

# REGIONAL PLAN FOR GOA

2001 A.D.





# REGIONAL PLAN FOR GOA 2001 A.D.

## Identification of Project

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# STUDIES / PROJECTS

## **Study / Project No. 1**

Critical study of settlements in Western Ghat sub-region.

## **Study / Project No. 2**

(ii) Detailed zonal plans / Development plans should be prepared for the market / service centres

## **Study / Project No. 3**

Micro Level Survey of Land Utilisation can be done with the help of Remote sensing

## **Study / Project No. 4**

Master Plan of Tourism Development vis - a - vis other intersectoral and cross - sectoral is recommended to identify the holding capacity in terms of tourist potential of the individual tourist places.

## **Study / Project No. 5**

GUAC ( Goa Urban Art Commission ). should be constituted with the following two functions

- I. To scrutinise the plans from aesthetic point of view,
- ii. To evolve new designs from aesthetic point of view,

## **Study/Project No. 6**

With the help of GIS the entire forest production, collection, distribution and management can be management.

## **Scheme / Project No. 7**

Water Supply ; Due to undulating terrain and limited surface water potential, a sustainable and efficient water supply system will have to be found out in building an Integrated Regional Water Grid including surface and underground water potential.

# LIST OF MAPS

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# REGIONAL PLAN FOR GOA 2001 A.D.

## Identification of Project

### *Introduction*

The Town and Country Planning Department of Goa, under the Goa Daman Diu Town and Country Planning Act, 1974, prepared 'Regional Plan for Goa - 2001 A.D.' and the same was **enacted upon since Dec. 1986.**

The plan is not only to consider the position of demand and supply of land and Urban Spaces but also **to build up a data-base in a spatial context** which was extremely weak, deficient and fragmented.

The plan should not be interpreted strictly as an instrument for development control, but should form the **basis for**

- (i) **Micro-level town and country planning as well as zoning activities including the preparation of Outline Development Plans (O.D.P. s) and Comprehensive Development Plans (C.D.P.s)**
- (ii) **considering major proposals and taking decisions affecting land uses on a larger scale.**

## 2. Objectives

- i. Rationalisation of inter - regional disparities in development.
- ii. Integrated resource utilisation
- iii. Balanced provision of urbanised opportunities and choices
- iv. Integrated rural development
- v. Environmental conservation, and
- vi. Improvement of quality of life

The basic concept of the regional plan is two fold, strengthening the inter - regional socioeconomic and functional unity, and developing the vital relationship with the surrounding hinterland.

## 3. Strategy of Regional Plan

Goa comprises of **three planning sub-regions** with different levels of development. They are -

### **Coastal Talukas**

Tiswadi  
Bardes  
Salcete  
Mormugao

### **Midland Talukas**

Pernem  
Bicholim  
Ponda  
Quepem

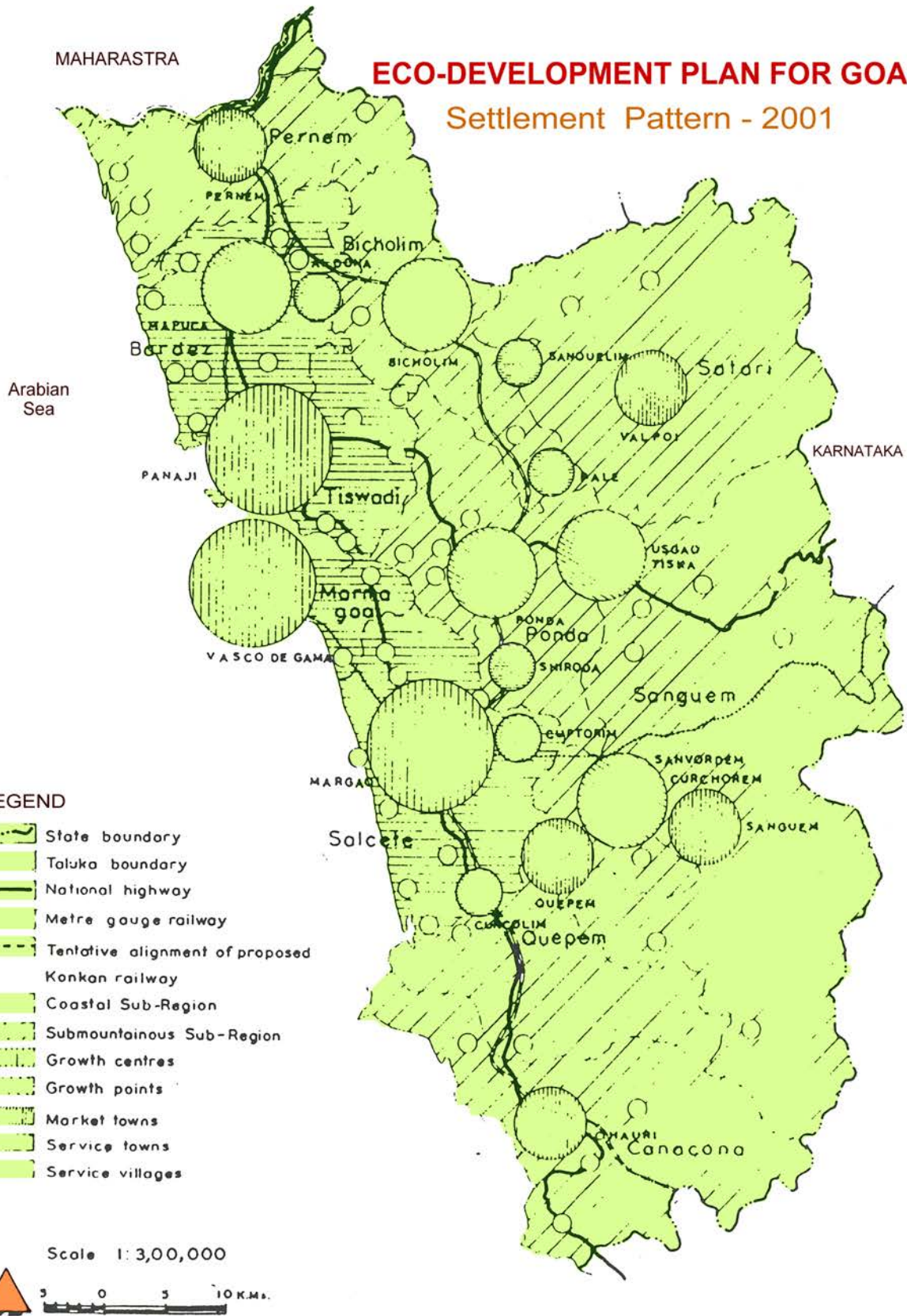
### **Western Ghat Talukas**

Satari  
Senguem  
Canacon

(Map no. 1 showing Eco-Development Plan for Goa; Settlement Pattern - 2001)

MAHARASTRA

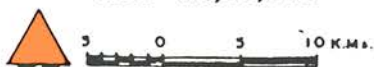
# ECO-DEVELOPMENT PLAN FOR GOA Settlement Pattern - 2001



### LEGEND

- State boundary
- Taluka boundary
- National highway
- Metre gauge railway
- Tentative alignment of proposed Konkan railway
- Coastal Sub-Region
- Submountainous Sub-Region
- Growth centres
- Growth points
- Market towns
- Service towns
- Service villages

Scale 1:3,00,000



Taluka-wise assessment of development levels shows, that due to concentration of geopolitically forces jrr Coastal Talukas have disproportionately developed whereas the talukas lying Midland and western Ghats have not. **More than 57% of the total population resides in coastal sub-region.**

**Levels of urbanisation**, tremendously inclined towards coastal Talukas, have highest concentration of urban population (83%) residing in 8 urban centres (out of total 15). While Midland Talukas and Western Ghat Talukas are yet to be developed aJot-more. Such regional imbalances calls for immediate attention and more systematic and harmonic development strategy.

## 4. Development Strategy

### (i) Distribution of settlements

- a. focus on the two less developed sub-regions
- b. more attention on conservation strategy for Coastal Talukas

### (ii) Land utilisation strategy

Persuasion of **balanced population distribution** through judicious land allocation and location of economic activities.

### (iii) Infrastructure

**Strengthening** and widening of the infrastructural network

### (iv) Sectoral Development

Appropriate sectoral development on the basis of their future **potential** and analysis of their impact on environment.

### (v) Conservation

Strategy for conservation of natural and man made environment.

### (vi) **Phasing** of proposal indicating strategies of timely and appropriately implementation of the project.

### (vii) Institutional Capacity

Institutional capacity strengthening to ensure appropriate enforcement of the regional plan

## These development strategies are statutory

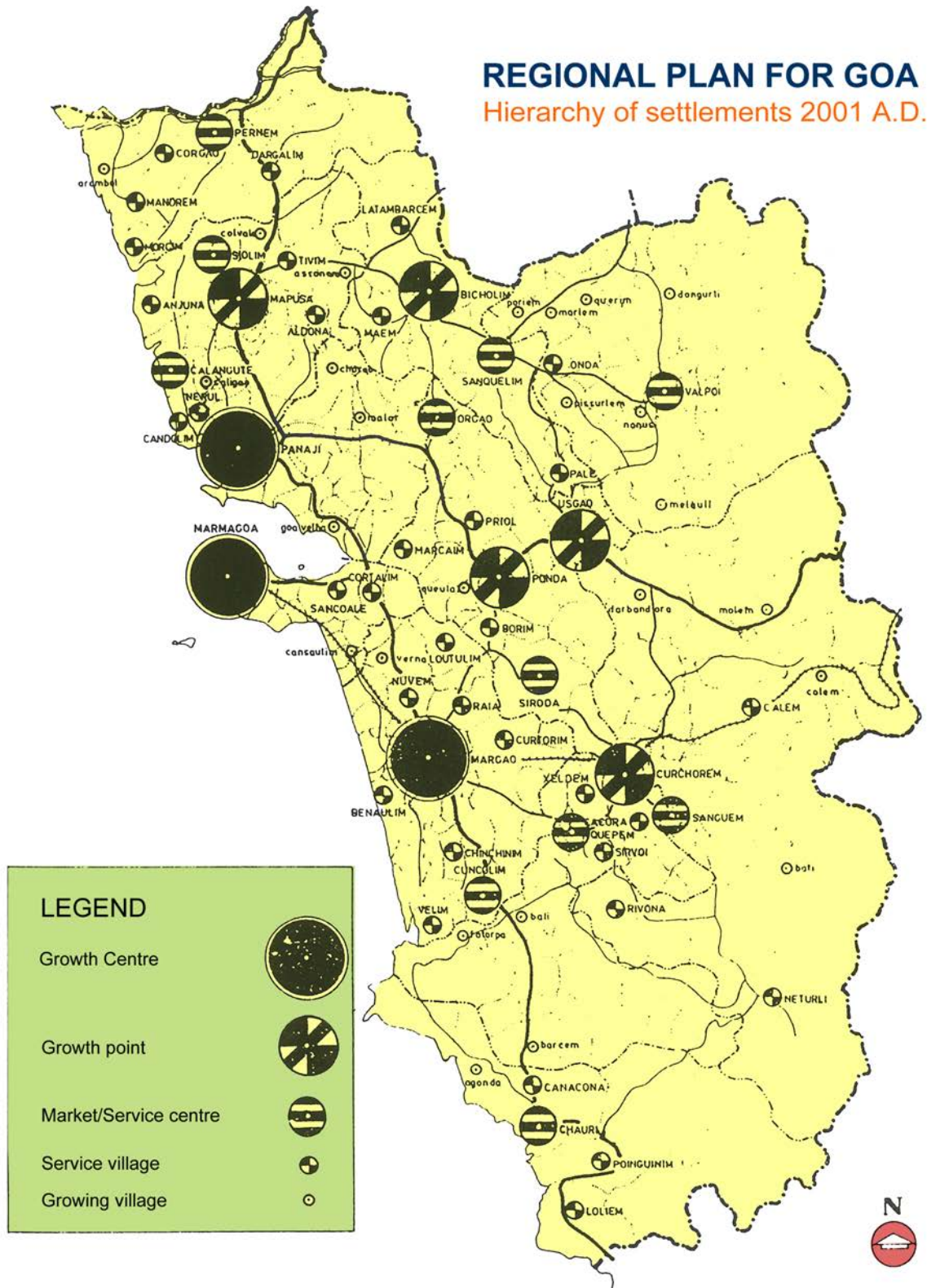
## 5. Demographic Component.

As per the previous details regarding imbalance distribution of urban population and settlements, it becomes indispensable to have a **sound and balanced settlement development strategy.**

To assess the quantum of requirements proposed in the Regional Plan population, **Taluka-wise and settlement-wise projections have been made for the year 2001 A.D.** on the basis of the assumptions derived from the subjective judgments of the population growth trends during 1971-81. **Now projections have to be modified based on 1991 Census.**

As per the estimates, population of Goa would be in the tune of 16 lakhs. Details of the settlement-wise

projections are given in the Table No.1 with their proposed status in 2001 A.D. as per the Plan. Hierarchy of settlements - 2001 A.D. is shown in map no.-2.



**TABLE NO: 1**  
**ESTIMATES OF PROJECTED POPULATION IN LAKHS**

YEAR	MOST OPTIMISTIC ESTIMATES	REASONABLE ESTIMATES	LEAST OPTIMISTIC ESTIMATE
1991	12.79	12.77	12.49
2001	15.74	15.37	14.99

For simplicity purposes population of Goa may be taken 16 lakh by 2001 and 22 lakh by 2010 A.D.

### Urban Rural Component

The growth rate of urban population during 1971-81 has been as high as 59% which further accentuated the concentration of the urban population in Coastal talukas. **At present, more than 83% of total urban population resides in Coastal talukas whereas Midland (13%) and Western Ghats (4%) has meagre share's of it.** Besides, out of 15 urban centres, 8 are located in the Coastal Talukas. This leads to over-urbanisation and deterioration of quality of life, (as shown in Map No.1)

With the aim of elimination of rural urban migration to prevent over concentration in these urban centres, and concentration of development measures on the towns situated in Midland and Western Ghats, the **Regional Plan has proposed a settlement pattern for 45% urban population and 40% Work Force Participation Rate in the year 2001**

To ensure balanced growth the Plan has delineated a well structured hierarchy of the settlements through decentralisation and integration of urban and rural areas, as shown in the following tables.

**TABLE NO: 2**  
**PROPOSED HIERARCHY OF SETTLEMENTS**

Classification of Settlements	Proposed Places	Existing population, 1981	Projected Population, 2001 A.D.
1. Growth centres	1. Marmugao	69684	120000
	2. margao	73126	119987
	2. PANJI	77226	115840
2. Growth points	1. Mapusa	25998	41586
	2. Ponda	15330	28744
	3. Bicholim	11233	19267
	4. Sanvordem- Curchorem	11430	18106
	5. usgao	7295	12310
2. Market/Service Centres	1. Cuncolim	12706	18296
	2. Shiroda	11663	17354
	3. Calangute	9621	15092
	4. Quepem/Deao Sirvoi	8848	13982
	5. Chauri/Nagprcem-Palolem	9571	13900
	6. Sanquelim/mau linguem South/ Carapur	8564	13051
	7. Siolim	8892	12591

	7. Siolim	8892	12591
	8. Pernem	5753	10826
	9. Orgao/ Cumbarjua	7123	10130
	10. Sanguem	5977	8750
	11. Valpoi	3895	6665

## PROPOSED SERVICE VILLAGES:

### 1. Bardez Taluka:

Nerul-ReisMagos  
Aldona

Anjuna  
Candolim

Tivim

### 2. Salcete Taluka:

Benaulim  
Curtorim  
Nuvem

Chinchinim  
Velim

Raja  
Loutulim

### 3. Mormugao Taluka:

Cortalim

Sancoale

### 4. Pernem Taluka:

Mandrem  
Corgao

Morjim

Dargalim

### 5. Bicholim Taluka

Mayem

Pale

Latambrcem

### 6. Ponda Talika:

Priol

Brim

Marcaim

### 7. Satari Taluka:

Onda

### 8. Quepem Taluka:

Caracora

Xeldem

### 9. Sanguem Taluka:

Rivona

Calem

Netorlim

### 10. Canacona Taluka:

Lolim

Canacona

A few more centres have been selected in view of their central location and faster rate of growth. The centres, so selected, are listed below

- |     |                         |          |                      |
|-----|-------------------------|----------|----------------------|
| 1.  | <b>Bardez Taluka:</b>   |          |                      |
|     | Saligao                 | Colvale  | Assnora              |
| 2.  | <b>Tiswadi Taluka:</b>  |          |                      |
|     | Chorao                  | Goavelha | Navelim/Goltim/Malar |
| 3.  | <b>Salcete Taluka:</b>  |          | Verna                |
| 4.  | <b>Mormugao Taluka:</b> |          | Cansaulim            |
| 5.  | <b>Pernem Taluka:</b>   |          | Arambol              |
| 6.  | <b>Ponda Taluka:</b>    |          | Quela                |
| 7.  | <b>Quepem Taluka:</b>   |          |                      |
|     | Bali                    | Fatorpa  | Barcem               |
| 8.  | <b>Satri Taluka:</b>    |          |                      |
|     | Poriem                  | Querim   | Pissurlem            |
|     | Nanus                   | Dongurli | Morlem               |
| 9.  | <b>Sanguem Taluka:</b>  |          |                      |
|     | Darbandora              | Colem    | Molem                |
|     | Bati                    |          |                      |
| 10. | <b>Canacona Taluka:</b> |          |                      |
|     |                         | Agonda   | Poinguinim           |

Though, the settlement development strategy seems to be appropriate yet a critical study of the settlement map indicates the need of concentration of the development measures more towards the Western Ghat Talukas.

### Study / Project No.1 - Critical study of settlements in Western Ghat sub-region.

## 6. Development Priorities

- (i) To remove the gaps in service and to upgrade the existing services; villages should be selected for the future to give them urban status so that they may act as market and service centres. The fast growing service villages, especially in Western Ghat Talukas, should be taken up for providing required facilities so that the surrounding village may avail these facilities at a comparatively lower cost.

### Study / Project No. 2

- (ii) Detailed zonal plans / Development plans should be prepared for the market / service centres

# 7.

## Land Surface Utilisation

Land availability, in Goa with a total area of about 3656 sq.kms. @ of 0.36 ha. per person is on lower side. As such emphasise has to be given on the judicious use of land.

Table No. 3

### Macro Land use of Goa (Pattern of Generalised Surface utilisation), 1977 and 2001 A.D.

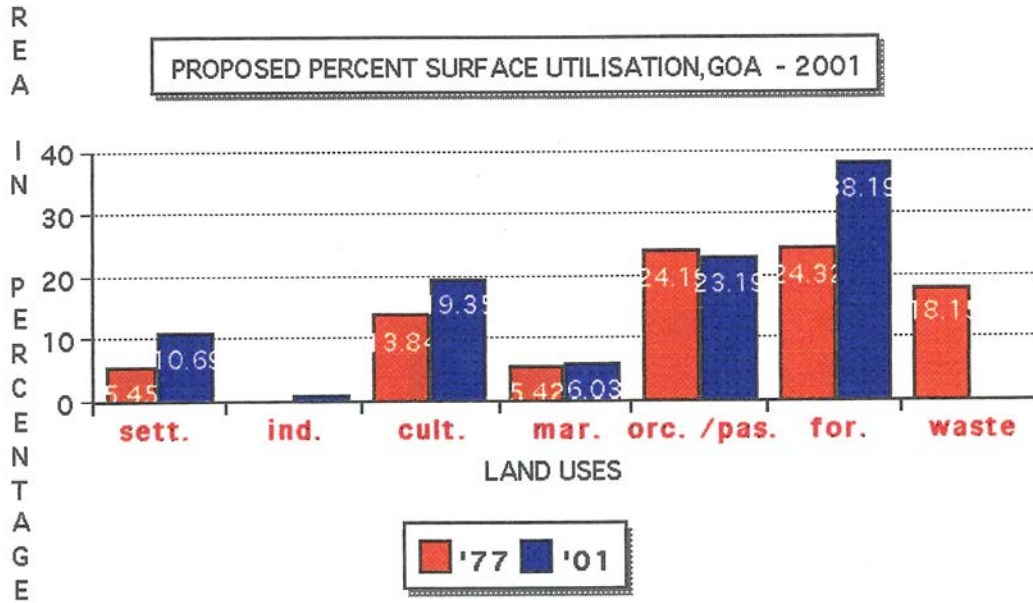
Year	1977	2001
Settlement area	19937 (5.45)	39073 (10.69)
Industrial Area	604 (0.17)	2596 (0.71)
Cultivated area	50582(13.84)	70737 (19.35)
Marshy land / water body Fish farm Saltpans Reservoir Sandyarea	19837 (5.42)	22037 (6.03)
Orchard (Including pasture)	88450 (24.19)	84783 (23.19)
Natural Cover/ Govt. land	88904 (24.32)	139603 (38.19)
Waste land	66322 (18.15)	-
Miscellaneous	30926 (8.46)	6733 (1.84)
<b>Total</b>	<b>365562 (100)</b>	<b>365562 (100)</b>

### Settlement density

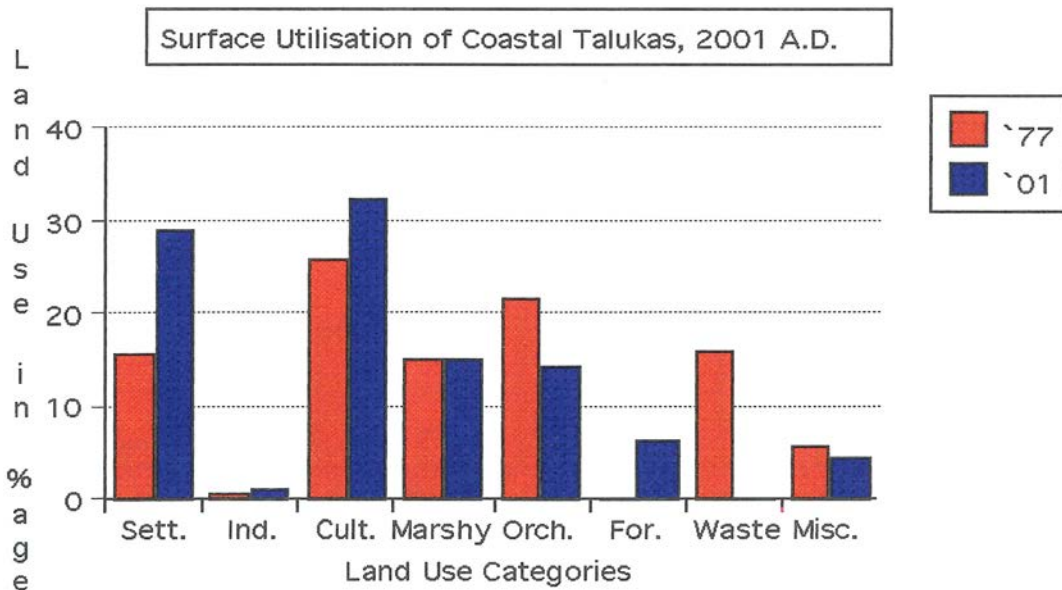
(person / ha)                      51                      39

A Surface Utilisation Plan has been proposed to evolve desirable landuse pattern for 2001 A.D. All sectors of economy compete for land utilisation in their benefit, This leads to a conflict. To resolve the conflict, through systematic land allocation strategy, the Surface Utilisation Plan has been drawn. This is based on sustainable socioeconomic environment and conservation of ecology and natural environment.

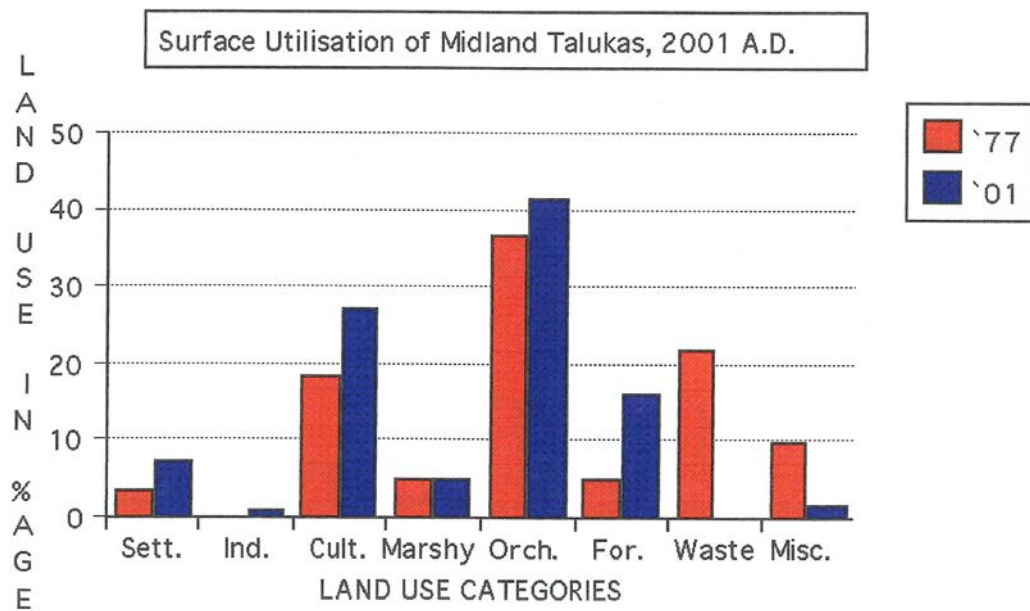
LAND USE	'77	'01
Sett.	5.45	10.69
ind.	0.17	0.71
cult.	13.84	19.35
mar.	5.42	6.03
orc./pas.	24.19	23.19
for.	24.32	38.19
waste	18.15	0
misc	8.46	1.84
<b>TOTAL</b>	<b>100</b>	<b>100</b>



	A	B	C	D
1		'77	'01	
2	Sett.	15.69	28.77	
3	ind.	0.53	0.95	
4	cult.	25.53	32.2	
5	marshy	15.1	15.1	
6	orch.	21.65	14.49	
7	for.	0.11	6.12	
8	waste	15.88	0	
9	misc	5.51	4.37	
10				

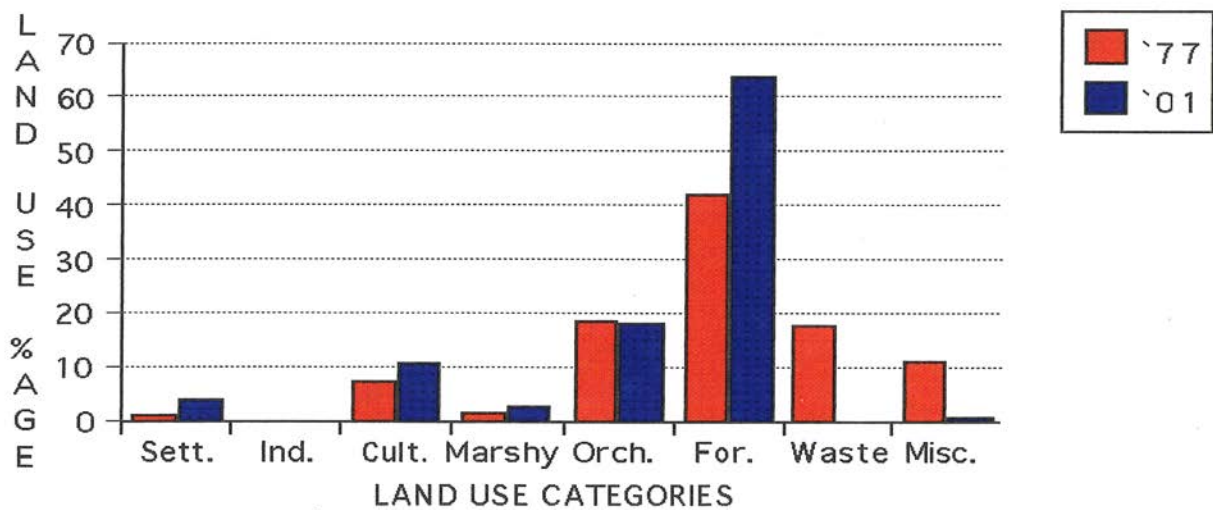


	A	B	C	D
1		'77	'01	
2	Sett.	3.31	7.38	
3	ind.	0	0.93	
4	cult.	18.45	27.28	
5	marshy	5.19	5.19	
6	orch.	36.49	41.43	
7	for.	4.96	16.32	
8	waste	21.82	0	
9	misc	9.78	1.47	
10				
11				
12				



	A	B	C	D
1		'77	'01	
2	Sett.	1.06	3.66	
3	ind.	0	0.2	
4	cult.	7.34	10.8	
5	marshy	1.76	3.04	
6	orch.	19.09	18.23	
7	for.	42.24	63.67	
8	waste	17.63	0	
9	misc	10.88	0.4	
10				
11				
12				

SURFACE UTILISATION OF WESTERN GHAT TALUKAS, 2001 A.D



### Main criteria for deciding the use of any land

- i. **Surface approach** (availability of land) to determine various land uses.
- ii. **Land capability** means physical potentiality of land
- iii. **Land productivity** implies capacity of land to produce primary goods.
- iv. **Water management** through integrated management of water resources and methods of augmentation.
- v. Nature of commitment implies here is the **Cost Benefit Analysis** of the land in case of conflict between two or more than two sectors of economy.
- vi. **Socioeconomic impact**; on education, health, security, justice, recreation etc.
- vii. **Ecological balance** means protection, maintenance and enrichment of environment (natural and man made)

## 8.

### Development Strategy

#### i. More urban concentration in Coastal areas.

As mentioned earlier, that more than 83% urban population and 70% industrial and tertiary activities are concentrated in Coastal Talukas, exerting tremendous pressure on the areas. To exempt this pressure and resolve the imbalances, **major thrust of the Plan is shifted from 'developed' to 'not developed' Midland and Western Ghat** Talukas. While in the case of coastal Talukas, the emphasis is on control and consolidation of development.

#### ii. Rapid decline and degradation of forest area under natural cover

The main consideration of the Plan would be to increase the area under the same conserve to protect it from any negative use. **By the year 2001, .38 % forest cover is proposed than the existing 24% of the total**

**area.** This increase would be adequate to restore ecological balance disrupted by mining, indiscriminate deforestation, soil erosion etc.

### iii. Due to low availability of per capita land;

The Plan has proposed to convert waste land (18% of the total land) in-to various uses specially forest cover, expansion of settlements etc.

### iv. To prevent soil erosion;

The Plan has also proposed following certain slope standards for various land uses;

- a. The land with a reasonable soil cover and **slope less than 10% has been proposed for agriculture use.**
- b. Expansion of **urban and rural settlements should not be permitted beyond 20% of slope.**
- c. The land with a **slope of less than 33%** has been proposed for afforestation.

v. **The Plan also recommends multiple use of land** without affecting the land quality. Some of the suggested compatible uses are:-

- a. Forestry and tourism
- b. Agriculture and pisciculture
- c. Social forestry and fodder cultivation, and
- d. Agriculture and horticulture

### vi. Mining Activity

Mining activity, covering 500 sq.kms. i.e. 14% of the total area of Goa, is **mostly concentrated in Western Ghats and Midland** Sub-regions, of which 350 sq.kms. is in forests. It is causing a serious threat to the ecology of sensitive areas by land degradation due to its **open cast character.** It is leading to **debris deposition** along or near water bodies which causes water **contamination.** Due to high level of vulnerability and sensitivity of the two sub-regions, the activity needs to be controlled and managed appropriately by putting **reclamation, soil conservation, afforestation measures** etc.

### vii. Settlements

Since liberation, area under settlements in Coastal Talukas has doubled. While keeping in view the strategy for settlement development and population projections, overall low density has been proposed as **50 persons per ha. for rural areas and 100 persons per hac. for urban areas.**

On the basis of these\* land utilisation strategies, the Plan has proposed a land use pattern for 2001 A.D.

## 9.

### Recommendations for Action Plan

- i. Demarcation of forest areas under **non-operable (protected) and operable** by forest department.
- ii. Assessment of the land productivity as **first, second and third class land** by agricultural department so as the only **third class land is put to settlement development.**
- iii. **Micro level survey** through remote sensing to categories and restore culturable waste land.
- iv. **Institutional strengthening and reorientation is recommended for effective monitoring and implementation of the programmes** related to land utilisation. The Town and Country Planning

Board is recommended to perform effectively the functions of the State Land Use Board through constituting a high powered Council to monitor the implementation of the land use related programmes in “totality”.

# 10.

## CONSERVATION STRATEGY

### 10.1 CONSERVATION OF NATURAL ENVIRONMENT

Naturally bestowed and endowed territory of Goa has following three distinct ecosystems namely -

- i. Coastal
- ii. Mountainous and
- iii. Forest

Due to human and economic pressure which cause innumerable negative impacts, these environmentally sensitive areas call a specialised and area-specific conservation strategies to mitigate the overall negative impacts, and channelisation them through environmentally sound Surface Utilisation policy. **The realistic approach would be to strike at a right balance between compatible socioeconomic and natural developmental activities.**

Therefore, the Eco-Development Plan for Goa recommends to maintain ecological balance while exploiting the resource and to minimise the following **inter-sectoral conflicts**, e.g.

- i. the conflicts between mining and forestry
- ii. agriculture and pesiculture
- iii. tourism and forestry etc.

To eliminate such conflicts, short term development objectives of maximisation of immediate benefits has to be discontinued and a comprehensive approach should be adopted, as given under:

### 10.2 POLICY FOR MANAGEMENT OF BEACHES

- (a) To preserve **world's most beautiful beach-line spreading over 101 kms.**, It has highly fragile ecosystem. The main source of tourism is being put into vulnerable condition through unscrupulous building activity in “**Preservation Line**” or “**Set Back Line**” (0-90 mts.) and “**High Tide Line**” (91-500 mts.) which should be regulated immediately.
- (b) The regulatory measures for construction between 90 mts. and 500 mts. recommended are as follow:-
  - Construction of two storey building with maximum 9 mts. height

# 11.

## REGIONAL PLAN STRATEGIES AND RECOMMENDATIONS

### General:

- i. The plan aims at the sector **as a tool to eliminate regional development imbalances** through judicious

locational strategy.

- ii. As Goa provides excellent environmental conditions which is also an economic asset in addition to the highly skilled and educated labour, the industrial strategy should be **to promote high -skilled and high- technology oriented clean industries.**
- iii. **Tremendous transportation infrastructural** potential through road, rail, water and air encourages large and medium size industries.
- iv. It also suggests to have **effluent treatment plant** on individual or estate basis.
- v. Due to energy and surface water constraint, **energy and water intensive units are discouraged** as far as possible.

## 11.1 INDUSTRIAL SECTOR

Since liberation, the district has undergone fast industrial development. The manufacturing sector has grown from 7% State's GDP in 1966 to 33% in 1980-81. The contribution of large and medium industries has rose from 40% to 73% during the same period. The Seventh Plan aims at establishing -1200 small scale and 25 medium scale industries.

### Classification of potential industries

#### (a) Resource-Based Industries

- (i) Agro based
- (ii) Livestock based
- (iii) Marine based
- (iv) Forest based
- (v) Mineral based

#### (b) Demand Based Industries

Engineering, Chemical, and allied industries (based on value added criteria and employment)

#### (c) Handicrafts Industries

#### (d) Cottage and Rural Industries

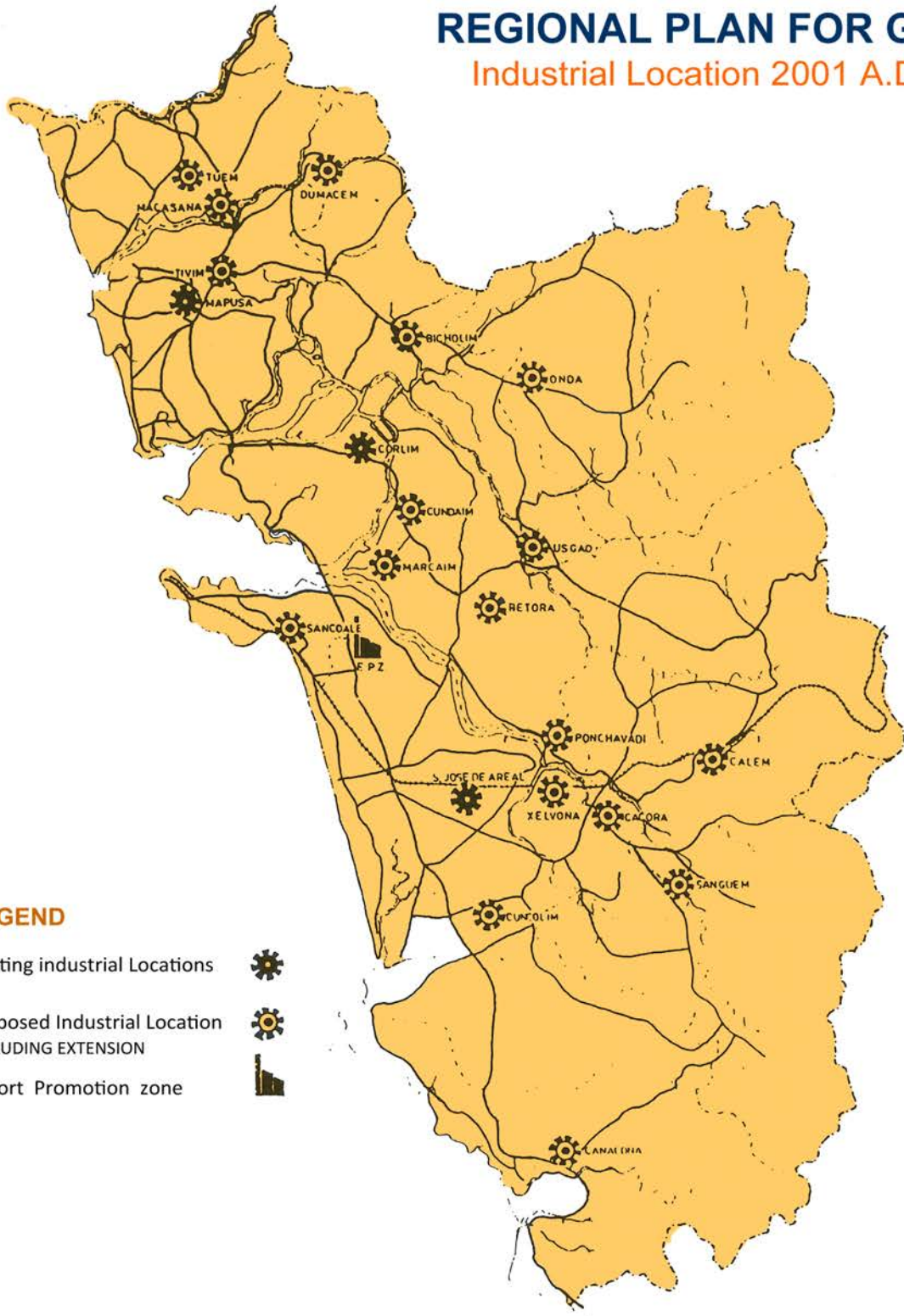
*See map no. 3; Industrial location - 2001 A.D.*

## 11.2 TOURISM SECTOR (strategies adopted are)

- (i) identification of potential Tourism interest areas in the Regional Plan and
- (ii) detailed Development Plan of each of these areas should be prepared at micro level
- (iii) It is proposed to encourage private sector to augment accommodation of middle and high income groups whereas accommodation for students and low income group tourists and infrastructural (physical services and recreation facilities) should be provided by the government of Goa.
  - Encouragement of 'Residents Tourist Areas' to give accommodation to tourists on paying guest basis to generate income to local economy.
  - Development of roads leading to tourist areas.
  - Location of new beach resorts on the line of traditional architecture with due consideration of conservation of beaches.
  - Decentralisation of tourist from Panaji to other potential areas such as Mapusa, Margao, Mormugao, Pernem, Bicholim, Sanguem etc. and other interior talukas. See following table for

# REGIONAL PLAN FOR GOA

## Industrial Location 2001 A.D.



### LEGEND

- Existing industrial Locations 
- Proposed Industrial Location INCLUDING EXTENSION 
- Export Promotion zone 



proposed distribution of tourists.

### Taluka-wise distribution of Tourist in Goa, 2002 A.D.

Taluka	Expected tourist traffic by 2001 A.D.	Area which could be earmarked for Tourism Development
1. Tiswadi	3,36,000	Panaji, Dona Paula Suburbas, Old Goa
2. Bardez	2,24,000	Mapusa and along the coast
3. Salcete	2,24,000	Margao and along the coast
4. Mormugao	1,12,000	Vasco, Chicalim (Air-port area) & along the coast
5. Ponda	1,40,800	Ponda town, Farmagudi & temple area
6. Permeme	27,200	Permeme town, Tiracol and along the coast (Harmal, Morjim and Keri)
7. Bicholim	11,200	Bicholim town, Mayem
8. Satari	11,200	Anjunem, Surla (on the road to Belgaum) Verheri Hill
9. Sanguem	11,200	Sanguem town and Salauli
10. Quepem	11,200	Quepem town and Curchorem, Betul
11. Canacona	11,200	Along the coast (in particular Cabo de Rama, Agonda, Palolem Talpona, Galgibhag and Pollem)

With unique scenic beauty and aesthetic heritage, **Goa has tremendous importance as a tourist spot**, contributing 16.45% to Net Domestic Product. Total number of tourists is increasing steadily from 1.2 lakhs in 1973-74 to 6.7 lakhs in 1984-85 with a growth rate of 431%.

The Regional Plan has estimated **12.70 lakhs tourists in 2001 A.D.** which will be more than the resident population of Goa in 1981. Due to

its seasonal character, the problem of maximum tourists during peak seasons will be beyond management levels and will further accentuate the regional imbalances.

Therefore, a policy decision regarding **optimum size of tourists** has to be made, since the matter is very complex.

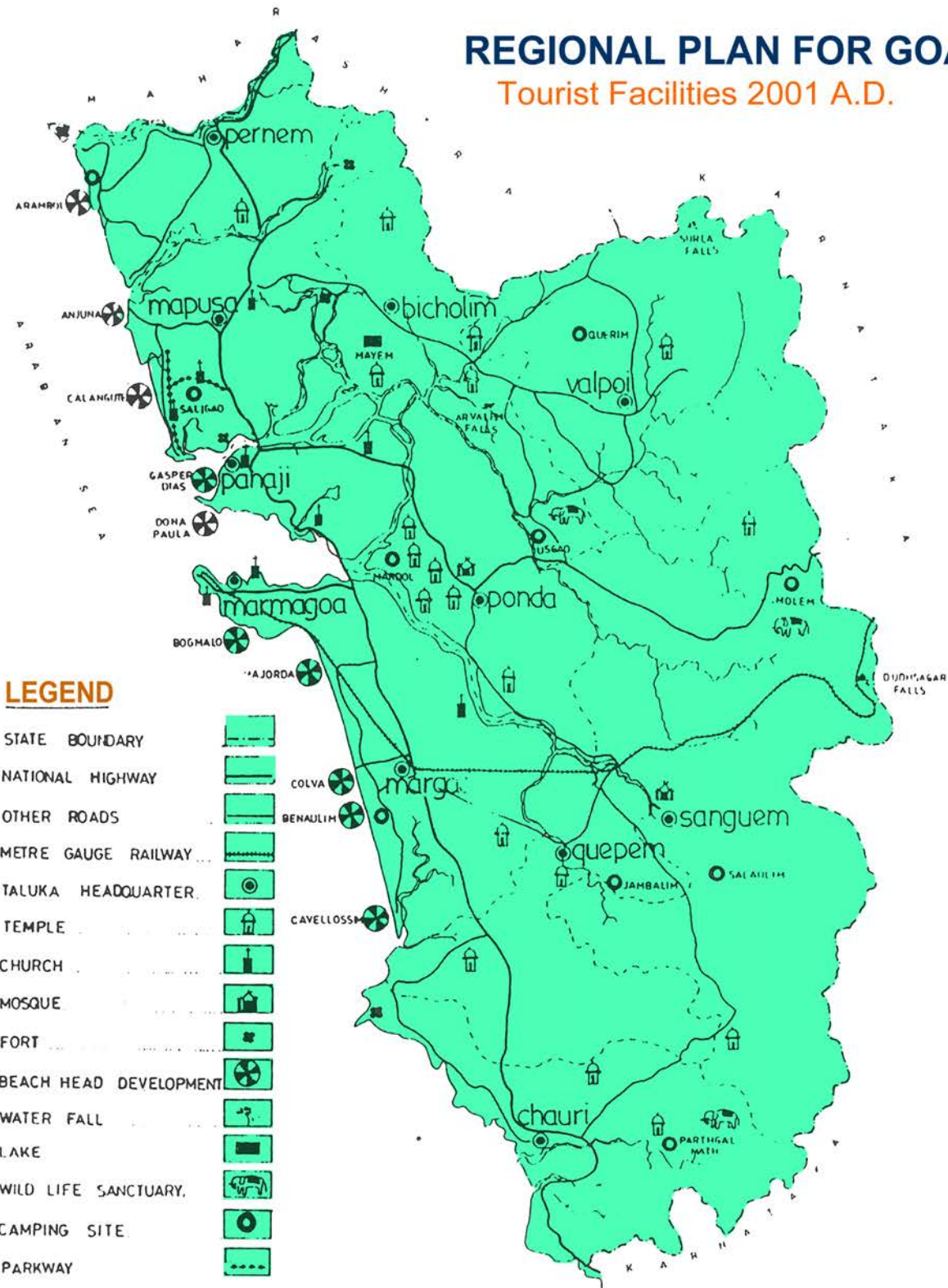
**Study / Project no. 4; Master Plan of Tourism Development vis-a-vis other intersectoral and cross- sectoral is recommended to identify the holding capacity in terms of tourist potential of the individual tourist places.**

Secondly the Master Plan would identify the **possibility of decentralisation** of the tourist traffic either by curtailing or creating tourist facilities.

- Building with **sloping roofs** on the lines of local architecture.
  - Provision of **adequate vacant land** in construction plans for plantation of trees.
  - **Larger plot size** to enhance low density pattern.
- (c) **Sea walls and jetties** have to be built to curb beach soil erosion and down drift erosion.
- **Artificial nourishment** of beaches.
  - **Stabilisation of dunes and backshore** through plantation and coastal shelter belt.

# REGIONAL PLAN FOR GOA

## Tourist Facilities 2001 A.D.



### 11.3 CONSERVATION OF URBAN AND RURAL AREAS

With reference to the imbalances leading to undesirable and haphazard development there is an urgent need -

- i. to check the sub-standard areas of towns and villages, and
- ii. to conserve the traditional architectural style
- iii. conservation of old monuments and buildings
- iv. revision of building bye-laws in favour of the areas having unique monumental and architectural value.
- v. sudden influx of population in Goa after liberation has resulted in housing shortage and thus slum development which, certainly is undesirable, This needs to be tackled through proper housing standards and regulation of new improved set of bye- laws.
- vi. to avoid traffic hazards unauthorised ribbon development along the road should be checked. Roads should be developed as per the prescribed standards.

#### Study / Project no. 5

**GUAC (Goa Urban Art Commission). should be constituted with the following 2 functions**

- i. To scrutinise the plans from aesthetic point of view,
- ii. To evolve new designs from aesthetic point of view,

## 12.

### POLICY FOR PRIMARY SECTOR OF ECONOMY

#### 12.1 AGRICULTURE SECTOR

Goa is deficient in food grains, mainly, **due to decline in area** under paddy fields from 38% in 1960 to 28% of the gross agricultural area in 1977.

The cultivated land of about 1.5 lakh hect. consists of following **three distinct geomorphological divisions**.

- i. Khazan land; saline alluvial soil in the low lying areas near rivers (18,000 hac.)
- ii. Kher land; well drained high textured sandy soil on mottled late rite substratum (17,000 hac.); and
- iii. Intensive agriculture

To increase the productivity of food grains, the Plan has proposed to increase the area under agricultural land (inc. orchards) from existing 1390 sq.km.s (38%) to 1555 sq.kms. (43%) in 2001 A.D. of which 35% for paddy, 2.1% for sugar cane and 63% for other crops by improving the culturable waste land along with various other measure to enhance crop yield.

Weak and old data base regarding area-wise cropping pattern does not allow strong base for agriculture planning. Therefore, the Plan recommends an urgent need **to assess land quality as 1st, 2nd and 3rd class land through remote sensing technique** so that the 3rd class land can be used for other competing uses.

To find potential areas for agricultural use in terms of new areas and to increase the productivity, There can be a threefold strategy.

- i. diversification of cropping pattern and suitable for the region.

- ii. **cropping intensification** by multiple, multi-level mixed cropping patterns.
- iii. use of **improved agricultural technology**.

The Plan also suggests a research programme in collaboration with the Agricultural Department to identify:-

- i. **Water requirements** of different crops for different types of soil
- ii. Possible **inter-cropping** systems
- iii. **Alternate crops** which could be grown on residual moisture and device for retaining the moisture level.
- iv. Development **suitable vegetable species** and other garden crops.
- v. The **agricultural market facility** and transportation should be provided to maximise the agricultural profit.

## 12.2 ANIMAL HUSBANDRY

Animal husbandry, dairy farming, poultry farming, pig-raising and bird rearing sector provides **gainful supplementary source of income** and can be a success if -

- i. **feed and fodder** for animals and birds is sufficiently available
- ii. **breeding and tending** of the stock is scientifically operated.

Due to monsoon climate, natural grazing is restricted (3-4 months/year). The main constant in the way of integrated development of the sector in Goa is lack of food & fodder resources. At present, The organised sector cultivates only 93 ha. which is insufficient with over-all increase in demand. Therefore, the Plan recommends fodder cultivation as a priority issue and has identified for the purpose.

## 12.3 FOREST SECTOR

The undulating terrain coupled with heavy precipitation (3562 m.m.) and loose and thin soil emphasises the need for more area under vegetal cover. The Plan proposes 38% area under forest. In absence of accurate assessment of the forest area it is suggested to assess, demarcate and classify the area under operable and non operable categories.

**Study / Project no. 6; With the help of GIS the entire forest production, collection, distribution and management can be management.**

Non operable area is recommended to be conserved and preserved as Sanctuaries and Reserved forest.

Major thrust of afforestation should be in operable forest and should also be through social forestry and community forest. Abandoned minning sites and ore rejected debris should also be covered.

Forest area should not be used for rehabilitation of the evacuees displaced by Anjunem and Salauli irrigation projects.

Demarcation of mangrove areas to ensure protection of the same as they are important to support ecosystem for fisheries and as coastal stabiliser.

In Goa, there are three Wild Life Sanctuaries namely Bondla, Mollem and Cotiago which cover an area of 353 sq.kms. representing 33% of the forest area and .10% of the total area of Goa. Various types of human pressures like continuation of agricultural activity, construction of road and indiscriminate cutting and felling of trees for food, fodder and fuel inside the Sanctuaries disturb the flora and fauna.

To protect these wet and semi-evergreen forests, the Plan recommends a systematic environmental survey to identify environmentally sensitive and ecological zones with imaginative management strategy.

To develop the Wild Life Sanctuaries and environmental, educational; and camping centres to motivate people regarding importance of it's conservation and preservation.

Development of a mini-zoo to have in-situ breeding facilities.

## Policy for Management of Forest

The present forest cover of 24%, however, is inadequate. Thus, the Regional Plan proposes **38% forest cover in 2001 A.D.** against a National Forest Policy of 33% which seems to be adequate.

**To obtain it; the Plan has recommended a conservation strategy.**

**Forest areas should be broadly demarcated under following categories:-**

- i. Non-productive protected Forests in areas **with more than 33% slope** to check soil erosion and are not for commercial use.
- ii. The Productive Operable Forests in areas **less than 33% slope and are permitted for selective felling of trees** to minimise soil erosion.
  - a. **Multi-tier Afforestation** to increase productivity and preserve the ecology.
  - b. Development Activities should be **minutely assessed of their negative impacts through EIA study** before implementation of the projects.
  - c. **Restoration of Mining areas** through reclamation of the rejected soil and plantation of the indigenous species.

## 12.4 FISHERIES

Fish forms 90% of staple food of Goa's population. With a 100 kms. coast line, 250 kms. of inland waterways, 4000 ha. of marshy land and 100 ha. of small tanks, the district has vast potential for development of the sector. Still the sector is facing unstable annual production. The Sixth and Seventh Plan targeted at 70,000 while the production is touching only 40,000 tones which is very low.

To reach the target, the Regional Plan has recommended deep - sea fishing up to the depth of 40 mts. which yields 332 kgs/ha against present yield of 77 kgs/ha, along with scientific development of existing fishing conditions and infrastructural facilities e.g. linkages between production and market centres, cold storage, processing repair and fuelling of vessels and welfare of fishermen.

To provide these the Plan has proposed the following:

- i. Fishing jetties, and
- ii. Decentralisation of facilities at scientific locations.
- iii. No, on-shore processing and
- iv. Avoidance of areas of tourist attraction

## 12.5 MINING

Mining is a dominant industry of Goa it accounted for 32% of country's iron ore production and 55% of it's total exports. The employment in the sector is 25,000 in 1981. The total 581 mining concessions covers an area of 500 sq.kms (14% of total land) of which 165 (26%) are located in forests causing damage to landscape and ecology largely due to deposition of minning rejects at the rate of 2.5 tones /1 tone of iron ore (26 million tones per annum). The damage is more evident during monsoon when the reject flows in water bodies, forests, and agricultural fields.

Scientific plan for immediate measures for proper management of minning areas. These can be

following points.

- i. A systematic plan of dumping of rejects.
- ii. With the help of remote sensing identification of additional land for dumping within broad framework of the proposed Surface Utilisation Plan to conserve ecologically sensitive areas and with a view to ultimate reclaim the land for afforestation.
- iii. Methods and strategies to be evolved about the possible types of reclamation of mined out areas and reject dump areas by afforestation through fast growing species.
- iv. Identification of a peripheral areas to reduce the minning impact on agriculture forest land.

## 13. PHYSICAL INFRASTRUCTURE

### 13.1 IRRIGATION

Irrigation, being The main consumer of water resource (1,125 million cu.m. or 86% of the total projected demand) and due to undulating terrain, the **sector is far below the required levels**. Due to low potential of minor irrigation, emphasis should be on major and medium irrigation schemes which will help multidimensional use of water like industrial, water supply, pisciculture etc.

The Master Plan has **identified twelve projects** of which Selauli and Anjunem are nearing completion. The others are in pipe line. Timely completion and conservational dimension have to be taken care of minutely.

**Modern Water management techniques** and by having an integrated tie-up of surface as well as ground water resources, the resource should be utilised efficiently.

**Watershed management should form an integral part** of the project in order to ensure optimum water yield and minimum sedimentation in the reservoirs.

### 13.2 WATER SUPPLY

Provision of safe and adequate water supply is not only a basic necessity for the healthy living of the community, but also holds the key to the successful implementation of all the sectoral development programmes envisaged in the Five Year Plan as well as in the Regional Plan. **Only 77% of the total urban population and 23% of the rural population were actually covered by the existing system of protected water supply**. The irregular and intermittent supply (2 to 6 hours/day) is inadequate to meet the existing and rising demand.

The Seventh Plan Programmes are oriented to meet the following targets recommended for the Decade by 1990 as follows:

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| - Urban Water Supply            | 100% of population by March, 1991 |
| - Rural Water Supply            | 100% of population by March, 1991 |
| - Urban Sewerage and Sanitation | 80% of Urban population           |
| - Rural Sanitation              | 25% of population                 |

To meet the above targets work on some schemes is already been initiated.

- Canacona Water Supply Scheme
- Mains from Opa works to Panaji

- **Selauli Water Supply Scheme** (100 MLD) to cover Vasco, Margao, Quepem and Sanguem towns, 90 villages and also 10 MLD industrial demand;
- **Madei Water Supply Scheme** - 120 MLD covering 2,00,000 population in Valpoi and Bicholim towns and 90 villages in Bicholim, Satari and Sanguem talukas.

On the basis of projected population, a taluka-wise demand for domestic water supply has been assessed (assuming a per capita consumption of 140 litres). The quantum of domestic water supply requirement has been worked out to be 224 MLD. Likewise, the industrial water requirement has been projected to the level of 275 MLD.

In projecting the demand, the Regional Plan recommends to account the requirements of floating population. The requirement of water envisaged under the Seventh Plan, thus, seems to be, inadequate. Therefore, it is strongly recommended that top priority should be given to the early implementation of the Salauli Water Supply Scheme in the South and Madei Water Supply in the North.

## Scheme / Project no. 7 Water Supply;

Due to undulating terrain and limited surface water potential, a sustainable and efficient water supply system will have to be found out in building an Integrated Regional Water Grid including surface and underground water potential.

### 13.3 SEWERAGE

The Regional Plan makes the following proposals

- All proposed growth centres should be provided with underground sewerage system with proper treatment facilities.
- To provide treatment based on Oxidation ponds or large bio-gas Plant should be considered in service / central and beach areas where septic tanks are not successful.
- large scale use of gobar gas plant for sewer disposal should be considered in rural areas.

### 13.4 TRANSPORT AND COMMUNICATION

With a density of road length 1150 kms /1000 sq.kms. which is very high compared to the Indian standard i.e. 160 kms. / 1000 kms. Goa has, comparatively high level of linkages, Hence, several qualitative draw-backs such as unsatisfactory geometric of road Network, metre gauge nature of the railways and silted character of navigable rivers. Thus, the plan aims at integrated development of all the three modes of transport. Strategies to do so are -

- To eliminate regional imbalances strengthening the transport infrastructure of interial talukas to make them compatible for location of economic and tourist facilities.
- To strengthen inter-regional road and railway link to develop hinter-land for the harbour.
- Upgrade air transport to facilitate international tourism.

With the above strategies, the Regional Plan proposes development of various modes as follow -

See map no. 5; rail & road network - 2001 A.D.

#### (i) Roads

- Qualitative Improvement of the Roads
- Upgrading and strengthening of existing roads
- Development of proposed bridges and missing road links.

- New roads to tourism importance
- Development of bye-passes to avoid settlement areas.
- Rationalisation of Right of ways.
- Development of rural roads to link them with nearby towns.
- Development of forest and mining roads with due consideration to conservation.
- Measures to check erosion and ecological destruction and afforestation on either sides of roads.
- Rationalisation of passenger road transport systems linking urban rural areas.

## **(ii) Water Transport**

- Identification of corridors of passengers movements and it's volume distribution origin, destination etc. along the water-ways.
- Integration of waterways with road transport system in terms of efficient exchange/terminal facility.
- Exploitation of Mandovi river for tourist purposes along with strictly controlled development of banks of it.
- Improvement of transport linkages to harbour from hinterland including diversion of National Highway.
- Development of Mormugao, Panaji, Chapora and betal ports.

## **(iii) Railways**

Conversion of existing Miraj-Londa-Hospent-Mormugao metre gauge railway line into broad gauge.

## **(iv) Airways**

It is proposed to further improve the existing linkages of the Airport with the leading towns of Goa and exploit the potential of the existing airport for Cargo handling.

## **13.5 POWER**

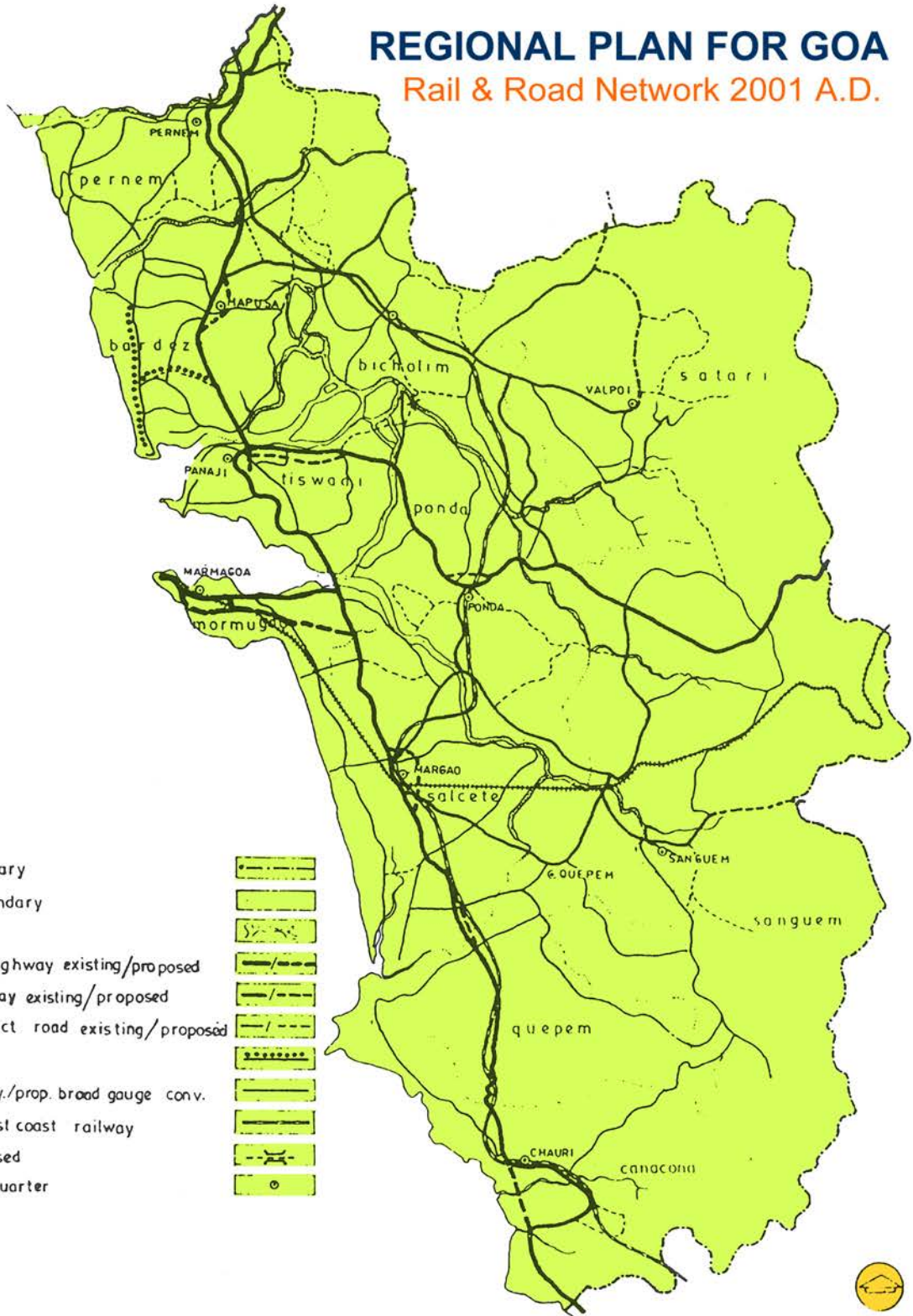
The level of power consumption has increased from a meagre 2.2 MKWH in 1965-66 to 312.4 MKWH in 1984-85. Industry was the major consumer of power (71%), followed by domestic, commercial (16%) and other public purposes (13%). The Regional Plan has estimated a 2400 MKWH for the year 2000-2001.

Due to limited scope of power generation, Goa has to depend on import of power from neighbouring states. The district has been assured of 200 MW of power from Korba (in M.P.) and Ramagundam (in A. P.) Super Thermal Power Stations.

Hence, increasing power demand emphasis on development of alternatives to power generation as the possibility of Thermal Power Generation is mooted out. The Seventh Plan envisaged the Dudhsagar hydal project with an installed capacity of 30 MW. On the other hand the Regional Plan lays emphasis on these above mentioned possibilities as well as power generation through non-conventional sources of energy.

# REGIONAL PLAN FOR GOA

## Rail & Road Network 2001 A.D.



### LEGEND

- state boundary
- taluka boundary
- river
- national highway existing/proposed
- state highway existing/proposed
- major district road existing/proposed
- parkway
- metre gauge rly./prop. broad gauge conv.
- proposed west coast railway
- bridge proposed
- taluka headquarter

# 14.

## SOCIAL INFRASTRUCTURE

### 14.1 HOUSING

As per census data, the quantitative housing shortage was 10,779 in 1981 of which 3,642 was urban and 7,137 rural. It is estimated that cumulative housing requirements by 2001 A.D. will reach a level of 1.37 lakhs out of which 0.81 lakhs would be urban components.

Strategies to combat the existing and forecasted housing shortage are -

- Need to assess the need under high priority
- Acquisition of large areas around urban growth centres by Housing Board for housing.
- Increase the level of construction of housing facility from the existing considerably low level.
- Encouragement of private sector and group housing.
- Simultaneous or prior development of infrastructural facilities.
- Improvement or rehabilitation of slum areas on the basis of condition of hutments.
- Encourage the use of local or mining reject material for construction.
- Creating housing according to the social and economic needs of the people.
- Minimisation of use of cement and steel to make housing cost effective.
- Preservation of local architectural style.
- Emphasis on provision of Economically Weaker Section.

### 14.2 EDUCATION FACILITIES

With the literacy rate of 45.3%, which is much higher in comparison to the All India figure of 29.5%, Goa emerges as a literate district. But more concentration on educational facilities in coastal areas creates regional imbalances in terms of education. Thus, the development strategies embarked on balanced distribution of educational facilities with special emphasis on a Midland and Western Ghat Talukas.

It is proposed that the Education Department should prepare a 15 years perspective plan indicating therein not only the aggregate but also settlement-wise or at least area-wise requirements of different types of education facilities. This will facilitate systematic location and development of different categories of educational facilities compatible with the settlement hierarchy, and will become accessible to the entire population of the district.

### 14.3 HEALTH FACILITIES

In terms of health facilities, the problem is same as of education. Concentration of medical facilities is more in Coastal Talukas in comparison of Midland and Western Ghat Talukas. Thus, the Regional Plan proposes decentralisation of Medical facilities so that interior talukas would get better and high type of facilities.

All the proposed central villages should also have rural Medical dispensaries and family welfare centres

Some of the large villages should also be provided with rural medical dispensaries.

The village which do not have these essential medical services should be catered through mobile dispensaries attached to the nearest hospitals.

## 14.4 SPORTS AND RECREATIONAL FACILITIES

The level of development of sports, recreational and cultural facilities is already quite high in Goa but its distribution pattern shows that about 74% of these facilities are concentrated in the Coastal Talukas for obvious reasons.

The overall development strategies should be to augment the existing facilities on one hand and to provide them adequately in the midland and the western ghat talukas on the other.

At present, all the eleven taluka towns are either having or going to have playgrounds with necessary facilities. The development and maintenance of these playgrounds is the direct responsibility of the Directorate of Sports and Culture, which is also giving grants to the panchayats for the development of the panchayat playgrounds.

The Regional Plan proposes that an easy and frequent transportation facilities should be made available, to and fro, from the Wild Life Sanctuaries, Water falls etc. to cultivate an awareness among the local people about the environment and the need for its conservation, because, ultimately, it is the people who will be the real defence against the environmental degradation

# 15. PHASING OF REGIONAL PLAN

Section 11 of the Town & Country Planning Act, 1974 outlining the contents of the Regional Plan includes “the stage by which the development will be carried out as an integral part of the Regional Plan”.

The phasing of the implementation of the Regional Plan is proposed to be based on the following broad concepts:

- Time span distribution and linkages with the Five Year Plan, in keeping with the planning at national level to integrate it with the planning for the state or Union Territory. Accordingly, it is proposed that the **span of 15 years from 1986 to 2001 A.D. can be divided into three phases of 5 years each**, coinciding with the Seventh, Eighth and Ninth Five Year Plans.

In the first phase for example, priority should be given to build up an **effective organisational structure** not only for implementation but also for monitoring all land related programmes. It is also proposed that a detailed and up-to-date capability study should be conducted in the first phase based on modern technologies which will facilitate quick and pragmatic review of the Regional Plan.

- Programs for the 2nd and the 3rd phase have yet to be formulated.

# 16. ORGANISATIONAL SET UP AND IMPLEMENTATION

The Act provides for the formation of a number of sub-regions to be declared as Planning Areas for which adequate provisions are made in the Act to constitute **Planning and Development Authorities** who will act as executive agencies.

To channelise the entire development through a set of hierarchical settlements, and at the same time to utilise the resources to their optimal level to ensure sustainability and the regional balance in economic development that encompasses the ecological balances and improvement of socioeconomic conditions of

the people, and their environment the Town & Country Planning Board which oversees the territory's physical planning activities should have greater interactions with the State Level Planning Board. It is recommended that the **Chief Town Planner, who is the custodian of the Regional Plan, should be made a member of the State Level Planning Board.** He should have an effective say in the formulation of projects related to land use.

In a recent meeting of the National Land Use and Conservation Board, the Deputy Chairman of Planning Commission recommended to **reactivate the State Land Use Board** which will function as a custodian of data on land use and issue necessary guidelines for efficient land use and monitor their adherence.

Detailed functions of the **State Land Resource Management Council / State Land Use Board** are recommended to be assigned by the government, possibly, under the statutory frame work.

Due to various statutory and semi judicious function of TCPB, and lack of time constitution of a High Power Standing Committee, which is to be named as **Land Resource Management Committee**, is recommended by TCPB. **The committee will be responsible for overall implementation of the regional plan for Goa.**

Once the Committee is appointed by the Government, it should be supported by a **suitable secretariat and nucleus staff**, which should be located in the Town and Country Planning Department. As recommended by the Eco Development Plan, the Regional Planning Unit of the Town & Country Planning Department Should be properly strengthened and equipped with necessary staff. The budgetary provisions for this purpose would be made from the budget of the Town and Country Planning Department **under the head, the Regional Plan.**

An **empowered Committee headed by the Chief Secretary** may be set up to take the necessary administrative decisions as a follow up of the recommendations of the Regional Plan for Goa. Alternatively, the existing Empowered Committee on Task Force may also be directed to perform the same function. This Committee should submit **report to the Chief Minister and Cabinet on action taken.**