Fine, mixed, Isohyperthermic, Typic Haplustalfs 	139.68 (0.453)
019	Deep, well drained, clayey soils on gently sloping valley lands with slight erosion; associated with deep, well drained, loamy soils, with slight erosion.	<ul style="list-style-type: none"> ○ Fine, mixed, Isohyperthermic, Typic Ustropepts ○ Fine-loamy, mixed, Isohyperthermic, Typic Ustropepts 	14.57 (0.047)
020	Deep, well drained, loamy soils on gently sloping valley lands with slight erosion and strong salinity; associated with deep, well drained, loamy soils with slight erosion.	<ul style="list-style-type: none"> ○ Fine-loamy, mixed, Isohyperthermic, Typic Ustropepts ○ Fine, mixed, Isohyperthermic, Typic Ustropepts 	2.18 (0.007)

SOILS OF ELONGATED RIDGES AND HILLS

023	Very shallow, somewhat excessively drained, loamy soils on moderately steeply sloping elongated ridges with hills with severe erosion and strong stoniness; associated with rock outcrops.	<ul style="list-style-type: none"> ○ Loamy, mixed Isohyperthermic, Lithic Ustorthents ○ Rock outcrops 	1.73 (0.008)
024	Shallow, well drained, loamy soils on moderately sloping elongated ridges/hills with moderate erosion and strong stoniness; associated with rock outcrops.	<ul style="list-style-type: none"> ○ Loamy, mixed, Isohyperthermic, Lithic Ustorthents ○ Rock outcrops 	3.47 (0.011)

M A H A R A S H T R A

SINDHUDURG DISTRICT

FOREST LAND

4






SOURCE : NATIONAL REMOTE SENSING
AGENCY BALANAGAR, HYDERABAD.

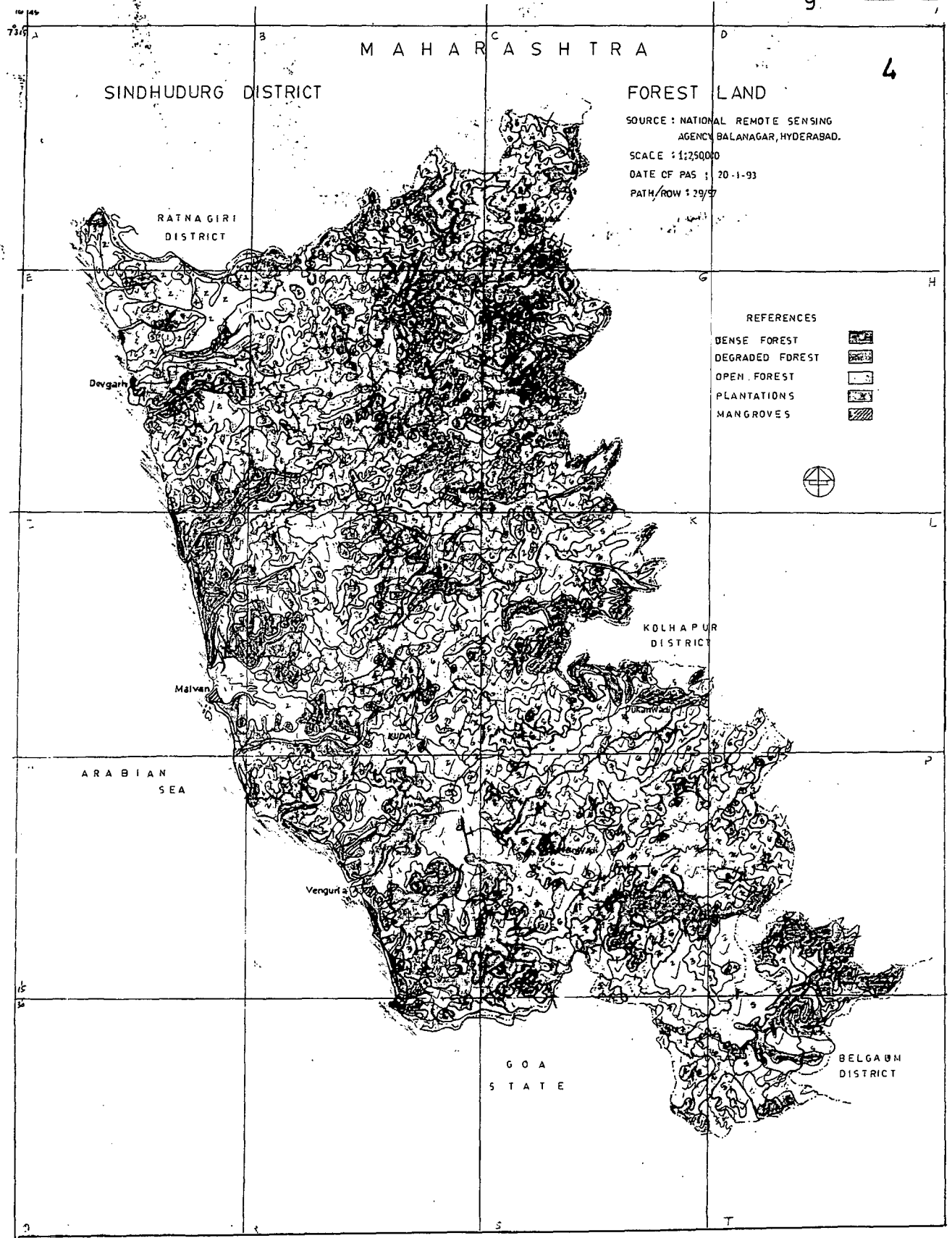
SCALE : 1:25000

DATE OF PAS : 20-1-93

PATH/ROW : 29/37

REFERENCES

- DENSE FOREST 
- DEGRADED FOREST 
- OPEN FOREST 
- PLANTATIONS 
- MANGROVES 



73 15

E

K

P

S

T

H

L

P

T

MAHARASHTRA

5

SINDHUDURG DISTRICT

WATER BODIES

SCALE 1:250000
SOURCE: NATIONAL REMOTE SENSING
AGENCY BALANAGAR, HYDERABAD
DATE OF PAS: 20-1-93
PATH/ROW: 29/57

RATANA GIRI DISTRICT

REFERENCES
WET LAND AREA [Symbol]
SURFACE WATER [Symbol]



Devgarh

Mahesh

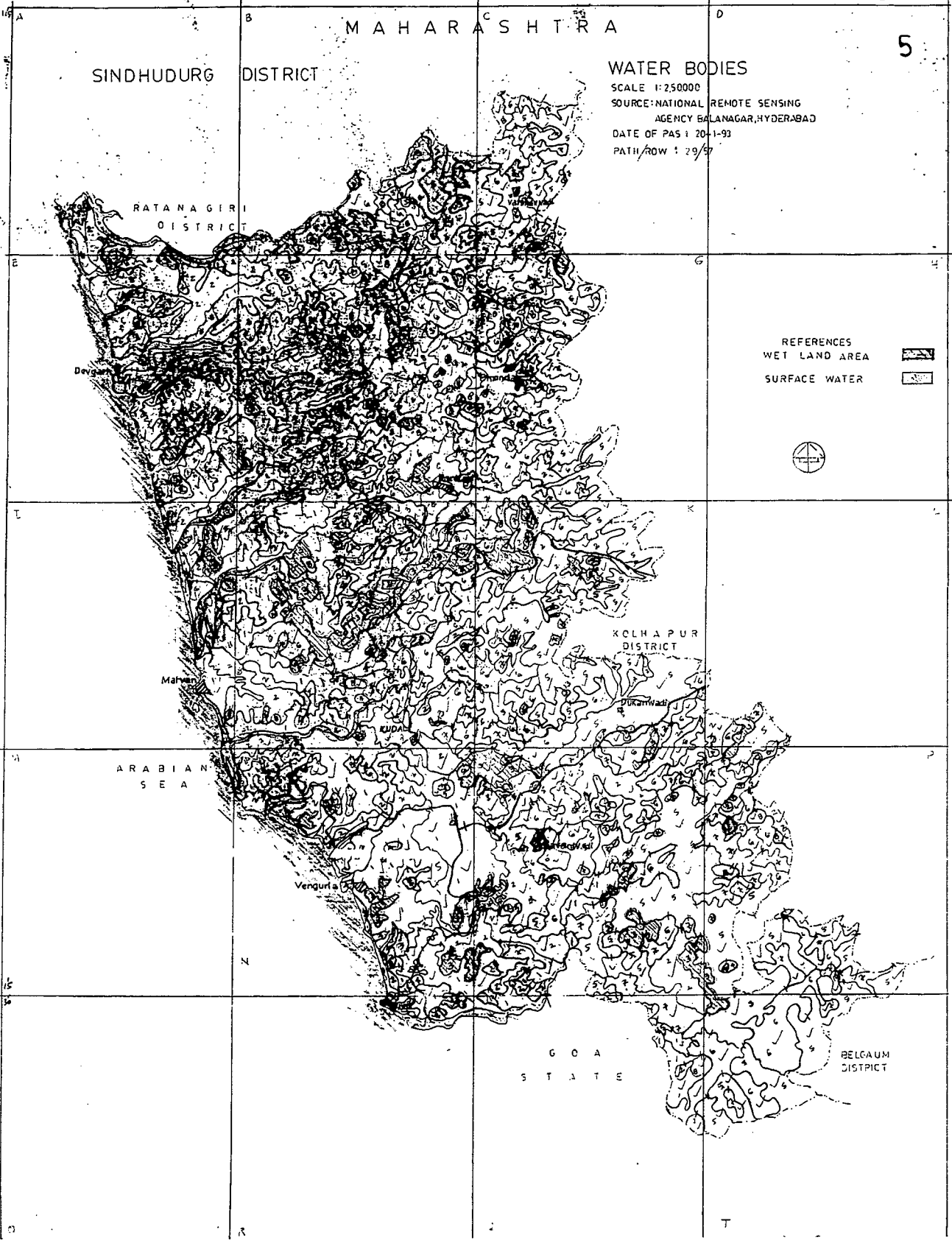
KOLHAPUR DISTRICT

ARABIAN SEA

Vengurla

GOA STATE

BELGAUM DISTRICT



2. Forests - (both private and government)
1488.07 sq kms / 29.25%
3. Agriculture and current fallow land - 1215.13 / 23.88%
4. Waterbodies, wet land area, surface water, 85.55 sq kms/
1.68%
5. Waste land - 2274.91 sq kms / 44.71%

The Agricultural land holding pattern is subjected to migration from the district. The total operational holdings fall into the following three categories.

1. below 2 Hectare - 1411 - 75.13%
2. 2 - 10 He - 407 - 21.68%
3. above 10 He - 60 - 3.19%

The average size of the operational holdings is 2.06 He against 2.65 of the State and 1.69 of India.

Chandan Sen Gupta (Ratnagiri Migrants in Bombay - Potentialities of Return and Migration Check) traced the relationship between migration, urbanisation and development. His study revealed that (i) most migrants of the region are engaged in both unskilled and unorganised sectors of urban economy and live in worst conditions than they left behind in the villages (ii) large number of migrants settled in Bombay are willing to return for which opportunities need to be created in the region (for resettling in home land, and (iii) since the region has tremendous potential for development and the same can be exploited if assistance is made available to existing voluntary agencies (NGO's and other

Agencies) by promoting co-operatives, creating commercial awareness and investment.

The major crops of the district are Rice, Wheat, Jowar, Pulses, Sugarcane, Cotton, Groundnut, Safflower and Sunflower. Fertilizer consumption is low. The percapita food grain production is 186 Kg against 115 Kg of the state. The value output of major crops percapita is Rs.822 against Rs.580 of the state and Rs.758 of India.

Agriculture and Horticulture and the general cropping pattern can be improved by providing training to locals through agriculture department and Zilla Parishad. Resource personnel can be invited from Konkan Krishi Vidyapeeth. The impact of this intensive agro-horticultural programme will result in increase in the share of food production. The related infrastructure services for technical guidance, fertilizers, pesticides, spraying, transportation, marketing and financing will have to be provided as when required.

The other characteristics of the population like literacy rate, level of education, artisitic and professional skills and affinity for the region are suggestive of rearsal of migratory trends. For this, now it is relatively easy to find workers.

Further, in the light of the recent demographic trends, the district may touch 8.8 to 9.2 lac. population in 2000 to 2001 AD which will be literate population with equal distribution of sex

living in urban agglomeration. Such a trend can be predicted for the population as it has doubled during the eighties from what it was in seventies. It is this increase in population (by 50%) need 2 lac employment opportunities which agriculture may not be able to provide.

The alternative is horticulture, industry and services. The planning authorities need to look into this direction and any lapse would inevitably lead to further fragmentation of already fragmented uneconomic holdings - a detriment to the economy of the district.

The forests of Sindhudurg are of dense, open, degraded forests; plantations and mangroves. The existing land use under forests is upto 1488 sq kms (29%). It is subjected to biotic activity (man as a biotic factor) and is dwindling rapidly (around 1.5% annually) from 81/82 to 92/93. The official data on forest are some what misleading for Sindhudurg have private forests. Precisely, the figures do not cover the private forest lands. In addition, land under orchards and other tree crops are also not taken into account. The Coastal soil does not support the growth of tall trees. Accordingly, the forest cover of 20% of the geographical area may be considered as adequate.

Curiously, Sindhudurg has private forest land where the land belongs to private ownership. It is with reference to such forest, the government is encouraging afforestation with a view to change the existing pattern by providing desired and useful plantation

which would suit the soil conditions. Such forests are being looked after by the government for the yield is shared on equal basis by the government and private owner of the land. In all 22,562 He of forest land is under private ownership (4.43% of the forest cover). It involves providing incentives to private owners for growing forest of any kind that suits the land. This is not a marginal sector but represents a substantial segment (map 3).

Besides, the forest department, government of Maharashtra started a new Social Forestry Department in 1982/83 with a main aim to develop forests on barren revenue lands. Thus in Sindhudurg there are private forests, social forestry and conventional on government land. In any case the major objectives of all this type are to augment the production of fire wood, fodder, timber requirements and fruits.

Under the social forestry massive tree planting in community and private waste and open lands is in vogue. This enhances the scope of rural employment and contain the migration of rural labour to city slums. It helps to restore ecological balance by providing recreation and improving the quality of life. Such forests are useful to contain deforestation of government lands through the developmental private and community woodlots close to habitation. Also it aids in improving the rural economy.

According to the Potential-linked credit plan, 1992-93 to 1996-97

report is available that 38 sq kms of area has been brought under social forestry. Still 75 sq kms culturable wastelands are available and can be exploited for cultivating commercial crops like coconut, palm, cashew, rubber and mango. In a way this wood yield large primary resources for industrialisation

However, there are major impediments in exploiting the forestry potential on private waste lands are : dispute regarding ownership ; little awareness among farmers ; and inadequate extension support.

Surely, afforestation can create commercial opportunities for tourism in the upper slopes of Sahyadri Range by developing holiday resorts or game sanctuaries.

In addition, strategies for agro-horticulture are :-

- (a) proper cropping pattern
- (b) terracing, bunding, trenching, gully, plugging
- (c) surface water storage
- (d) intensive farming in the valleys
- (e) development of horticulture nurseries
- (f) avoiding Rab system
- (g) reclamation of khar land
- (h) encouragement to fodder crops, and
- (i) use of organic manures

The district receives abundant rainfall but provision for storage is not adequate and faces acute shortfall of water

in summer for which the planning is solely responsible (lack of funds). Whenever water problem is resolved, it would pave way for the establishment of medium/large scale process industries. In the absence of water facilities, Sindhudurg has to remain on manufacturing activity to the total exclusion of process activity. This lopsided development may hamper the utilization of available natural resources.

Further, scarcity of water affects the development of viable urban centres. It will restrain the growth and availability of requisite skilled labour, manpower, service activities and markets for products and services which are so essential for industrial growth.

The rivers and creeks of the district are narrow in width and short in length. The area mapped under rivers is estimated as 7813 He (1.54% of district area). Further, there are quite a few irrigated projects. The three medium irrigated projects are not able to meet the demand.

The ground water availability is of higher order and may meet the balance comfortably. This promises great potential for irrigation, drinking and other purposes including industry if tapped. Surface water wetland areas have been shown in map (Map 5).

The human settlements have come into being and settled at places according to the availability of drinking water. After

settlement, properly organised water supply according to needs is a necessity of the habitation. The resource region receives heavy rainfall yet drinking water is a scarce commodity in many of the settlements. Non availability of drinking water and jobs might have influenced the life resulting into migration. Therefore, revised water supply schemes for the projected population of 2001 AD need to be implemented.

At present large areas of the district are drought prone during summer with even shortage of drinking water. Construction of major and minor dams alone will enable to over come the prevailing situation.

Watershed management of Sindhudurg as accepted involve the following:

- i. afforestation programme
- ii. mixed vegetation cover should be provided to the soil
- iii. terracing
- iv. conservation of catchment areas of major irrigation projects
- v. preventive measures for shifting cultivation and rehabilitation of the affected people, and
- vi. conservation of the flora and fauna.

The three costal talukas viz., Devgad, Malwan and Vengurla have about 38 fishing ports with their own fisher colony.

The fishing activity is by antiquated are traditional methods

along the shore only. Indeed it is subsistence activity with little or no awareness of commercial potential.

It is in the recent past with the new mechanised boats made available by the fishing co-operative, deep fishing has become has possible. There seems ample scope to upgrade the level of technology and improve productivity.

Now Sindhudurg is contributing 9% to the total fishing of Maharashtra. In all 33 variety including prawns are available in the catches. Commercially better variety of fish are not available in Sindhudurg (for obsolete techniques). The prices (retail) are low due to lack of local demand and storage facilities which by now way are comparable to Bombay or Ratnagiri (alone with 28 cold storages). There are only three Credit Co-operative Societies. The impediments that are faced by the fisherman are :

1. their poverty
2. lack of commercial culture
3. weak co-operative movement, and
4. poor development of transport

If progress were to be made in fisheries, some land based development must take place to support deep fishing, building piers, providing boat repair facilities.

Prospects for furthering fishing activities in Sindhudurg appear bleak.

Wastelands include undulating uplands with or without scrubs, sandy area, mining area, barren rocky area which extend to 2274.91 Sq kms (44.71%). Taluka wise extent of the wasteland have been shown in map (Map 5). Further, hydrogeomorphological survey helps in developing wasteland. The regions that need consideration along with their salient features have been indicated for the district (Map 7)

Scrub land or degraded forest unit is confined to notified forest area only. Similar terrain outside the notified forest area is a land with or without scrubs. A patch of 4112 He near Chaukal (Savantwadi Tehsil) has been mapped by satellite.

Land with or without scrub is seen all over the district and the area mostly belongs to private ownership and is not looked after properly. The extent of this area is 1,85,173 He. Sandy area (coastal) that deserves mention are near Vengurla and Malwan.

The mineral wealth of the district has been depicted in map (Map 8). The Southern part of the coast line i.e., Kudal, Kankavli have deposits of silica where from thousands of tonnes is despatched to Bombay, Pune, Kolhapur, Belgaum and Ichalkaranji. Uranium oxide is also found.

Redi, a historical settlement (16 km from Vengurla) was a small picturesque and quiet village till the last four decades has now become a very active settlement bustling with movement of dumpers, large number of workers and shipment activities.

HYDROGEOLOGICAL MAP OF SINDHUDURG DISTRICT MAHARASHTRA

20 7



HYDROGEOMORPHOLOGICAL MAP OF SINDHUDURG DISTRICT MAHARASHTRA

(BASED ON VISUAL INTERPRETATION OF (LANDSAT TM) IMAGERY WITH LIMITED FIELD CHECKS)

SCALE - 1:250,000

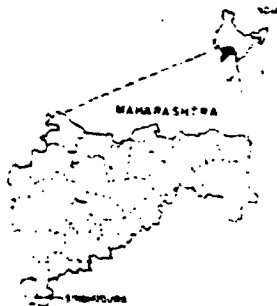


LEGEND

MAP UNIT	GEOMORPHIC UNIT	LITHOSTRATIGRAPHIC UNIT	STRUCTURE	DESCRIPTION	GROUND WATER PROCS
B	BEACH ZONE	UNCONSOLIDATED SEDIMENTS (QUATERNARY)	—	Narrow linear zone bordering the coast consisting of fine Sand, Silt.	Good, often brackish
PZ	PEDMOUNT ZONE	ALLUVIUM RESTING OVER BEDROCK (RECENT)	—	A narrow stretch of alluvial plain formed at the foot hills consisting unconsolidated sediments as far as material like Boulders, Pebbles, Sand and Silt.	Good.
LP	DISSECTED LATERITIC CAPPINGS	LATERITES (UPPER TERTIARY)	Rough irregular pitted and pocklike surface.	Hard laterite horizons capping the Western Ghats high lands.	Poor.
WGS	WESTERN GHATS AND SATPURA HILL RANGES	BASALTIC ROCKS (UPPER CRETACEOUS TO LOWER EOCENE)	Fractures/lineaments present.	Flat topped areas with deep gorges bordering the Deccan plateau.	Poor, except along fractures.
PP _{gm}	PEDPLAIN MODERATELY WEATHERED	ARCHAEOAN GRANITE - GNEISSIC COMPLEX	Fractures and faults present.	Mostly Schist, Phyllite, Gneiss, Quartzites and Migmatites, moderately weathered with occasional narrow valleys forming gently undulating plain with thick waste.	Moderate, good along fractured zone.
PP _g	PEDPLAIN SHALLOW WEATHERED	— DO —	— DO —	Granite, Gneisses, Schist, Phyllite and Migmatites, with narrow valleys forming gently undulating plain with occasional soil cover.	Moderate, good along fractures.
DH _g	DENUDATIONAL HILLS OF GRANITIC ROCKS	— DO —	Joints, fractures and lineaments present.	Hard Granite, Gneisses and Migmatites forming moderate to high hills occasionally with barren exposures.	Poor, except along fractures.
RH	RESIDUAL HILLS	ARCHAEOAN GNEISSIC COMPLEX	Fractures/faults present.	Isolated hill of Granite, Gneisses, Granophyres and Migmatites/Quartzites during the erosion.	Negligible.
	STRUCTURAL RIDGES / LINEAR RIDGES	— DO —	Recess associated with faulting and faulting showing definite trend lines.	Narrow linear ridges of mostly Quartzites.	Generally not so barren as residual hills.

FRACTURE / LINEAMENT	LITHOLOGICAL BOUNDARY	INFERRED FAULT

LOCATION MAP



REFERENCE

BOUNDARY	International, State, District	
ROAD	Major, Minor	
RAILWAY		
SETTLEMENT	State Hq, Dist Hq, Others	
RIVER / STREAM / WATERBODY		

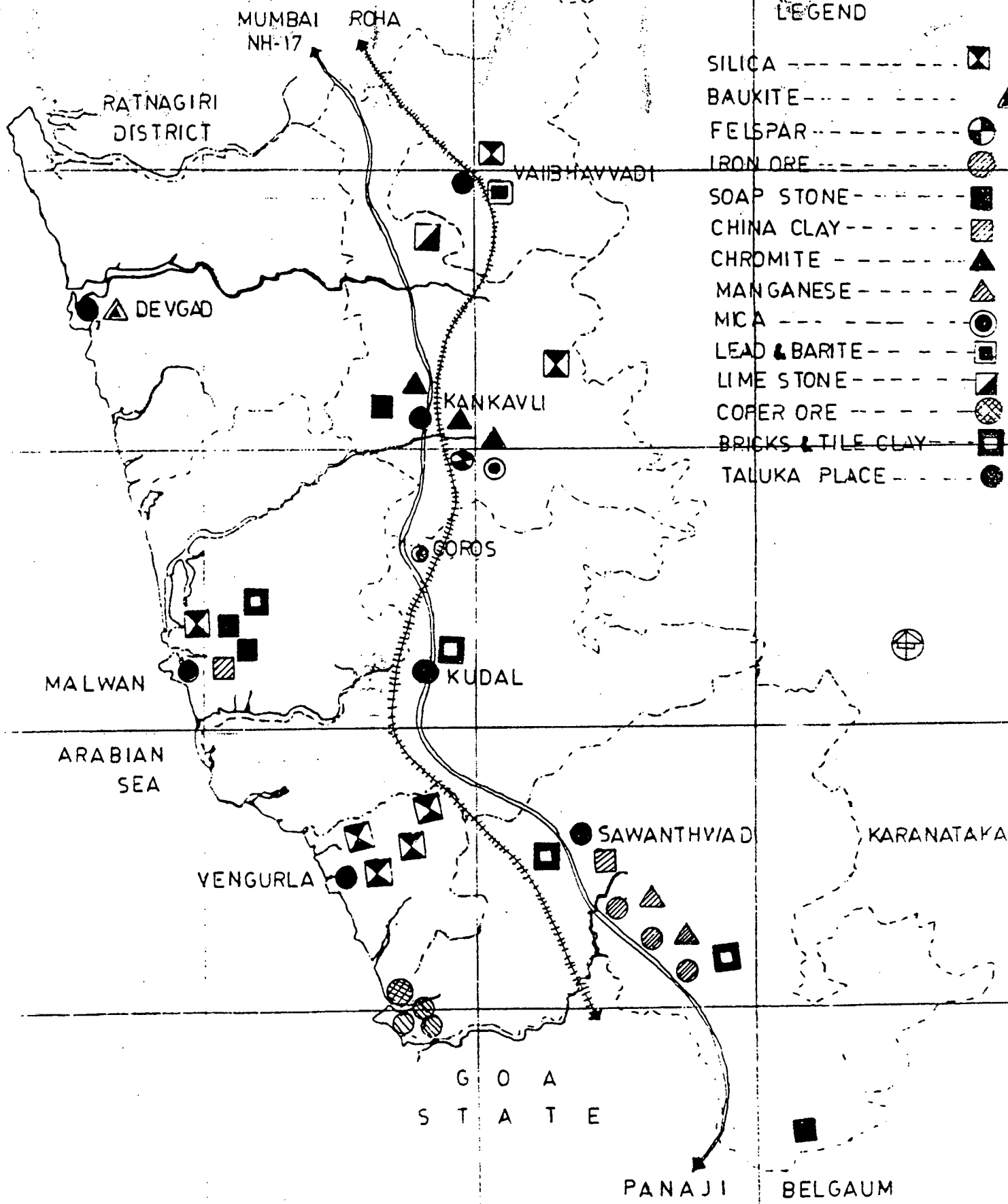
SOURCE OF COLLATERAL DATA

805 TOPO SHEETS ON 1:250,000 SCALE
 LANDSAT IMAGERY - 140-040, 040, 045, 050
 147-040, 045, 045, 050, 055, 060, 065
 DISTRICT BOUNDARY FROM P.W.D.
 L.M./L.C. MAP, CSRE, BOMBAY

MINERAL WEALTH

LEGEND

- SILICA ----- ⊠
- BAUXITE ----- ⊠
- FELSPAR ----- ⊠
- IRON ORE ----- ⊠
- SOAP STONE ----- ⊠
- CHINA CLAY ----- ⊠
- CHROMITE ----- ▲
- MANGANESE ----- ▲
- MICA ----- ⊙
- LEAD & BARITE ----- ⊠
- LIME STONE ----- ⊠
- COPPER ORE ----- ⊠
- BRICKS & TILE CLAY ----- ⊠
- TALUKA PLACE ----- ●



The iron ore (+60%) which is exported to Taiwan and Rumania (foreign exchange). Due to increased mining activity the entire settlement is going to be affected for one of the mines has already touched the inhabited area. In future if decided to expand the activity, the whole settlement may have to be shifted - a serious and remote possibility. The problems created by the mine operation vis-a-vis the settlement are:

- a. granting permission for mining by special legislation on the lines of Surface Mining Control and Reclamation Act
- b. providing surface road accesses for the use of the villagers and miners / dumpers saperately (to be maintained by public works department)
- c. dumping of waste material on land and sea be organised scientifically to avoid damage to the existing agriculture, horticulture and water courses
- d. the areas created by sea side dumping be used for plantation or tourist camps
- e. water pumped out of mines be used for charging local wells and irrigation - a scheme that involves collaboration with Gram Panchyat, farmers and mine owners
- f. providing hospital for workers and residents of the settlements (common to both)
- g. providing sports ground, public hall, expansion of High School and a cremation ground for different Wadis, and
- h. any developmental activity need enforcement of laws (in collaboration with R.M. Authority, Grampanchyat and Revenue authority

Any attempt to propose utilization of land need to maintain the balance of ecology. For this extension of cultivated area by utilization of culturable waste lands, conservation and replenishing of forest area constitute policy measures. Such a policy takes into account:

1. using high hill ranges for afforestation along with quick growing grass (with restricted grazing)
2. intensive utilization of elongated ranges for plantation like mango, pineapple, cashew nut, and cocunut
3. intervening valleys be used for plantation of arecanut, eucalyptus, cashewnut, pineapple and cocunut
4. the upper and lower plateau be used for agricultural crops
5. an integrated approach for the development of water sheds is called for
6. area along beaches to a depth of 500 mts from the high tide line need to be preserved against non-agricultural activities
7. evolving sectoral developments on the basis of administrative units, and
8. conserving rain water in wells, water tanks, natural slope through major and minor dams for providing drinking water, irrigation, and to maintain water table of the region.

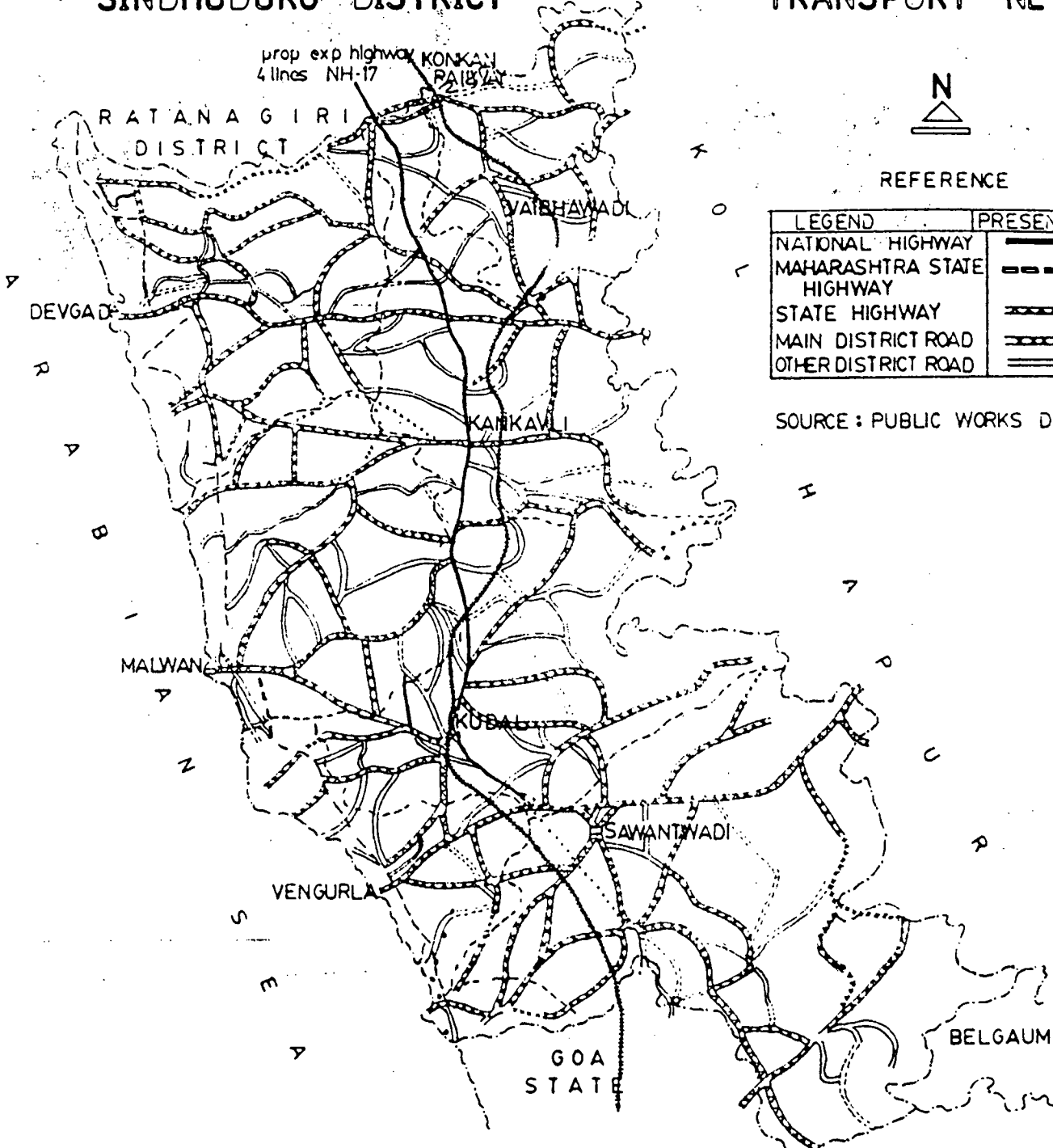
Transport by any means is essential for the development of other aspects of life. The existing situation of resource region is a major bottle neck in the development from the point of view of utilisation of available natural resources - minerals, agro-horticulture and industrial development and modernisation of local life and society. According to expert report of Government of India, it is observed that the problem posed by this region is a national one and needs development of this sector by special development plans over and above the provisions of current State and Central Plans. Neglect has resulted in the large scale exodus of population to Mumbai and other places for finding employment in preference to cultivation. The whole fabric of the economy of these areas require reshaping so as to fit in with the developed part of the State.

The modes of transport (p.76) and integrated transport (p.132) provide an account of taluka wise distribution of roads, missing links of transport in the villages of 7 talukas. Further, rail and navigable transport and lack of air transport also become apparent.

Transport network, and Ring Road Transport Network have been presented lucidly in the maps (Map 9 & 10) which convey the developmental impulses of this sector. Because of land form the district is devoid of linkage in transport as found in other districts having plain lands.

SINDHUDURG DISTRICT

TRANSPORT NETWORK

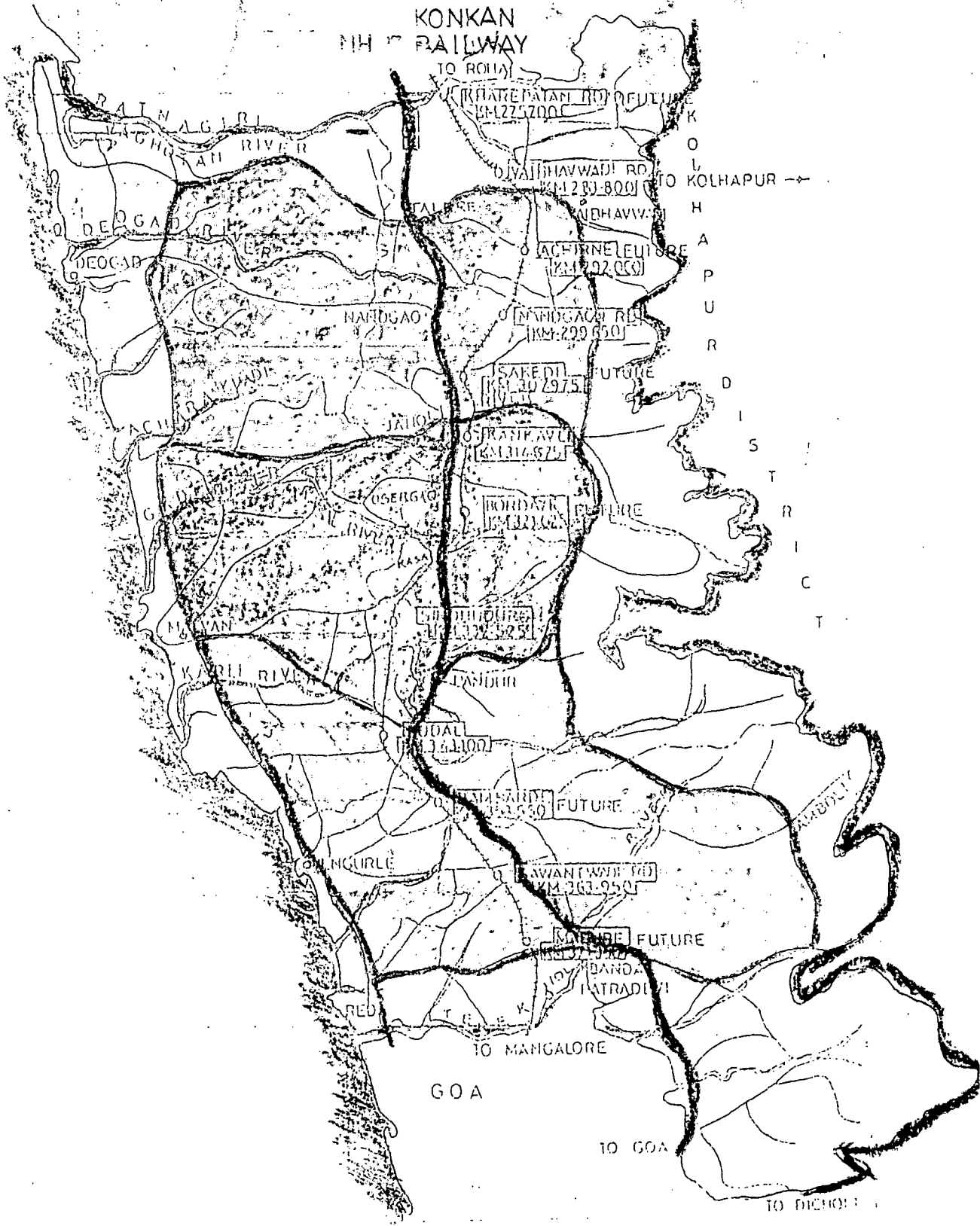


REFERENCE

LEGEND	PRESENT	PROPOSED
NATIONAL HIGHWAY	————
MAHARASHTRA STATE HIGHWAY	———	———
STATE HIGHWAY	———	▲▲▲▲
MAIN DISTRICT ROAD	———	xxxxx
OTHER DISTRICT ROAD	———	=====

SOURCE : PUBLIC WORKS DEPARTMENT

SINDHUDURG DISTRICT RING ROAD TRANSPORT NETWORK



'Linkage' approach looks for opportunities which essentially get tied to the existing economic activity of the region both by backward and forward linkages.

Industries that can be linked to agriculture are seed processing and farm implements manufacturing while those linked to non-agricultural activities include a host of ancillary units, repair shops and service units.

Their growth and fortune are hitched to 'mother' industries.

The district Sindhudurg has been carved out of Ratnagiri and Kolhapur districts. According to physiography, Sindhudurg can be divided vertically into three North-South belts which extend from the coastland in the West to the slope of Sahyadri in the East.

It is pertinent to note that the socio-cultural diversity divides it horizontally from West to East into two tracts - northern and southern tract.

Devgad, Vaibhavwadi, Kankavali and Malwan talukas of North have less close links with Mumbai and Thane than Kolhapur and Belgaum. As a contrast to this, labour from southern talukas of Savantwadi, Vengurla and Kudal have migrated to Mumbai and Thane. It has a strong link with Mumbai - Thane region. The southern tract has distinctive character of its own due to the influence of princely State of Savantwadi as well as the Goan culture

(adjoining) Even the civil structures. Architectural expression and artistic values are distinct over the northern part of the district. Mineral resource and relatively strong-agro horticultural activity has made this region more prosperous over the other

The population of over 8.3 lac of the district is predominantly rural with low degree of urbanization. It has a poor agrarian economy and low level of development. The concentration of the population is in Kudal, Savantwadi and Kankavali. Sex ratio of 1150 females out number males. The population growth rate has doubled in the eighties from what it was in seventies. Almost 60% of the workers are cultivators while agricultural labour accounts for a very small proportion. A high proportion of the population owns land but the holdings are small in size (even fragmented further) rendering them uneconomical for cultivation.

Lack of job opportunities in the district force the young male members to seek employment in metropolitan areas like Bombay and more recently to Thane, Pune, Kolhapur and Sholapur.

The population of the district include Main and marginal workers. The main workers are employed in Primary Sector ie., cultivators, agricultural labourers and others ; and Secondary Sector comprising labourers employed in either household or other industries. The other group is of marginal workers who work for less than

183 days in a year.

Quality of life reflects level of development as one can rely on various indicators viz., demographic, economic and social.

The indicators are:

- a. urban population ratio
- b. sex ratio
- c. extent of literacy and levels of education
- d. occupational distribution of work force
- e. size of land holding, cropping pattern and yields, and
- f. the physical, social and financial infrastructure like road lengths, electricity consumption, telephones and banks and so on.

A comparative analysis of such available indicators with those for the country or the state can broadly help to determine the level of development or extent of backwardness of a district.

In terms of these parameters and comparative analysis unfold the backwardness of Sindhudurg over Maharashtra and India. However, care is required to exclude Grater Bombay and Thane for they fall in Maharashtra but are industrially advanced to avoid misleading conclusions of exaggerating figures of backwardness of Sindhudurg.

Of the 7 talukas, Savantwadi, Kudal, Malwan and Vengurla are urban towns with a combined population of 63,000 ie., bare 7.57% of total population. The low degree of urbanization is an indicator

of the backwardness. It implies that the secondary and tertiary sector activities have not yet developed to provide jobs. The dependents receive money orders from the migrants.

Sex ratio of 1137 females against 1000 males is high (over average of 951 and 929 for the state and country). In fact it has fallen from 1205 and 1137 in 1981 and 1991. This fall is in no way an index of migration which is linked (may be due to family planning) with low birth rate, higher female mortality rate. The trend has changed from individual to family migration (low population growth of 0.5% during 1981-91 as against 2.3% of the state).

The proportion of workers in the total population and their distribution is also an indicator of development. Accordingly, early stages of development, opportunities for gainful employment are few outside the Primary Sector. As a consequence there is (i) a low proportion of workers in the population, (ii) greater concentration of workforce in the Primary Sector and (iii) considerable amount of disguised unemployment (marginal workers). Based on these aspects Sindhudurg is still an underdeveloped district.

Degree of high literacy (almost 100%) due to historical background in Sindhudurg has not led to economic development. The district has a tradition of literature, art and culture and quite a few eminent scholars, literary figures, social workers as well as political leaders hail from the district. The

succeeding generations maintained the traditional values without economic development. In the absence of opportunities for gainful employment locally led to brain drain.

Other indicators like Transport, including road, rail and water ways, telecommunication, electricity, market and warehouses, co-operative movement, commercial banks are also suggestive of backwardness of Sindhudurg.

Besides socio-economic weaknesses, there is inadequacy of primary resource, infrastructural deficiency and planning infirmities.

Preciesly, when the industries get established on a sound footing supported by ancially units and service industries, consumer goods industires will follow for urbanisation gains momentum to cater to regional markets. The entire process of development may take more than two decades even if a begning is made now.

Maharashtra experienced major changes in the administrative set up after 1981 Census. There is an increase of 2 divisions and 4 districts. By the end of 1991 the state had 6 divisions, with 30 districts - Konkan division - 5 districts (including Sindhudurg); Pune - 5 ; Aurangabad - 7; Nagpur - 5; and 2 newly created divisions Nashik - 4 and Amrawati - 4 .

Sindhudurg has 4 towns (7 talukas) and 736 villages spread over Kudal (123 villages), Malwan (135), Devgad (97), Vaibhavwadi (58)

Kankavali (105), Savantwadi (140), Vengurla (78) all of which fall under 2 sub divisions viz., Savantwadi and Kankavali.

They are looked after by District Collector, Judge, Supdt., of Police and Chief Executive Officer of the Zilla Parishad. Thasildar, BDO, Judicial Magistrate, Deputy Engineers are responsible at tahsil level for the development and other regulatory functions

To promote development of democratic institutions for securing major participation of people in the development plans and local governmental affairs by decentralisation of powers and functions, Zilla Parishad and Panchyat Samathies have been established (Zilla Parishad and Panchyat Samathies Act).

The statutory urban local bodies are municipalities and corporation manned by Chief officer and a Commissioner respectively.

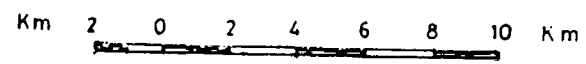
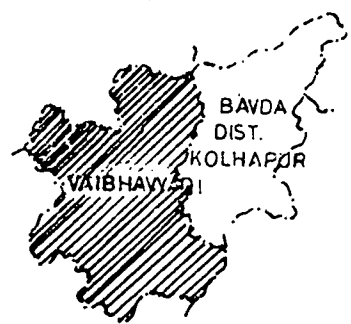
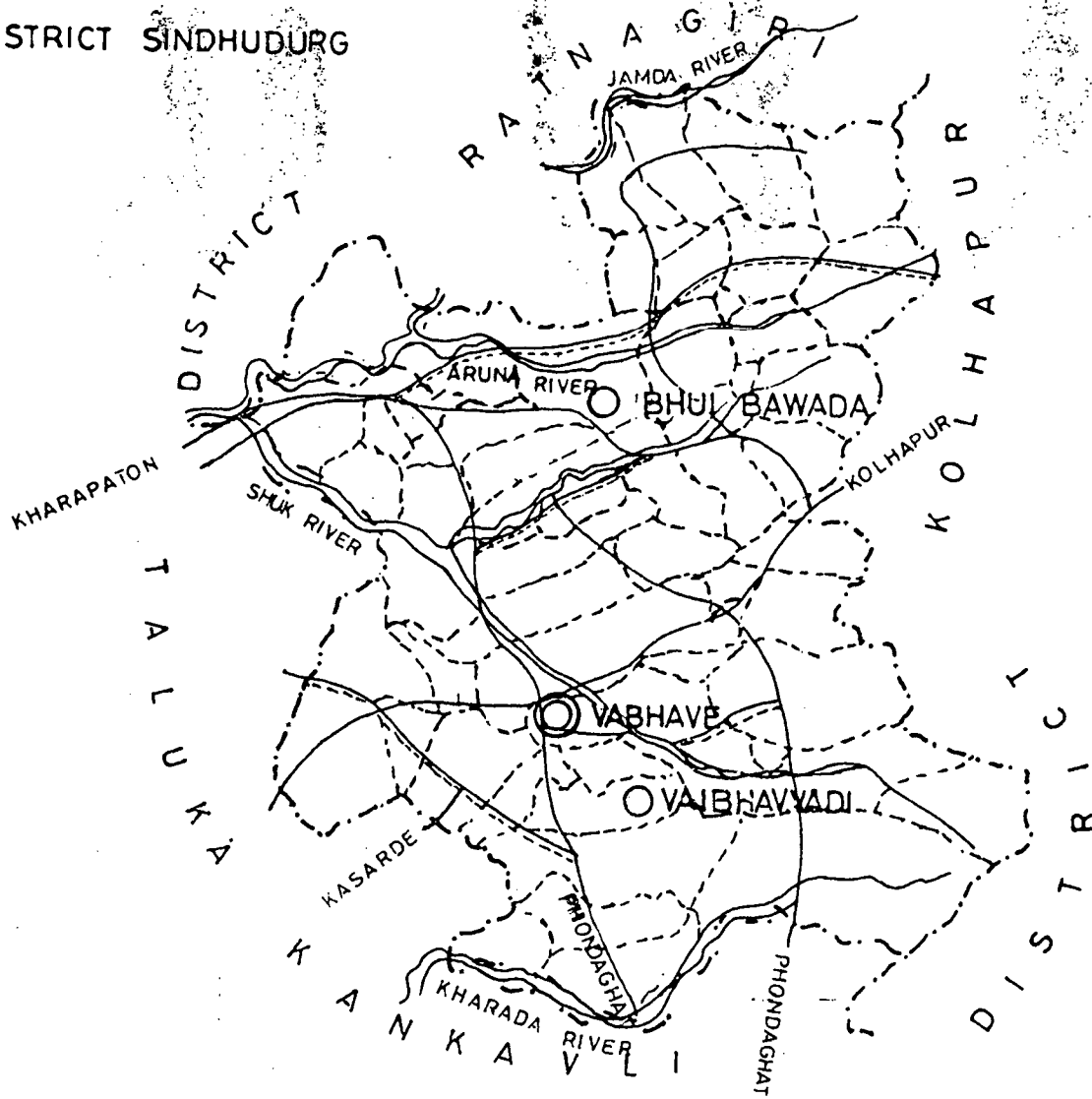
The incentives and facilities made available by the government, local authorities, NGO's and so on play a significant role in determining the location and / or area of operation. Incentives like providing lands at lower rates, giving access to major route ways, public utilities, social factors like schools, housing grants and loans, pollution control and influencing the location and the decision of entrepreneurs. Likewise fiscal levies and concessions, and subsidies also play an important role for the upcoming enterprises.


Government departments, bodies and organisation have been implementing Developmental Programmes. Still it is observed that the region has remained in an under developed state. The reasons for this may be many: like socio-economic, physiographic in nature; attitude of people due to long period of neglect and poverty, enmosity over fragmented and also common holdings and age old beliefs which need to be overcome for accelerated development. For this utilization of investments of government, public and semi-public organisation need close and judicious monitoring of the development.

RESOURCE TALUKA - VAIBHAVWADI
A PROFILE

TALUKA VAIBHAVVADI

DISTRICT SINDHUDURG



 AREA GAINED BY NEWLY CREATED VAIBHAVVADI TALUKA OF SINDHUDURG DIST. FROM BAWDA TALUKA OF KOLHAPUR DIST.

From the Bhavda Tehsil of Kolhapur, 53 villages were transferred to Sindhudurg and on May 1, 1981, a new Taluka Vaibhavwadi came into being. Subsequently, 5 new villages have been created and now it consists of 58 villages with a population of 48,536 (Map-1)

On the north the taluka is bounded by Ratnagiri and on the east by Kolhapur districts. The south and west are surrounded by Kankavali taluka.

Vaibhavwadi belongs to C & D Block according to census of 1991. The geographical area is 415.81 Sq kms having a density of 117 Sq kms. All the 58 villages have habitation and curiously there is no urban area. Indeed they are all rural villages. The number of occupied residential houses is 9913 and the number of households are 10695. The taluka has the lowest number of villages in the district Sindhudurg.

The total number of males are 21629 and 26907 females (Census 1991) and ranks first in the district in the sex ratio. The rate of literacy is 64.3% and ranks seventh. About 54% of the population is represented by marginal labourers who work for less than 183 days in a year. There are no fixed assets without any industry. The area has electric connection to about 39 villages.

Primary schools account for 96.5% and ranks third. The Primary Health Centres account for 27.59% (fourth rank).

In all 74 buses run on the road with 75.85 bus stops - Vaibhav-wadi Konkan Railway pass. The pakka roads are to the extent of 44.83%.

Banking facility is available in 3 villages out of which two are from the co-operative sector.

Granite is available as a resource and is now subjected to export.

The average annual rainfall is around 3300 mm and the temperature ranges between 17 - 30° C . All the villages have wells for drinking water (ranks fifth). Veghoton (Kharida) and Deogad rivers (minor) flow through the taluka with no consequence as they dry up.

The soil mapping units of the taluka belong to 08, 15 and 35 where 08 represents soils of undulating lands with mesas and narrow valleys (84.64 He); 15 represents soils of valley land (139.68 He); and 35 is soils of undulating western foot hills, slopes and narrow valleys (130.11 He). Their relative percentages are 0.27; 0.45; and 0.421% respectively.

The taluka doesnot have fishing activity but there are 22 potential inland fishing villages.

Forest cover of the villages is 37.39% with fourth rank. The irrigated area is 10.34% (seventh rank). 26.86 He (29.23%) are occupied by horticultural crops like mango, jackfruit and

and Cashew. Rice is cultivated in 43.4 He (49.15%) and other crops like green gram, bamboo and groundnut are found in 19.26 He (21.62%). This amounts to 88.60 He. The rest of the land is waste land.

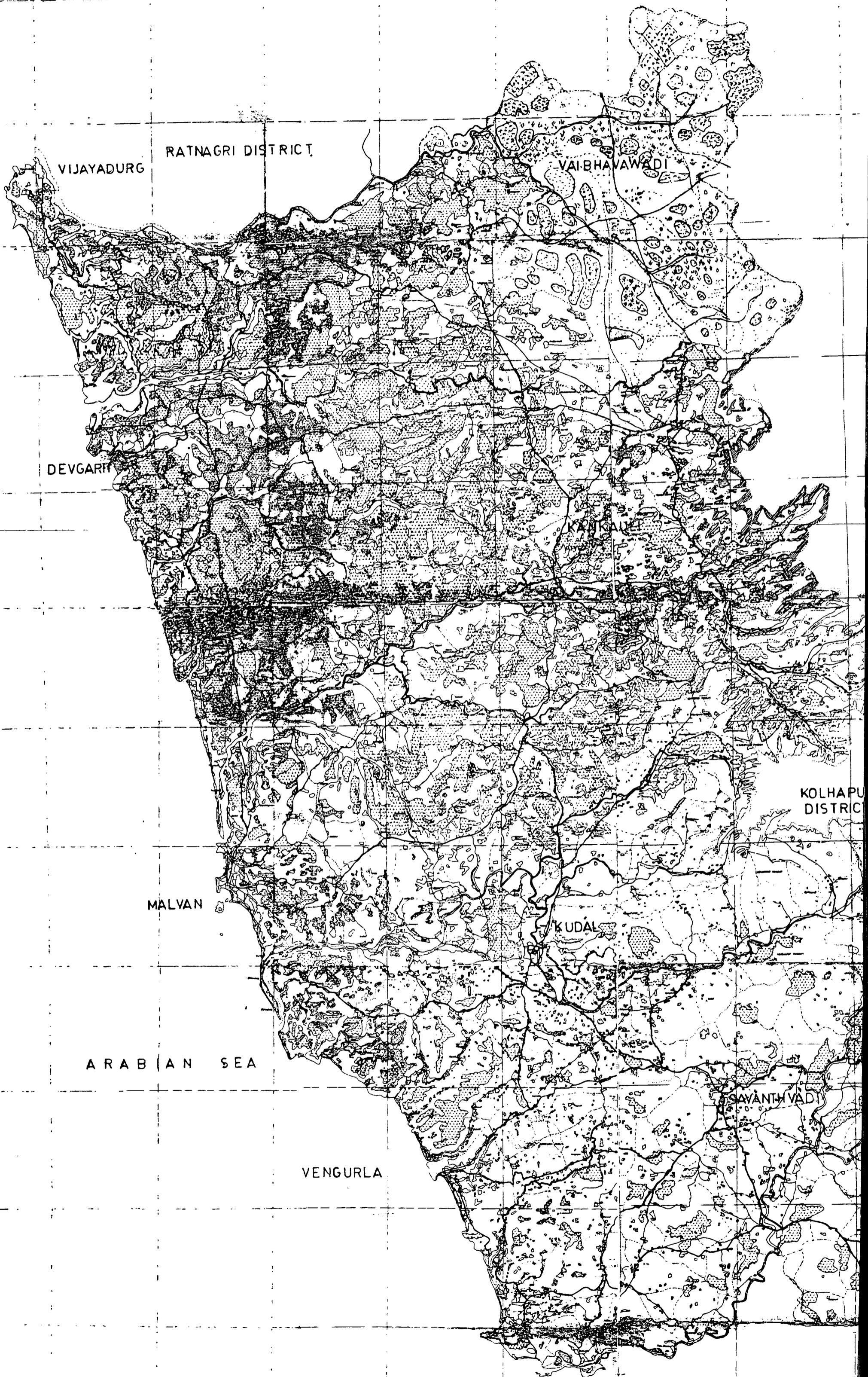
STRATEGIES:

- river waters of Devgad and Veghoton needs preservation through minor dams on water shed management and for irrigation of waste lands
- for increasing the cash crop production, horticultural provision should be made available for more wells.
- Zilla parishad through Gram panchayats should come forward to provide water supply schemes for a population of 500 to 1500 including wadies - Sangutwadi, Kurli and Nawale
- to increase agricultural productivity by optimum use
- providing incentives for growing medicinal and aromatic plants on the available waste lands with the technical knowhow from agencies like CIMAP, a potential that is not being tapped
- by introducing quick growing grasses, the waste lands can be harnessed to the advantage of dairy which itself will lead to the development of many other sectors at taluka level
- increasing the forest cover by using waste lands through incentives
- since the taluka has more than 20 potential inland fishing centres, there is a need to be converted as production centres

- through the participation of locals and Gram panchyat by providing incentives and necessary funding.
- improving transport facilities
 - all measures should be taken up for providing electricity to agriculture, industry and domestic consumers
 - encouraging nodal settlements at identified village growth centre
 - on undulated plateau and foot hills need afforestation by first growing grasses, mango and pineapple
 - need of the time is to provide incentives in any form for establishing industries which would lead to several ancillary activities - this will generate employment opportunities and would stop exodus to urban areas
 - creating awareness among people to undertake poultry, dairy and fish culture.
 - any activity leading to the prosperity of the sector under study should aim at conserving natural resources, fragile ecology and cultural heritage - ecofriendly approach

Any approach to study eco-development to evolve strategies for Sindhudurg have implications of their own because of its topography. The only one common denominator of the region is the name Sindhudurg and its poverty - a pigeon hole that is accommodating sectors with diverse natural resources and sectoral peculiarities.

SIDHUDURG DISTRICT



VIJAYADURG

RATNAGRI DISTRICT

VAIBHAVWADI

DEVGARH

RANIKANT

KOLHAPUR DISTRICT

MALVAN

KUDAL

ARABIAN SEA

VENGURLA

SAVANTVADI

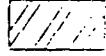

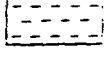
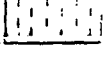
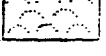
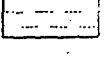
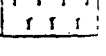
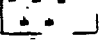
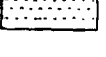
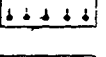
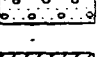
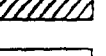
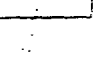
GOA STATE

WASTELAND MAP 6

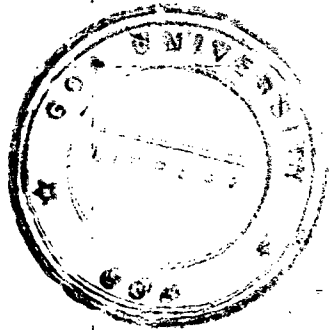
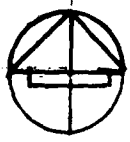
1987 SCALE 1:250,000

SOURCE: SURVEY OF INDIA

REFERENCES

GULLED AND/OR RAVINOUS LAND	
UPLAND WITH OR WITHOUT SCRUB	
WATER LOGGED AND MARSHY LAND	
LAND AFFECTED BY SALINITY/ALKALINITY-COASTAL/INLAND	
SHIFTING CULTIVATION AREA	
UNDER UTILISED/DEGRADED NOTIFIED FOREST LAND	
DEGRADED PASTURES/GRAZING LAND	
DEGRADED LAND UNDER PLANTATION CROPS	
SANDS-DESERTIC/COASTAL	
MINING/INDUSTRIAL WASTELANDS	
BARREN ROCKY/STONY WASTE/SHEET ROCK AREA	
STEEP SLOPING AREA	
SNOW COVERED AND/OR GLACIAL AREA	
BOUNDARY: International	SETTLEMENTS: Town or Village
State	CANAL
District	RIVER
Taluk	STREAM
Village	HEIGHT (in metres) 786
Forest	RAILWAY
ROADS: Major, Others	WATER BODIES

T-143



BELGAUM DISTRICT

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