

DRAFT REPORT

WESTERN GHATS REGIONAL PLAN

KERALA SUB-REGION

Volume : One

DEVELOPMENT PERSPECTIVE AND STRATEGY

November 1981

NIEPA DC



D00918

TOWN AND COUNTRY PLANNING ORGANISATION

Government of India, Ministry of Works and Housing

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DOC. No.....9.18.....
Date.....19/12/82.....**

PREFACE

The Western Ghats Development Programme forms a part of the Hill Area Development Programme initiated by the Planning Commission during the Fifth Five Year Plan to improve the ecology and economy of area with the objective of improving the living conditions of the local people. With this objective in view, the Western Ghats Area was delineated. As an outstanding geographical feature, the Western Ghats form a spine which is extremely significant for the life and welfare of the communities both on the eastern slope as also on the western side, which tapers off rather abruptly, facing the Arabian Sea. As an economically important geographical area, it comprises parts of the States of Maharashtra, Kerala, Tamil Nadu, Karnataka and Union Territory of Goa.

The Town and Country Planning Organisation has been entrusted by the Planning Commission with the task of developing an appropriate spatial development strategy for the self-sustained growth of this Region. In order to formulate such a spatial regional plan, the Town and Country Planning Organisation initiated a number of studies and surveys to improve our understanding of the situation as it obtained in the defined region. The planning of this Region provides an opportunity in what has often been termed as multi-level planning. The Town and Country Planning Organisation envisages the development of the Western Ghats Region at four levels and scales. While the plans are of necessity to be prepared for a limited region as defined, there is, of course, a larger region of reference which cannot be ignored in the evolution of the development strategy. The Organisation has taken up the preparation of this Draft Plan for Kerala Sub-region and has prepared a series of sectoral reports based on the information assembled from secondary sources, mainly unpublished, and in consultations with the various States, Central agencies and departments functioning in the area.

This report is being submitted to the Planning Commission for the consideration of the High Level Committee, comprising of the Chief Ministers of the concerned States, under the Chairmanship of the Chief Minister of Maharashtra. The report should, however, be considered by the Steering Committee, consisting of the concerned Secretaries of the States with the Member, Planning Commission as the Chairman, constituted to finalise the plans and to review the progress of the various plans and programmes.

The report attempts to lay down a possible strategy for the development of the Kerala Sub-region of the Western Ghats. It indicates the spatial linkages of the development in a particular sequence. The report incorporates a number of maps, charts and diagrams illustrating the data and broadly indicating the spatial relationships in the development of different sectors. It is hoped that the sub-regional plan that has emerged would

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provide a sound basis for undertaking the development programmes within the sub-regional frame, and that it would be implemented under the State Plan-funds and Special Central assistance, alongwith such institutional funds that may be available to achieve the objectives set for the development of the Sub-region.

I would like to specially mention the keen interest evinced by Dr. M.S. Swaminathan, Member, Planning Commission and Shri P.H. Vaishnav, Joint Secretary, (State Plans), Planning Commission, whose personal interest and assistance have made this assignment possible.

In the preparation of the plan, all the officers of the Government of Kerala, from the Secretary, Planning Department to the Heads of Department and their associates have given full co-operation and assistance and worked closely with the team of officers from the Town and Country Planning Organisation. I would like to express our grateful appreciation for their invaluable co-operation and assistance in drawing up the Plan.

There has been a delay in bringing out this Plan mainly on account of lack of adequate staff as the Town and Country Planning Organisation had to give simultaneous attention to other projects which were also of urgent nature. It is hoped, however, that this slight delay will not, in any way, affect the basic, thesis, policies and programmes that have been built into the Plan and to this end, efforts have been made, as far as possible to keep the information up-to-date.

I would like to express my personal thanks and gratitude to my colleagues Shri R L.P. Sinha, Project-Incharge, Shri S. Arunachalam, Shri A. Qaiyum, Shri P.M. Kolhatker and Shri Satish Chander, besides the staff, for working with enthusiasm and great devotion.

Above all, I would also like to place on record my thanks to Shri G.D. Mathur, Head of the Regional Planning Division for looking after the work of the Western Ghats Project.



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SECTION - I : INTRODUCTION

During the Fifth Plan period, the Western Ghats Development Programme was initiated as one of the Hill Area Development¹ programmes by the Planning Commission. A High Level Committee under the Chairmanship of the Chief Minister of Maharashtra was entrusted with the task of evolving strategies, policies and programmes for the integrated development of the Western Ghats Region, which in turn set up a Secretaries' Committee under the Chairmanship of member, Planning Commission, to review and monitor the programmes. The High Level Committee discussed the policies and programme contents in a series of meetings in 1974 and decided that the programme should focus attention on bringing real and direct benefits to the people of the Ghats area, in general, and to ensure that the major gains of development accrue to the weaker sections of the population in particular. The primary objective was to achieve the economic well-being of the hill area people with only secondary emphasis on the development of the natural resources. This led to an exclusive emphasis on the beneficiary-oriented schemes and exclusion of resource development schemes from its purview. Accordingly, various schemes in key sectors such as agriculture, animal husbandry, forestry, dairy development, minor irrigation and roads were taken up.

Subsequently, the objective of the Western Ghats development programme was reconsidered at the Secretaries' Committee meeting held at Trivandrum in October, 1979 where the emphasis shifted to the development of ecology

1. Hill areas present special ecological and socio-cultural features which unless specially accounted for do not permit the present planning process and schemes developed within it to be of major consequence to them.

and afforestation in place of beneficiary schemes. The problem of the protection of existing forests and improvement of ecological balance was again viewed seriously at the Secretaries Committee meeting held at New Delhi on 6th August, 1980. The Committee, accordingly, recommended that during the Sixth Plan period 1980-85 both beneficiary-oriented programmes as well as resource development programmes i.e. schemes promoting improvement in ecology, afforestation and watershed management, development of silviculture and biosphere reserves should be considered in appropriate combination in the programme. The Sixth Plan document, which was formulated subsequently, in its policy framework for hill area development has also emphasised the need for a balance in emphasis between beneficiary oriented and infrastructural development programmes, keeping in view the vital importance of ecological restoration and conservation.² Since the recommendations of the Secretaries' Committee were in line with the policy enunciated for Sixth Plan, the High Level Committee endorsed these recommendations and directed that the Sixth Plan programmes for Western Ghats development be formulated in accordance with the above policy approach.

Need for and Integrated Regional Development Plan

So far, several programmes have been undertaken by the Constituent State Governments under the Western Ghats Development Programmes which are mainly directed either towards a section of the rural economy (agriculture, animal husbandry and forest) or a section of the population under sectoral programmes or sectional wel-

2. Sixth Five Year Plan (1980-85) Govt. of India, Planning Commission.

fare programmes. Investments under the sectoral programmes have been mainly limited to the provision of necessary inputs for land development. While the resource development efforts have gone apace, the population which is engaged in the resource development has been given only a limited attention (in the total national development spectrum) in terms of infrastructural support and welfare activities. Infrastructural investments, if any, in these sectoral programmes, however, are normally not co-ordinated and integrated by a single plan frame, and, services are provided in haphazard locations and do not converge in desirable combinations at the most optimum locations.

It has been realised that such sectoral investments have not led to lasting benefits for want of an equal emphasis on the development of land and people, and the absence of an Integrated Regional Development Plan. The development programmes, therefore, in order to be lastingly beneficial, must stem from the Regional Development Plan for the Western Ghats Area, the outstanding feature of which is the co-ordination of various future economic and social activities in space, simultaneously taking note of all inter-dependent aspects of development (the demand for space by the competing uses or activities) and systematic and conscious locations of the services in relation to human settlements, for maximum advantage.

The Central Town and Country Planning Organisation has been entrusted with the preparation of such a comprehensive regional plan, preceded by techno-economic surveys of the Western Ghats Region and its Sub-regions, indicating the appropriate strategy of development in

the form of a long term regional plan for the entire Region and its Sub-regions. The details of the methodology and the content of the regional development plan, as indicated in the following paragraphs, were discussed and approved by the Secretaries Committee and Empowered Committee on Surveys, Studies and Training of the Western Ghats Regional development programmes.

Methodology for preparation of Regional/Development Plan

The preparation of such a plan involves surveys to understand, appreciate and assess the development potentials, the formulation of development strategy (perspective), and preparation of a spatial plan, to achieve the set goals.

The survey will specifically attempt at the following:-

- i) Assessment of the resources and the present level of physical economic and social aspects of development, and the spatial structure including settlement pattern, hierarchy of cities, their functions, and the location of infrastructure facilities in the Region.
- ii) Assessment of the major needs and potential for development in agriculture including plantations, animal husbandry, fisheries, forestry, irrigation, power, mining, industries, communications, tourism, and, finally, identification of the structural bottlenecks to development as well as key problems, along with the constraints of development in these sectors, for future growth.

The process of formulating and implementing the Regional Development Plan will be mainly in three stages:-

- i) Formulation of total development strategy - short-term as well as long-term-indicating interse priorities of the programmes in the context of social and economic developmental needs of the Region and comprising of the following:-
 - (a) Diversification of the economy to provide not only additional employment opportunities and income, but also a much needed diversity of rural occupations to prevent migration of surplus labour force to urban centres within or outside the Region.
 - (b) Assessment of holding capacity in the various sectors of economy.
 - (c) Identification of population groups to provide incentives/dis-incentives to overcome their problems.
 - (d) Assessment of the need for infrastructural support - economic, social and cultural services - to strengthen the regions' economy and to improve the quality of life of the people.
 - (e) Evolution of suitable urban and rural settlement pattern for a stable organisational and functional set-up for both urban and regional developmental needs and finally,
 - (f) Identification of developmental agencies- Central/State Governments, local bodies and institutions including co-operatives, to promote overall development of the Region.

- ii) Preparation of a perspective plan for integrated development of the Region indicating inter-se priorities of the programmes in the context of the social and economic backwardness of the Region detailing out the following:-
- (a) A desirable landuse pattern taking note of the demand for space by competing uses, and suitability of the soil and terrain as well as legal constraints, if any.
 - (b) Identification of the problem areas such as areas affected by soil erosion, shifting cultivation and mining operations.
 - (c) Transport and communication network to serve the Region adequately.
 - (d) Development of infrastructure such as water and power including, storage and distribution network, serving the needs of industry, agriculture, etc.
 - (e) Location of social welfare programmes especially to improve the manpower resources and its ability to benefit from the industrial and other general development of the Region.
 - (f) Location of settlements in hierarchy (both rural and urban) serving the needs of agricultural areas (market centres, service towns and service village) industrial development (growth points, growth centres and growth poles) and social welfare including tribal welfare (education health, water supply, etc.).
 - (g) Within the framework of the Regional Plan, formulation of series of phased programmes in different sectors, both in terms

of space and time. In this part an attempt would also be made to identify agencies which are to take up implementation of the different programmes.

iii) Plan implementation.

Levels of Development Plans for the Western Ghats

Owing to the rugged relief, variations in soil and climatic conditions, and the peculiar shape and size of the Region, the landuse, cropping pattern, development problems and the life style of the people of the Region vary from area to area. Systematic planning for such a Region necessitates the planning functions to be conceived of at several levels and scales. A four level approach for planning and development of the Western Ghats Region has been conceived:

1. Regional level covering the entire Region.
2. Sub-regional level co-terminus with the States.
3. Taluk (Block) level and
4. Settlement level, i.e. both Rural and Urban.

For the effective realisation of the multi-faceted development of a region such as Western Ghats, the plans to be prepared at the four levels, as indicated above, will have different development thrusts at different levels, and the recommendations and proposals will be much more detailed and specific as we proceed from top to bottom.

One of the outstanding features of the Regional Level Development Plan would be to pin-point the areas where inter-state efforts would be needed in order to

exploit the resources fully for the rational development of the Region as well as of the concerned States. The development thrust will, therefore, be of an inter-state nature, i.e., development of water and power resources, prospecting and development of minerals, major ecological problems including soil conservation in the inter-state watersheds, provision of inter-state road network and other developmental issues.

The Sub-regional plan will attempt at systematic efforts to allocate land among the various competing uses and activities, i.e., for agriculture, forestry, plantations, mining and minerals, etc. It will attempt at intersectoral interactions among sectoral programmes and infrastructural development and also involve proposals for transport network, development of water and power, identification of the hierarchy of settlements and their functions.

Taluk-level planning may be viewed as intermediate level planning between the Sub-regional and the settlement level. The taluk, being smaller and more homogeneous than the Sub-region, the categorisation of the land and population and the structuring of the programmes relating to each specific group of people may be easier at this level. Within the framework of the Sub-regional plan, the programmes of development at taluk-level will be structured, based mainly on local resources, for creation of employment and will spell out the population groupwise; the kind of primary, secondary, tertiary activities that should be promoted and the need for infrastructure and other support for such activities identifying the resources necessary for the purpose.

The planning strategy at the taluk level must emphasise the growth of rural centres in order to offer sufficient market and storage facilities as well as labour-intensive industries for the processing of local materials.

Since there is likely to be considerable diversity at the taluk-level in the various states (even within a state), no definite methodology can be prescribed which could be universally applied. Our attempt would be to develop the plan for one typical taluk, in each of the Sub-regions, representative of different typologies as identified by the Administrative Staff College, Hyderabad. Based on these prototype plans, the State Town Planning departments may prepare other taluk plans.

The fourth level of planning is settlement planning, i.e., the physical planning of the settlements, which is concerned with the provision of support services to the various activities envisaged at the various levels. It will provide the organising principles and locational criteria for these activities.

It may be seen, from the above, that the goals as well as planning functions envisaged at the various levels are somewhat different. The main task would be to aim at a plan having an appropriate mix of project or programme proposals which are meaningful from the development point of view, feasible from the financial point of view and compatible with goals and objectives at the various levels. The programmes envisaged at the regional and Sub-regional levels will be comparatively big projects having some "ignition or trigger potential" whereas the schemes at the taluk level will be relatively

small mainly of the nature of beneficiary-oriented schemes to assist definite target groups in the area. At the settlement level, the programme will be concerned with the provision of location - specific support services.

Scope of the Report and Plan

The Town and Country Planning Organisation undertook the preparation of Report and Plan for the Kerala Sub-region and elicited the co-operation of the concerned departments of the Kerala State Government through the Planning department, especially in the collection of information and also to arrange for, if and when necessary, detailed discussions with the officers of the departments concerned with the problems and priorities of development in their respective sectors. Based on this information, this Organisation prepared a series of status reports indicating the resource potential, the present stage of development, the gaps vis-a-vis developmental potentials and constraints of development in the various sectors. The draft reports were circulated to the State departments.

Following the discussions held with the State officials and their observations, the inter and intra sectoral co-ordination was attempted and the sectoral programmes were re-oriented accordingly. The sectoral developments have taken into account as far as possible, national economic and social objectives set out in the Five Year Plans. In working out the priorities of development, in addition to national objectives, the Regional imperatives such as the development of the economy specially suited to the Hill Areas i.e. exploitation of the resources in keeping with the preservation of ecological

balance and the general backwardness of the area, have been kept in view.

The Sub-regional plan that has emerged from this exercise is presented in two volumes; the first volume presents in summary form the sectoral studies together with development strategy and perspective. The second volume presents the existing situation, development potentials, the constraints for development and the manner in which potentials are realised in each sector. The framework of the Sub-regional plan thus evolved may help the State Government to identify development programmes area-wise together with the investment required for implementation. The normal State Plan funds and the Special Central assistance, alongwith such institutional funds that may be available, should be used in a mutually complementary and reinforcing manner in implementing the plan proposals, as envisaged by the Planning Commission.

Data base - its limitations

The treatment of the report is, by and large, based on the information obtained from secondary sources mainly available in unpublished form at the taluk-level. The data, specially in respect of landuse, agriculture and forests, that are normally available, are statistical areawise and, do not reveal a full picture in spatial terms and, therefore, are of very limited use for resource development and planning. The typically poor quality and inadequate quantity of the existing information on landuse and related variables sets limits to the depth of the analysis. Frequently, the available information is either incomplete and/or in a rudimentary form and is not compatible. Spatial distribution of various land

uses over time is often hard to obtain or is not available at all and, as such, comes in the way of evolving a future land use pattern. Very limited information is available on the capability or suitability of land for different uses.

While considering the possible improvements in respect of land use information, as suggested by the Planning Commission, the Organisation approached the Remote Sensing Agency, Hyderabad, National Bureau of Soil Survey and Landuse Planning, Nagpur, and Space Application Centre, Ahmedabad and discussed the possibility of collection of information both in the form of maps and statistics required for resource assessment and development. The first two agencies agreed to prepare the land use map, the land capability map and the problem areas map but raised doubts about statistical information for these maps. This set limits on the use of maps obtained from the application of modern techniques as the maps so prepared and the statistical figures available from the revenue records are not comparable.

The National Bureau of Soil Survey and Land use Planning, Nagpur, however, has agreed to prepare almost free of cost the existing land use, problems area and land suitability maps, etc., which should help in identifying some of the sectoral development programmes and problem areas and, thus, hopefully make the proposals more specific. The problem area maps are likely to be made available by the Bureau by the end of November, 1981. Besides, it may be noted that due to paucity of information at taluk-level in respect of vital sectors of the economy and investment in the earlier plan period and the Sixth Plan programme targets, investment pattern

under the State and Central Plans and other Agencies involved in the development of one or more aspects in the area, it is not possible to indicate the order of investment both area-wise and sector-wise.

The present report and plan is based on information, the reliability of which is often open to question and, therefore, should be viewed under these limitations. It is evident that, despite the limitations of the data base, the Sub-region has immense potentialities in the form of forestry, plantation crops, water, power and human resources, and the proposals contained in this report and plan need to be implemented with all seriousness with pointed attention to the maintenance of ecological balance and to bring the Sub-region economically at par, at least with the adjoining developed plain areas.

SECTION II : DEVELOPMENT SECTORS

The Kerala Sub-region is one of the five Sub-regions of the Western Ghats Region (Fig.1). It comprises of 21 taluks falling in 9 districts of Kerala State (Fig.2). It has an area of 21,856 sq.kms. and a total population of 6,881,115 persons in 1971. It accounts for 56.25% of the area of the State but contains only 32.25% of its population. The Sub-region is, thus, sparsely populated with a density of 315 persons per sq.km. against 549 persons in the State (Table -1). The Sub-region is rural in character with 92% of its population living in rural areas. The total scheduled population (Scheduled Tribes and Scheduled Castes) in the Sub-region is 7,53,570 persons, constituting about 11% of the total population.

The Sub-region is generally characterised by a hilly terrain, being composed of laterite plat-forms and erosional surfaces of hard basement rock. The Sahyadri mountains, ranging in elevation from 760 m to 1220 m, run almost continuously parallel all along, their continuity being broken by a few gaps or ghats like the Palghat. These gaps have been used as transport links both through railways and roads (Fig.3).

Bharatpuzha (251 km.) is the longest river flowing through the Sub-region. Other important rivers are Periyar, Beypore and Pambar. These serve as important arteries of inland communication and are also utilised for generation of hydro-electricity and for irrigation purposes. The soil is generally low in organic content and, therefore, less fertile.

The main soil types found in the Sub-region are

Table - 1 : Area and Population of the Constituent Taluks of Kerala Sub-region.

S.No.	District/Taluk	Area '(Sq.Km.)'	Population (1971)	Density 'per sq.km.
I.	<u>KOZHIKODE</u>			
	1. Mananthavadi (North Wynad)*	747.4	129,335	173
	2. South Wynad	1,378.2	284,515	206
	3. Quilandy	756.9	468,714	619
	4. Badagara	549.8	409,771	745
II.	<u>MALAPURAM</u>			
	5. Ernad	2,261.9	715,496	316
III.	<u>PALGHAT</u>			
	6. Mannarghat	1,199.6	184,579	168
	7. Palghat	720.3	369,001	513
	8. Chittur	1,155.1	313,973	272
IV.	<u>TRICHUR</u>			
	9. Mukandapuram	1,316.0	590,317	449
V.	<u>ERNAKULAM</u>			
	10. Kunnathunad	677.7	292,113	431
	11. Kothamangalam	285.0	142,378	494
VI.	<u>IDUKKI</u>			
	12. Thodupuzha	973.7	219,504	225
	13. Devicolam	1,774.1	134,350	76
	14. Udambanchola	1,071.4	364,913	247
	15. Peermade	1,307.8	146,841	112
VII.	<u>KOTTAYAM</u>			
	16. Meenachil	722.7	315,879	487
	17. Kanjirappally	351.3	172,360	491
VIII.	<u>QUILON</u>			
	18. Pathanamthitta	1,975.6	390,150	197
	19. Pathanapuram	1,233.7	310,659	252
IX.	<u>TRIVANDRUM</u>			
	20. Neyyattinkara	571.0	559,488	979
	21. Nedumangad	926.8	430,779	464
Kerala Sub-region		21,856.0	6,881,115	315
Kerala State		38,864.0	21,347,375	549

* North Wynad Taluk has been named as Mananthavadi since November 1980.

Fig. I

Western Ghats Region: Its Sub-Regions

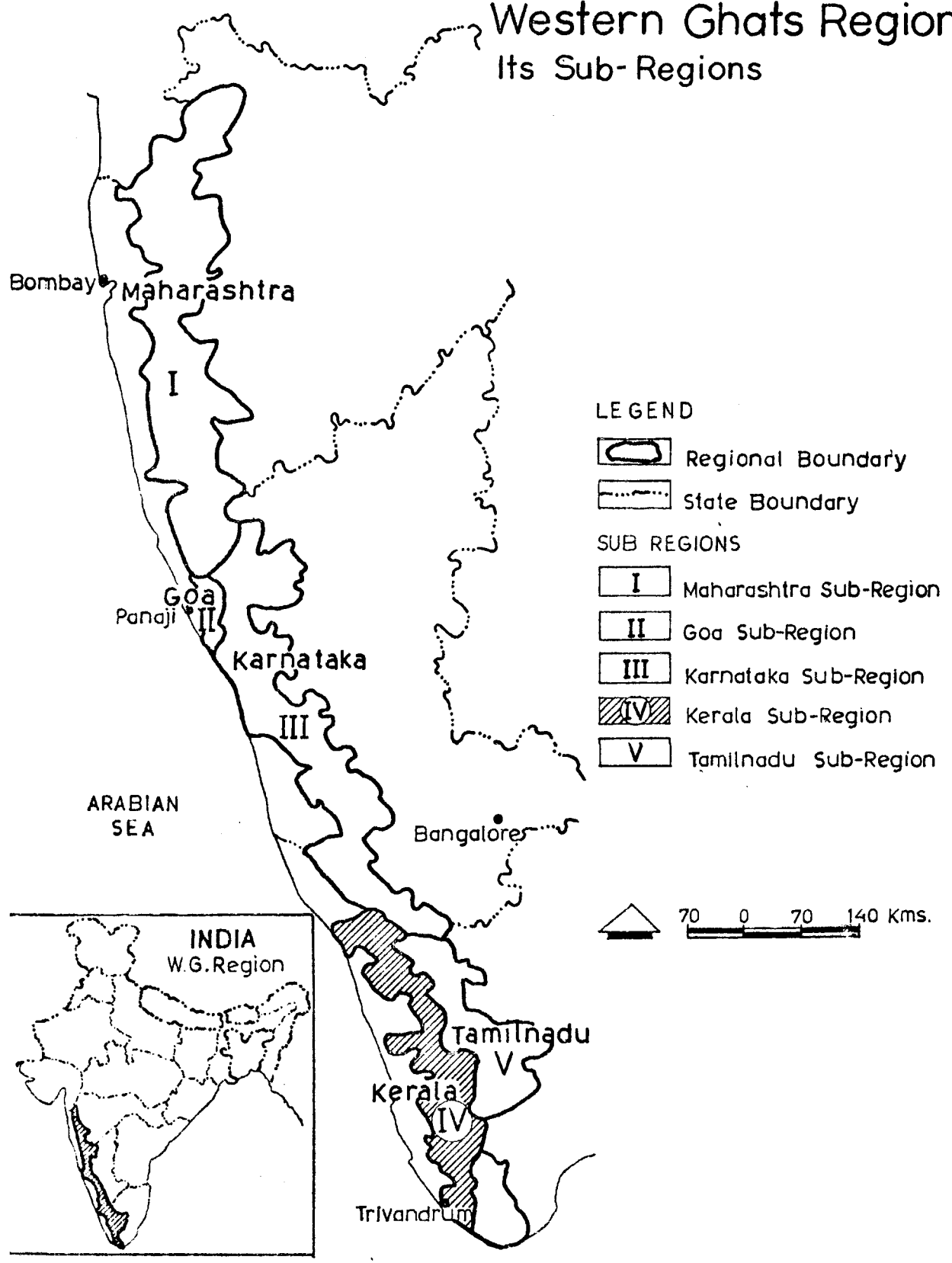


Fig. 2

Kerala Sub-Region: Its Taluks

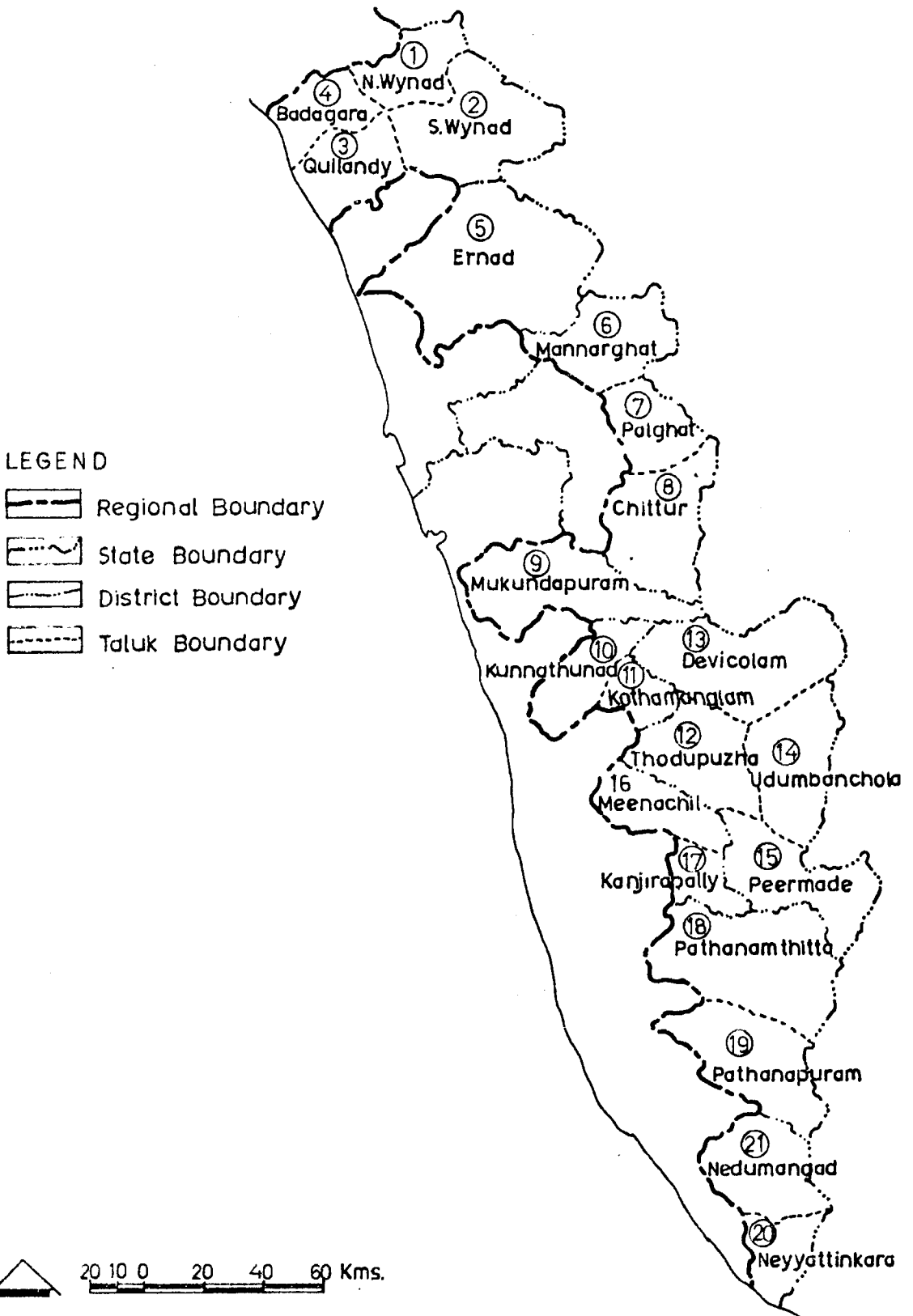












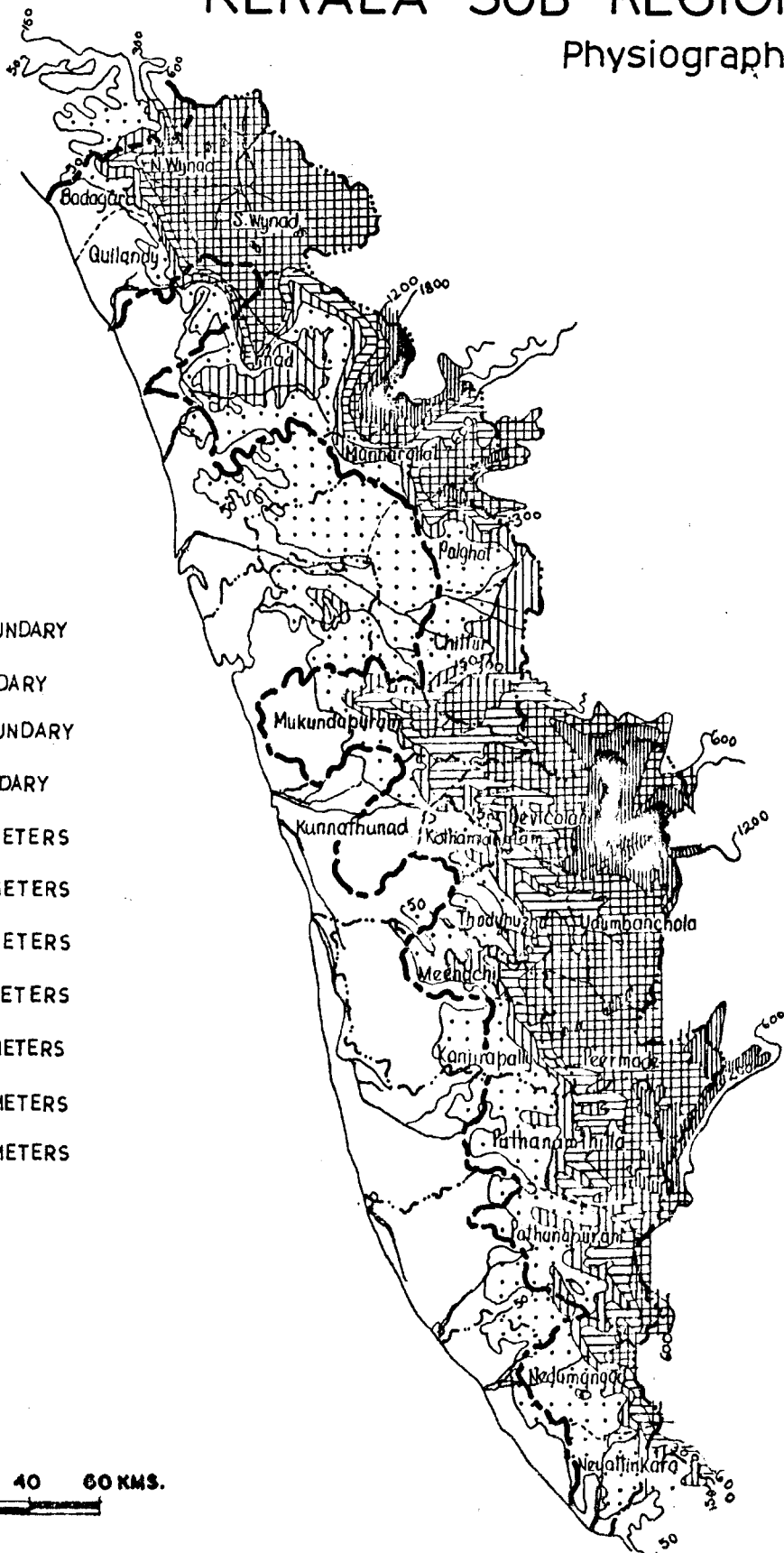


Fig. 3

KERALA SUB-REGION Physiography

Legend

-  REGIONAL BOUNDARY
-  STATE BOUNDARY
-  DISTRICT BOUNDARY
-  TALUK BOUNDARY
-  BELOW 50 METERS
-  50 TO 150 METERS
-  150 TO 300 METERS
-  300 TO 600 METERS
-  600 TO 1200 METERS
-  1200 TO 1800 METERS
-  ABOVE 1800 METERS
-  RIVERS



WESTERN GHATS : SURVEY & PLAN

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laterite soil, forest loam, coastal alluvium, black soil and red loam. They vary in composition and fertility. The chief characteristics of climate are high temperature and rainfall throughout the year. Mean monthly temperature ranges from 24°C to 31°C. The Sub-region gets nearly two-thirds of its rainfall from the South-west monsoon.

Demographic Characteristics

The Sub-region had a total population of 68.81 lakhs in 1971. It, thus contained 27 percent of the total population of the Western Ghats Region while covering only 16 percent of the Region's total area. Like Kerala State which was the most densely populated state in the country with a population density of 549 persons per sq.km. in 1971¹, the Sub-region with a density of 315 persons per sq.km. was also marked by high density despite its hilly physiography. Compared to the all India average density of 177 (1971), these figures are very high indeed. The intra-sub-regional disparities in population density are striking, varying from 76 in Devicolam to 979 in Neyyattinkara (Fig.4).

The Sub-region as well as nearly all its constituent taluks experienced a high rate of growth of population during 1961-71, the growth rate for the Sub-region being 27.04 percent. Fortunately, higher growth rates were recorded by taluks with a comparatively low pressure of population such as Mananthavadi, South Wynad and Udumbanchola. This may have been due to the out-migration of people from high to low density taluks. Only in the two taluks of Devicolam and Peermade, the

1. According to 1981 Census, the Sub-region has a density of 400 against the State figure of 654.

growth rate was less than 10 percent. The population of the Sub-region is estimated at 87.4 and² 105.7 lakhs in 1981 and 1991 respectively.

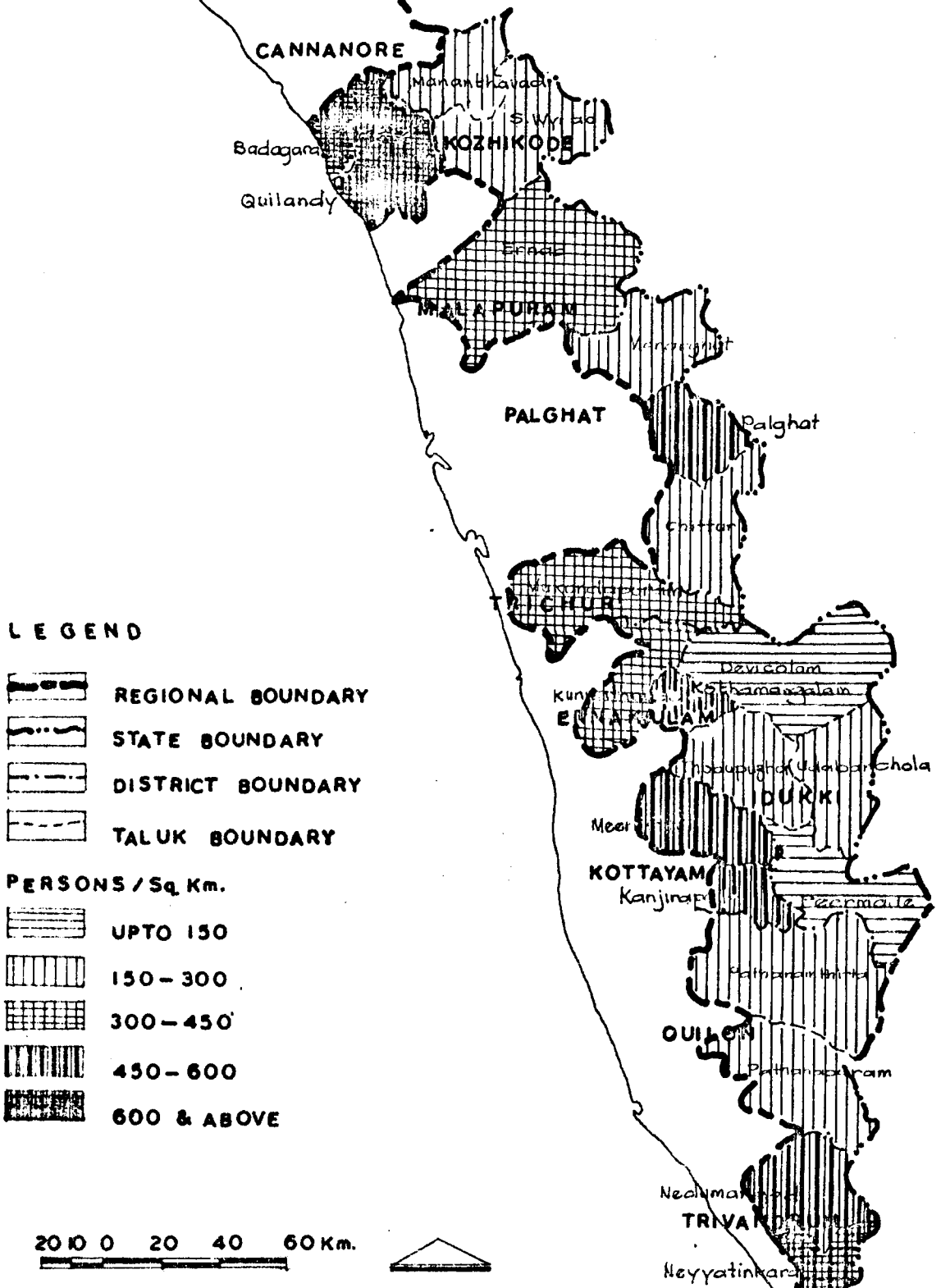
In 1971, there were 996 females per 1000 males in the Sub-region, the figure being nearly the same for Kerala State. Adverse sex ratios were observed in taluks such as Mukundapuram, Palghat, Chittur, Quilandy, Badagara etc., probably due to out-migration of males in search of employment opportunities elsewhere. The age-structure of the population is important from the point of view of deriving planning imperatives for the future. It is seen that taluks with higher population density have share of higher working age group; for example Neyyattinkara, Nedumangad etc. (Table-2). Understandably, these taluks enjoy relatively better economic conditions than others.

The proportion of urban to total population is often considered as an indicator of level of development of an area. The Sub-region is characterised by a low level of urbanism being only 8 percent of its total population compared to 16.2 percent for the State (1971). In 1971, only 2 out of a total of 24 urban settlements were of Class-II, the majority being placed in Class-III and Class IV and a very few in the lower class. No urban centre was of Class-I status. At the taluk level, 6

2. Since the decadal growth of population in the Sub-region between 1941 and 1971 have been uneven and varied, it was difficult to establish a trend. However, from the share of population of each taluk to that of the Sub-region, and in turn of the Sub-region that talukwise and Sub-regional population for 1981 as well as for 1991 has been extrapolated. The corresponding figures for the State have been estimated by the Registrar General - Census Operations.

Fig. 4

KERALA SUB-REGION DEMOGRAPHY & ECONOMIC PROFILE POPULATION DENSITY-1971



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Table - 2 : Demographic Characteristics of the Sub-region (1971).

Taluk	Popula- tion Growth Rate '1961-71	Sex Ratio (No. of females '/1000 males	Work- ing force % of total Popu- lation	Urban Popu- lation as % of to- tal Popu- lation	S.C. Popu- lation as % of to- tal popu- lation	S.T. Popula- tion as % of total Popula- tion
1. Mananthavadi	43.39	942	52.05	-	1.3	22.0
2. South Wynad	53.75	913	53.20	-	2.6	16.5
3. Quilandy	28.71	1012	52.83	6.09	2.3	6.4
4. Badagara	28.09	1036	52.47	13.16	0.2	0.9
5. Ernad	36.47	1008	51.09	6.67	9.2	1.0
6. Mannarghat	39.79	1009	52.34	-	8.9	8.9
7. Palghat	24.57	1037	54.59	27.56	11.7	0.6
8. Chittur	15.32	1034	54.78	13.19	12.2	1.3
9. Mukandapuram	26.42	1051	52.36	10.67	12.0	0.2
10. Kunnathunad	27.40	988	52.97	7.15	11.4	Neg.
11. Kothamangalam	29.71	986	N.A.	4.59	7.6	Neg.
12. Meenachil	13.57	990	53.41	5.76	4.7	5.0
13. Kanjirapally	15.34	963	53.80	25.82	29.0	4.9
14. Thodupuzha	30.77	934	52.44	9.90	5.9	2.1
15. Devicolam	9.05	931	55.71	3.26	22.3	1.2
16. Udumbanchola	70.27	927	52.77	-	3.9	1.8
17. Peermade	9.88	965	53.39	-	8.6	2.5
18. Pathanamthitta	17.05	1000	53.85	-	9.2	0.4
19. Pathanapuram	25.40	991	52.84	4.37	12.1	0.6
20. Neyyattinkara	22.39	988	55.01	9.90	7.7	0.3
21. Nedumangad	24.96	1000	54.43	3.40	8.8	2.1
Sub-region	27.04	996	53.20	8.01	8.4	2.6

taluks were devoid of urban settlements, a factor that signifies their developmental backwardness. In most of the other taluks, the urban component of population was less than 10 percent. Palghat and Kanjirappally being relatively well developed had 25 percent of their population as urban component.

A significant proportion of Scheduled Castes and Scheduled Tribes is present in the Sub-region (Table-2). Scheduled Castes formed 8.4 percent of its total population and Scheduled Tribes, though not conspicuous in terms of numbers, accounted for as much as 60% of the State's total Scheduled Tribes population (1971). The Scheduled Tribes population was distributed in only three taluks viz. Mananthavadi, South Wynad and Quilandy, forming 22.0, 16.5 and 6.4 percent respectively of their total population. Unlike in other tribal areas of the country, the tribals of the Sub-region were not in primitive isolation but were practising settled agriculture employing modern techniques. But, by and large, only these tribals suffered from abject poverty and general economic backwardness.

Economic Profile

Compared to the participation ratio of 34 percent in 1971 for the Western Ghats Region as a whole, the Sub-region had a low ratio of only 30.23 percent. This is perhaps indicative of wide spread of unemployment. Interestingly enough the taluka-level variations show that participation ratios are lower in those taluks which possess relatively better physiographic conditions, higher concentration of population and high literacy rates. This phenomenon points to the fact that employ-

ment opportunities in such taluks are limited. On the other hand, in the relatively backward taluks, higher participation ratios are observed due, probably, to lower population concentration, and the main occupation being agriculture.

In regard to occupational structure as of 1971, the primary sector was predominant absorbing 68.34% of the total working force whereas only 11.27 percent were engaged in secondary sector and 20.39 percent in the tertiary sector (Table-3 and Fig.5). Variations at taluk level conform to the familiar pattern in this respect also, that is, the primary sector leading in taluks with sparse population such as Devicolam, Peermade and Mananthavadi. A more diversified economic structure is observed in the other taluks which are relatively better developed.e.g. Neyyattinkara, Nedumangad, Pathanamthitta, etc.

As mentioned earlier, the primary sector holds sway in most of the taluks. But within this sector, it is not agriculture but forestry and plantation activities that dominate,engaging 10.79 percent of the workers. Plantation activity plays an important role in the Sub-region's economy as it is very lucrative and leads to the establishment of processing industries besides checking of soil erosion and diversification of tertiary activities. In the taluks of Peermade, Mananthavadi, and Quilandy especially plantation activity is significant.

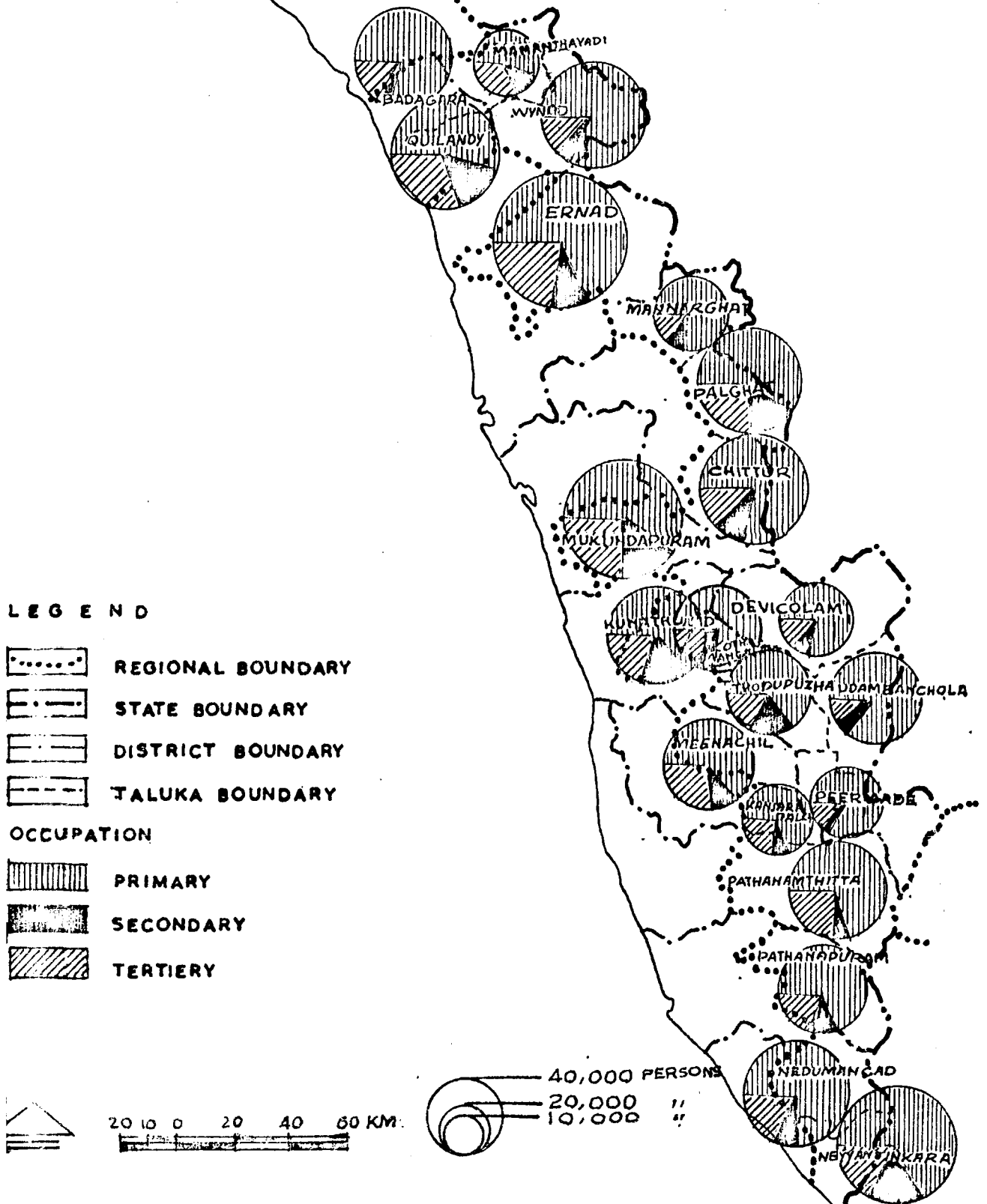
Development of large scale secondary activities is of remote possibility mainly for want of proper raw materials in adequate measures apart from its likely repercussion on the ecological balance. However, deve-

Table - 3 : Classification of Workers in Primary, Secondary and Tertiary Sector in 1971.

Taluk	Workers (as % of popu- -lation)	Primary Sector (% of workers)	Secondary Sector (% of Workers)	Tertiary Sector (% of Workers)
1. North Wynad	46433 (35.90)	37336 (80.40)	2083 (4.49)	7014 (15.11)
2. South Wynad	106041 (37.27)	88528 (83.48)	4852 (4.58)	12661 (11.94)
3. Quilandy	121341 (25.89)	65781 (54.21)	18617 (15.34)	36943 (30.45)
4. Badagara	103250 (25.20)	55845 (54.09)	14006 (13.57)	33399 (32.34)
5. Ernad	198819 (27.79)	135025 (67.91)	20867 (10.50)	42927 (21.59)
6. Mannarghat	65013 (35.22)	50203 (77.22)	5081 (7.82)	9729 (14.96)
7. Palghat	132461 (35.90)	76231 (57.55)	20174 (15.23)	36056 (27.22)
8. Chittur	131883 (42.00)	94740 (71.84)	15609 (11.84)	21534 (16.32)
9. Mukundapuram	166086 (28.14)	97670 (58.81)	31236 (18.81)	37180 (22.38)
10. Kunnathunad	91358 (31.27)	57687 (63.14)	16148 (17.68)	17523 (19.18)
11. Kothamangalam	43741 (30.72)	31963 (73.07)	3762 (8.60)	8016 (18.33)
12. Thodupuzha	66136 (30.13)	42841 (64.78)	10339 (15.63)	12956 (19.59)
13. Devicolam	51778 (38.54)	40683 (78.57)	4143 (8.00)	6952 (13.43)
14. Udumbanchola	89769 (33.89)	78863 (87.85)	3103 (3.46)	7803 (8.69)
15. Peermade	57407 (39.09)	47407 (82.58)	2774 (4.83)	7226 (12.59)
16. Meenachil	95351 (27.10)	66179 (69.41)	8306 (8.71)	20866 (21.88)
17. Kanjirapally	47206 (27.39)	32493 (68.83)	3914 (8.29)	10799 (22.88)
18. Pathanamthitta	100582 (25.78)	71223 (70.81)	6796 (6.76)	22563 (22.43)
19. Pathanapuram	87196 (28.07)	59637 (68.39)	11017 (12.64)	16542 (18.97)
20. Neyyattinkara	156060 (27.89)	101923 (65.31)	20199 (12.94)	33938 (21.75)
21. Nedumangad	122388 (28.41)	89427 (73.07)	11346 (9.27)	21615 (17.66)
Sub-region	2080299 (30.23)	1421685 (68.34)	234372 (11.27)	424242 (20.39)

Fig. 5

KERALA SUB-REGION DEMOGRAPHY & ECONOMIC PROFILE OCCUPATIONAL STRUCTURE



lopment of small scale and cottage industries hold high prospects. As regards the tertiary sector, employment in the 'other services' category (10.86%) is most significant. A systematic change towards improvement of this sector would need to be related to a proper settlement hierarchy, which is absent at present.

Land Use

The two major land uses in the Sub-region are forests and agriculture. Forests (concentrated mostly in the relatively higher eastern parts) cover 42.57% of the total area, and agriculture which dominates the lower, western parts, covers 45.20% of the total area. With a population of 6,881,115 persons (1971) and an area of 2,177,280 hectares, the per capita land, in the Sub-region, is 0.32 hectare as compared to 0.10 hectare at the State level, the all India average being 0.53 hectare. High per capita land ratio indicates the dominance of forests and agriculture on one hand, and lower urbanisation on the other. Due to the presence of relatively poor soil and hilly nature of terrain, the net area sown is only 45.20% of total area as compared to 57.24% at the State level. Land use pattern in the Sub-region in 1974-75 is indicated in Table-4.

Fallow lands form a slightly lower percentage than is usually found in hilly areas; this may be attributed to more land occupied by shifting cultivation (not classified as fallow). Culturable waste is greater than at the State level and is the most promising sector of land suitable for reclamation. A substantial portion of the area under tree crops and groves is covered by casuarina trees, thatching grass, bamboo, bushes etc.

and may promising enough for cultivation, after suitable studies are undertaken. The area occupied by settlements and transportation is relatively lower, being only 7.13% as compared to 9.33% at State level, due to the hilly, forested and backward nature of the Sub-region, in general.

Table - 4 : Landuse Pattern in Kerala Sub-region and Kerala State during 1974-75.

Sl. No.	Landuse Category	Kerala Sub-region		Kerala State	
		Area in '000' hectare	% to total area	Area in '000' hectare	% to total area
1.	Net area sown	984.07	45.20	2208.45	57.24
2.	Fallow land	21.89	1.00	45.36	1.18
3.	Culturable Waste Land	55.86	2.57	71.95	1.86
4.	Permanent Pasture	33.35	1.53	125.48	3.25
A.	Total Arable Land	1095.17	50.30	2451.24	63.53
5.	Area not available for cultivation	155.30	7.13	360.00	9.33
6.	Area under forest.	926.81	42.57	1047.28	27.14
B.	Total non-agricultural land	1082.11	49.70	1407.28	36.47
Total: Geographical Area (A+B)		2177.28	100.00	3858.28	100.00

Source: Compiled from the data collected from the Bureau of Economics and Statistics, Kerala, Trivandrum.

Between 1970-71 and 1974-75, changes in the overall land-use pattern have been negligible and the rates (of change) vary from taluk to taluk. There has been a marginal increase, at the Sub-regional level, in net area sown mainly at the expense of forest area than by utilisation of fallow lands and culturable waste, though these two categories have also registered a decrease. Significant changes, however, were recorded in some taluks, e.g., in Mananthavadi taluk, net area sown increased from 29.83% (1970-71) to 35.50% (1974-75) while area under forests decreased from 34.12% to 28.03% respectively. In other taluks, changes were negligible.

Heterogeneity in relief, structure, climate and soil types, has given rise to considerable variation in land-use pattern, in the various taluks, and has affected the socio-economic life of the people (Fig. 6 & 7). The percentage of land covered by forests is quite significant and varies from 0.07% in Meenachil to 76.11% in Pathanamparam. Seven taluks have more than half of their total area under forests. Out of 21 taluks, 12 have reported a higher percentage of cultivated area to total area than the Sub-regional average of 45.20%. Many of these have as high as three-fourths of their land under cultivation - e.g., Kothamangalam (89.55%), Neyyattinkara (81.28%) and Quilandy (76.95%) to name a few. Regional variation in the concentration of cultivated land and forests reveals interesting information (Fig. 8 & 9). Taluks with a low concentration of cultivated land have a larger forest cover and are characterised by undulating terrain and poor soil. On the other hand, high concentration of cultivated land is coupled with lower forested area in the other taluks. Percentage of net area sown varies from 21.65% in Devicolam to 88.44%

in Kothamangalam and more than 50% of the taluks have a higher percentage of net area sown than the Sub-regional average. Higher percentages of fallow lands are found in those taluks which lack an adequate water supply and suffer from soil erosion, fragmentation of land holdings, apathy to modern innovations etc. e.g., Quilandy and Kanjirapally.

Agricultural Development

The net area sown accounts for 89.86% of the total arable land¹ in the Sub-region as compared to 90.09% in Kerala State. Nearly 97% of total arable land is potentially arable; only 3% being under pastures and tree crops which may be turned into rich grazing land. However, it was found that a substantial portion of available land is not put to productive use and is either left as fallow or culturable waste (Table -5). This may probably be due to non-availability of irrigation facilities, fragmentation of holdings, poor economic condition of the cultivators etc. Land in these categories can be utilised for extension of cultivated land. A broad picture of agricultural development in the Sub-region is provided by Table-6.

Though the Sub-region had a relatively lower population density (315 persons per/km.^{sq.}, 1971) as compared to Kerala State (549), the inter_taluk variations ranged from 76 persons per sq.km. in Devicolam to 979

1. Total arable land includes net area sown, fallow lands, culturable waste and areas under pasture, tree crops etc. "Potential arable land" includes only net area sown, fallow lands and culturable waste.

Table - 5 : Arable Land in the Kerala Sub-region 1974-75

Sl. No.	Taluk	(Area in 000' Hectares)									
		Net Area Sown		Fallow Lands		Other Uncultivated Land Excluding Fallow Lands		Culturable Land Pastures, tree crops etc.		Total arable land and its % to total area.	
		Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage
1.	North Wynad	26.55	58.35	1.65	3.63	8.37	18.40	8.93	19.63	45.50	60.88
2.	South Wynad	34.31	82.61	1.22	2.94	4.44	10.69	1.56	3.76	41.53	30.13
3.	Quilandy	56.94	91.35	1.30	2.09	1.42	2.28	2.67	4.28	62.33	82.35
4.	Badagara	37.07	93.95	1.11	2.81	0.94	2.38	0.34	0.86	39.46	71.77
5.	Ernad	91.98	77.38	3.05	2.57	18.30	15.40	5.54	4.65	118.86	52.55
6.	Mannarghat	70.32	94.47	1.73	2.32	1.28	1.72	1.11	1.49	74.44	67.69
7.	Palghat	52.43	96.10	0.81	1.48	0.64	1.17	0.68	1.25	54.56	75.74
8.	Chittur	58.56	93.76	2.02	3.23	1.19	1.91	0.69	1.10	62.46	54.07
9.	Mukundapuram	47.08	93.64	0.86	1.71	0.66	1.31	1.68	3.34	50.28	36.21
10.	kunnathunad	50.22	94.05	1.47	2.75	0.88	1.65	0.83	1.55	53.40	78.79
11.	Kothamangalam	25.21	95.89	0.32	1.22	0.21	0.80	0.55	2.09	26.69	92.21
12.	Thodupuzha	33.60	93.38	1.89	5.25	0.14	0.39	0.35	0.96	35.97	39.34
13.	Devicolan	38.42	79.71	0.31	0.64	0.68	16.01	0.79	1.64	48.20	27.17
14.	Udumbanchola	53.46	95.01	0.16	0.28	2.44	4.34	0.21	0.37	56.27	52.52
15.	Peernade	41.39	88.03	1.66	3.51	2.30	4.89	1.68	3.57	47.02	35.95
16.	Meenachil	53.07	93.07	0.83	1.46	2.31	4.05	0.81	1.42	57.02	78.90
17.	Kanjirapally	23.73	96.62	0.54	2.16	0.12	0.49	0.18	0.73	24.56	69.91
18.	Pathanamthitta	64.85	93.00	0.24	0.34	0.89	1.28	3.75	5.38	69.73	35.29
19.	Pathanapuram	27.94	97.42	0.19	0.66	0.37	1.29	0.18	0.63	28.68	23.26
20.	Neyyattinkara	44.31	98.44	0.18	0.40	0.12	0.27	0.40	0.89	45.01	82.23
21.	Nedumangad	52.63	98.39	0.35	0.65	0.14	0.26	0.37	0.69	53.49	57.72
Kerala Sub-region		984.07	89.86	21.89	2.00	55.86	5.10	33.35	3.04	1095.17	50.29
Kerala State		2208.45	90.09	45.36	1.85	71.95	2.94	125.48	5.12	2451.24	63.53

Fig. 6

KERALA SUB-REGION

Land Use
(1974-75)

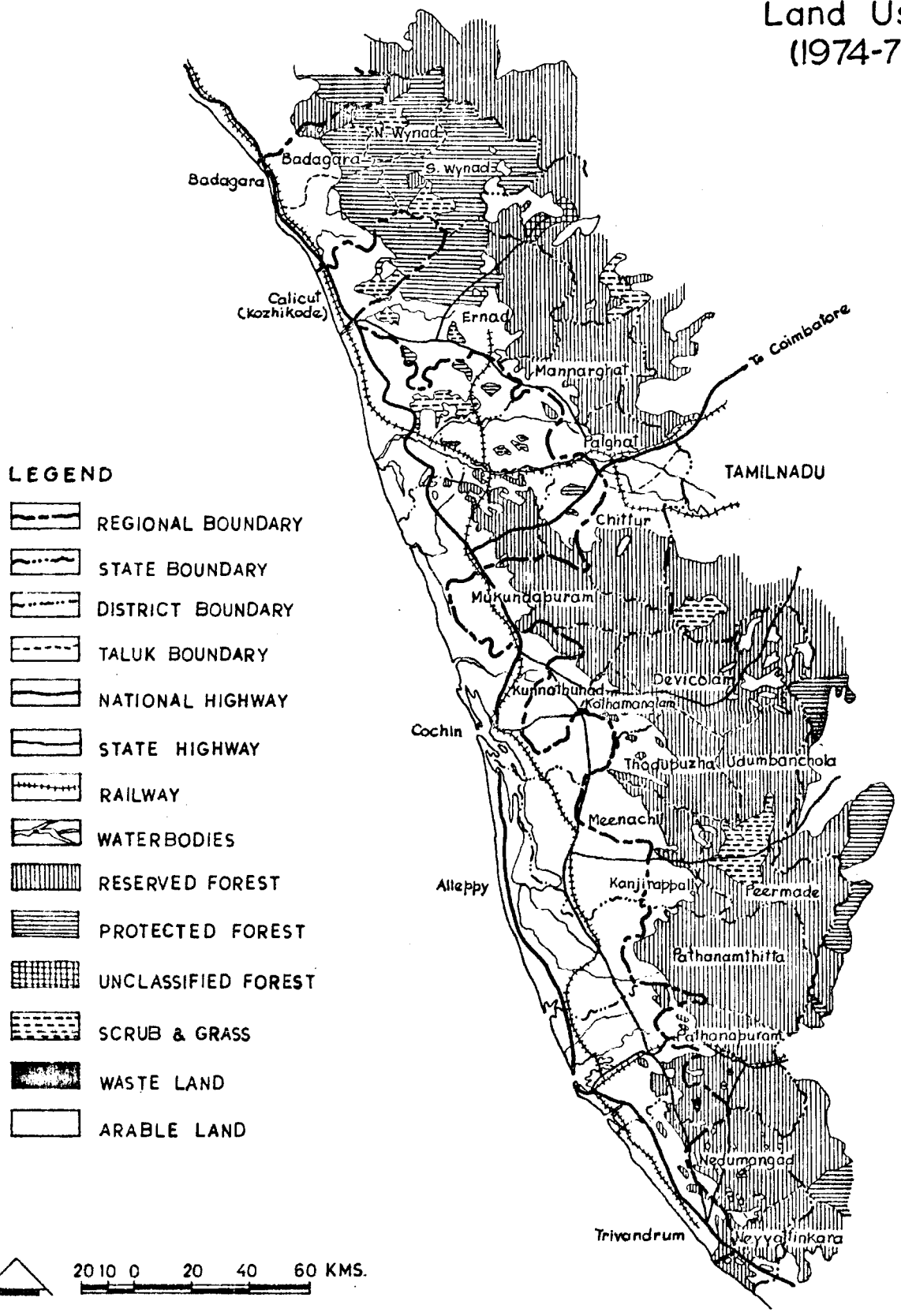










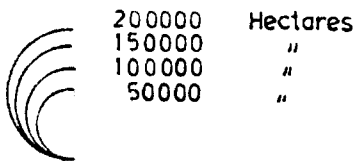
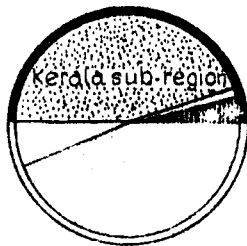
Fig.7

KERALA SUB-REGION

Land Use Categories
(1974-75)

LEGEND

-  REGIONAL BOUNDARY
-  STATE BOUNDARY
-  DISTRICT BOUNDARY
-  TALUK BOUNDARY
-  TOTAL ARABLE LAND
-  NON AGRICULTURAL LAND
-  NET AREA SOWN
-  FALLOW LAND
-  CULTURABLE WASTE & PASTURES
-  FOREST
-  AREA NOT AVAILABLE FOR CULTIVATION



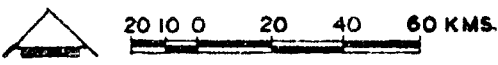
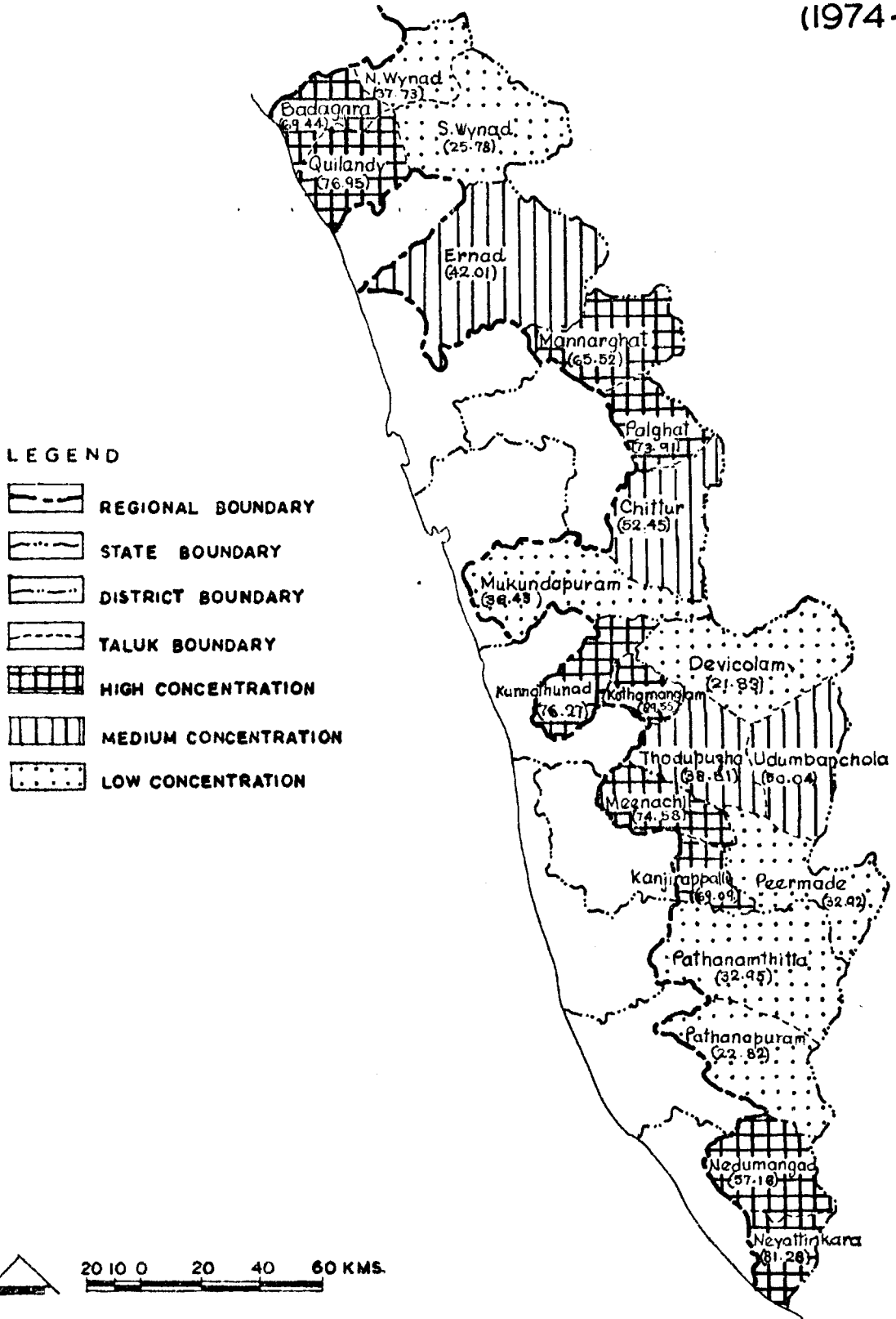
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Fig. 8

KERALA SUB-REGION

Concentration of Cultivated Land (1974-75)



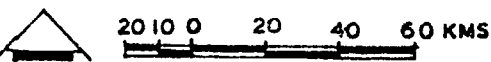
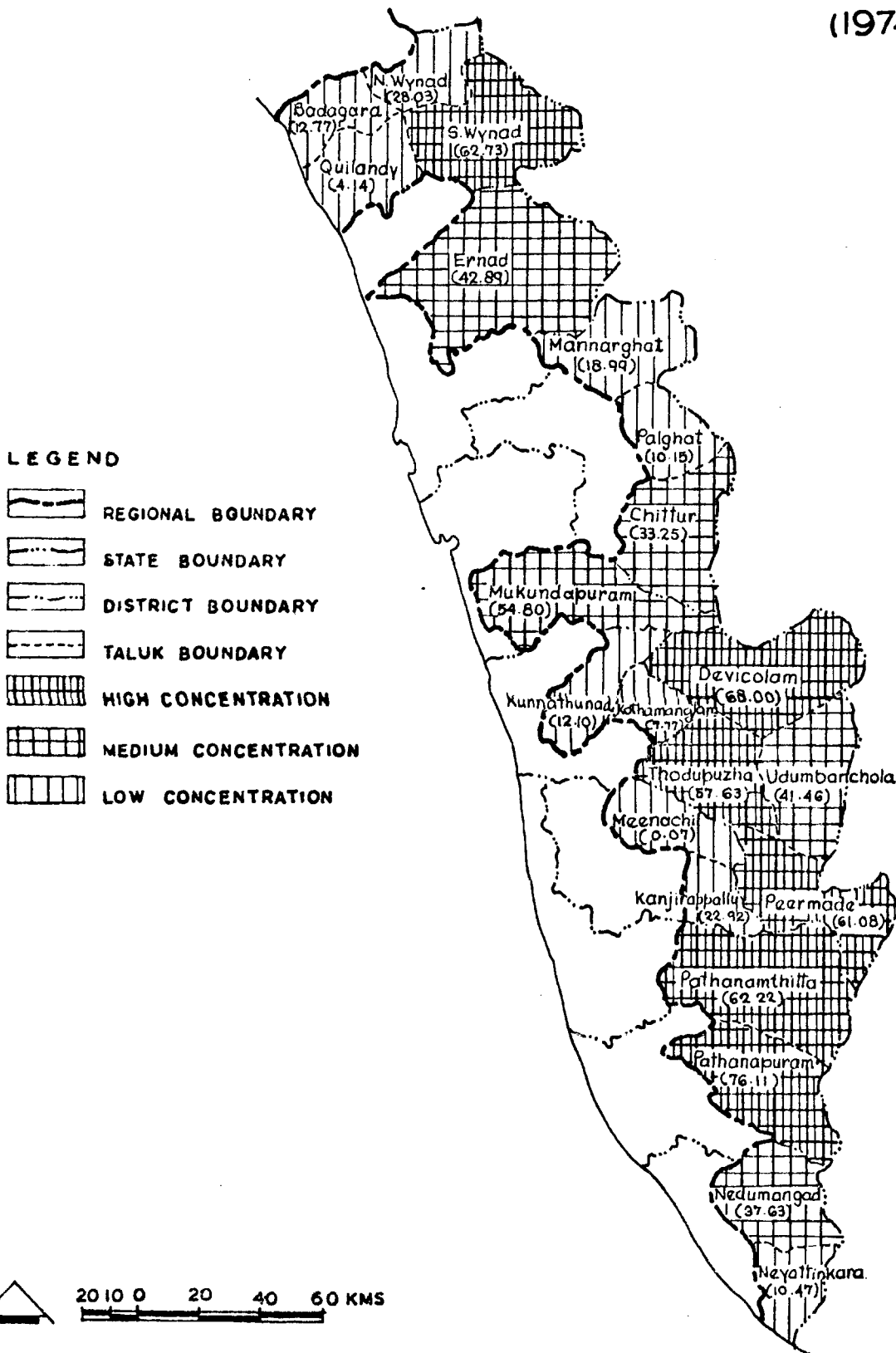
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Fig. 9

KERALA SUB-REGION

Concentration of Forest
(1974-75)



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persons per sq.km. in Neyyattinkara. Understandably, the taluks characterised by low level plain land and located on the coast have higher densities and, therefore, lower per capita cultivated land. Compared to 0.10 hectares in Kerala State, the per capita cultivated land in the Sub-region is 0.15 hectares and varies from 0.08 hectares to 0.39 hectares amongst the taluks. Higher values may be attributed to the lower population density, but the supporting capacity of the cultivated land is relatively lower because of the hilly terrain and poor soil conditions.

Table - 6 : Selected Agricultural and Related Characteristics of the Sub-region Compared with State Figures.

Sl.No.	Indicators	Kerala State	Sub-region
1.	Density of population/sq.km.(1971)	549	315
2.	% of rural population (1971)	81.98	92.00
3.	% of tribal population (1971)	1.26	2.60
4.	% of agricultural workers (1971)	48.50	57.18
5.	% of cultivated land (1974-75)	57.84	46.20
6.	% of potential arable land (1974-75)	60.28	48.77
7.	% of area sown more than once(1974-75)	35.25	22.86
8.	% of net irrigated area to net cropped area (1974-75)	27.98	10.34
9.	% of area under food crops (1974-75)	31.30	35.77
10.	% of area under non-food crops(1974-75)	68.70	64.23
11.	% of area under rice (1974-75)	29.65	24.28
12.	Yield (Kg.) of Rice/Hectare(1974-75)	15.40	15.90
13.	Yield (Kg.) of Food-grains/hectare (1974-75)	14.85	15.50
14.	Per-capita cultivated land(in Ha.) (1974-75)	0.10	0.15
15.	Participation rate	29.12	30.23

Since the Sub-region receives rainfall twice a year, double cropping is practised on a large scale i.e. on 22.86% of net area sown, with greater irrigation facilities and more use of H.Y.V. and other inputs, this figure can be increased. A greater scope exists for intensive rather than extensive cultivation. Rice is the predominant crop and grown extensively, due to favourable agro-climatic conditions, especially in the northern taluks which are marked by a high concentration of rice as compared to the southern ones where concentration is low. In the central taluks, concentration of rice is of the medium level. Rice and coconut rank as the first and second crops in almost all the taluks. Plantation crops are next in importance and rank first or second in many taluks but third or fourth in most of them. Other food crops such as jowar and tapioca are grown in areas unsuitable for rice cultivation. Possibilities of crop diversification are present over a large part of the Sub-region especially in areas where conditions are less favourable for growing rice. If the economy of the Sub-region is to improve, not only it is necessary to increase intensive cultivation but also to introduce a second crop and diversify the cropping pattern as far as possible. Taking into consideration soil, climatic factors and physical features, it may be possible to grow several crops by application of improved methods of farming and irrigation.

In general the size of land holdings is small in the Sub-region, 84% of these being less than one hectare in size and 93% upto 2 hectares. A great disparity is observed in the distribution of operational land holdings among the taluks, ranging from 1.10 hectares in Pathapuram to 5.64 hectares in Devicolam. Fragmentation

of land holdings poses an acute problem affecting agricultural production and efficiency. It is necessary to study the aerial variations of holdings-size and suggest measures for maintenance of small holdings with improved farming methods and technology. A welcome sign is the recent land legislation passed in the State according to which cultivators got ownership of land. This has, to a large extent, helped reduce inequalities.

Agriculture employs 57.18% of the total workers in the Sub-region as compared to 48.50% at the State level. This percentage varies from 20.10% in Peermade to 69.99% in Mannerghat taluk (Fig.10), being lower in the hilly taluks and higher in those where perennial crops (coconut, tea, rubber) are grown. Out of the total workers in agriculture, 38.41% are cultivators and 61.59% agricultural labourers, the latter being particularly high in taluks where foodgrains are grown, e.g. Chittur, Palghat, Quilandy etc. Though agriculture in the area is labour intensive the magnitude of unemployment is also high. On an average, the unemployment rate is estimated to be about 48.50% of the working force² (15-59 years of age). However, with an increase in the intensity and output of agricultural production, there is scope for further employment. Agriculture, therefore, must become a major productive sector in the Sub-region, if the problem of unemployment has to be solved, and also for the overall development of the Sub-region.

The Sub-region is quite backward and traditional in agricultural technology, relaying heavily on labour intensive methods and old fashioned inputs. The process of water management also is not well developed. Rain-

2. For details please refer Vol II P.63-65.

fall is erratic and there is a heavy dependence on irrigation, but irrigated area forms only 10.34% of the net area sown (1974-75); this percentage varies in different taluks. Only 15 taluks, especially those which are relatively plain, are provided with irrigation facilities. The main source of irrigation is canals by which 82.1% of the total cultivated area is irrigated; 13.1% is covered by tanks and 4.8% by lift irrigation schemes. There are a large number of major, medium and minor irrigation schemes both in existence and proposed (Fig.11). The latter, when completed by 1985, will raise the coverage of irrigation from 10.34% to 34.62% of net area sown.

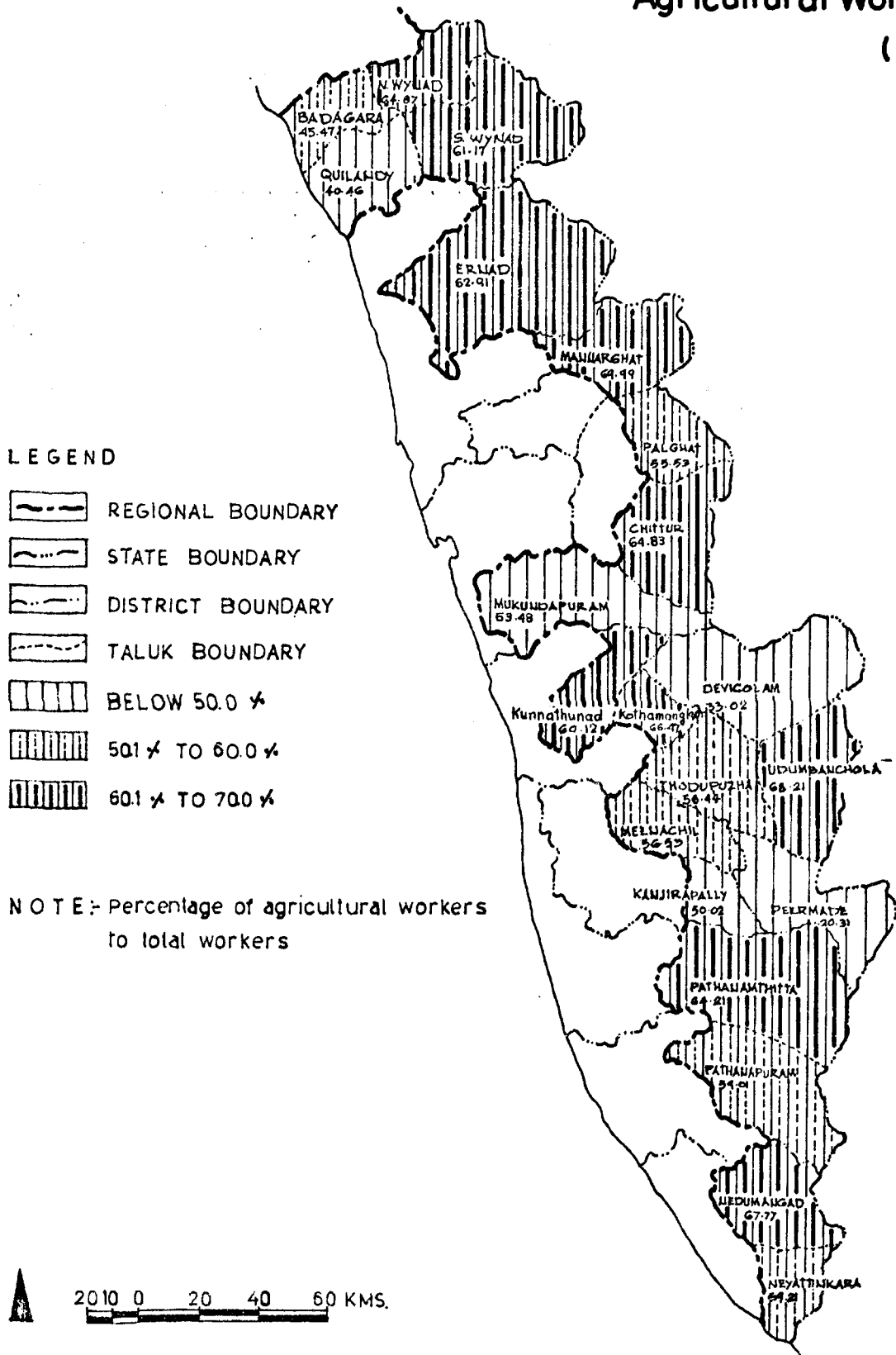
The use of fertilizers, in the Sub-region works out to be 46.74 Kgs. per hectare, which is much below the requirements of the soil. It varies from 3.68 Kgs. per hectare in Udumbanchola to 242.06 Kgs. per hectare in Pathanamthitta. Only 22.5% of the total cropped area is under plant protection schemes. Again, only 2.8% of the total cropped area in the Sub-region, is under High Yield Variety seed cultivation (1974-75). A comprehensive programme to introduce fertilisers, plant protection methods and HYV seeds appears to be a necessity.

For the effective distribution of the above agricultural inputs, it is necessary to have an efficient system of markets. However, a regulated market is found only in Pathanampuram taluk while 276 unregulated markets are unevenly distributed in the Sub-region. Three taluks, viz. Ernad, Peermade and Palghat, have only one daily market each. Co-operative marketing societies in 12 taluks deal with arecanut, pepper, coconut, bananas and vegetables. Warehousing and storage facilities are inadequate especially in respect of plantation crops.

Fig.10

KERALA SUB-REGION

Agricultural Workers (1971)



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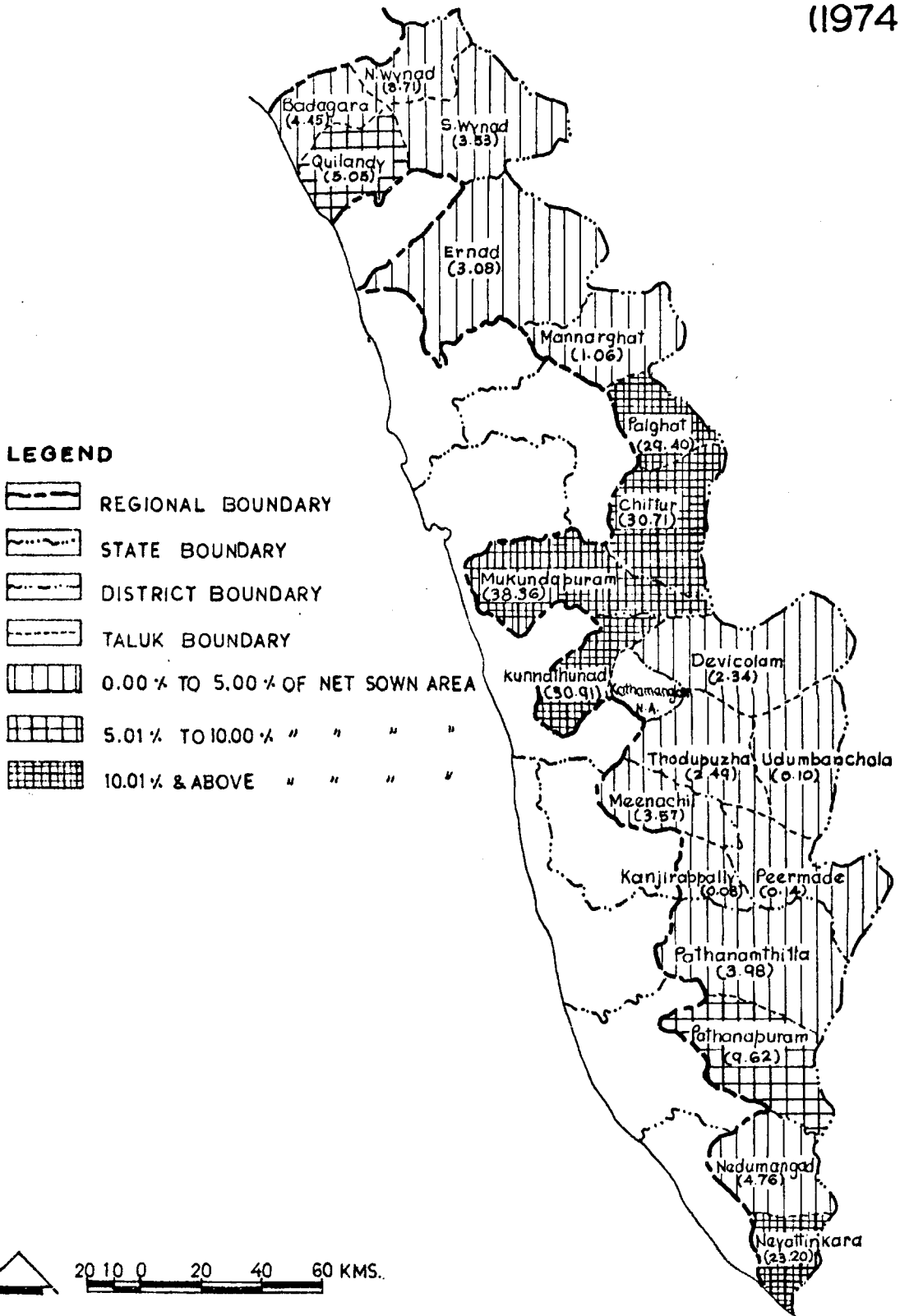
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Fig. II

KERALA SUB-REGION

Net Irrigated Area

(1974-75)



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A large number of institutional and non-institutional facilities are available for giving credit to farmers. Besides various banks and societies, Kerala Financial Corporation provides financial assistance. However, on the whole, the loans advanced do not meet the requirements.

Livestock and Animal Husbandry

Besides agriculture, livestock and animal husbandry occupy an important position in the rural economy. Animals are raised for provision of milk, motive power, meat, manure and other such products. Livestock population includes bullocks, cows, buffaloes, sheep, goats, pigs, poultry, horses and donkeys. Poultry is the most important category and constitutes 75% of total livestock population. It has registered a substantial increase in all the taluks leading to an overall increase of 20.94% in 1966-72, and seems to have good scope for development as an important supporting activity. Goats and cows are next in importance giving rise to dairy farming which is a wide spread activity in all taluks. The Sub-region is adequately served by veterinary services, including dispensaries, hospitals, artificial insemination centres, two rinder posts (in South Wynad and Chittur) and a mobile dispensary (Udumbanchola). However, more mobile dispensaries are needed in hilly taluks.

Forestry Development

As mentioned earlier, forests cover 42.57% of the total area in the Sub-region, compared to 27.14% in Kerala State (1974-75). Percentage of forest cover varies from 0.07% in Meenachil to 76.11% in Pathanapuram.

Seven, out of 21, taluks have less than 20% of their area under forests - these are mostly coastal taluks. The National Forest Policy has recommended maintenance of one-third of total area to be under forests, 60% of the area in hilly regions and 20% of the area in the plains needs to be developed as forests to meet this requirement. On this basis, the Sub-region has a deficit of 67,367.34 hectares of forest land.

The forests, in the Sub-region, are broadly divided into 5 categories, viz. (a) Southern Tropical Wet Evergreen (b) Montane Wet Sub-tropical Evergreen (c) Tropical Dry Deciduous (d) Southern Tropical Moist Deciduous and (e) Temperate Shola Grasslands. These different types are present at different elevations and vary with respect to their physical characteristics as well as the forest produce obtained from them. Forests are further classified into (a) Reserved (b) Protected and (c) Unclassified forests. Reserved forests cover 86.66% of total forested area and, being directly under Government control, are easily manageable. Protected forests (covering 1.4% of forested area) are difficult to manage as a large number of rights regarding these are inherited from previous owners or tribal customs. Unclassified forests occupy 11.93% of forested area. The distribution of these three categories of forests varies from taluk to taluk e.g. percentage of reserved forests varies from 39.73% in Ernad to 98.89% in Devicolam. Protected forests are found mostly in hilly taluks like North Wynad, Kunnathunad and Mukandapuram, inhabited by tribal population.

The value of total forest produce in 1974-75 was Rs.6.37 crores. Major forest products are industrial

timber, fuel wood and bamboos. Pathanapuram is the main production centre accounting for 21.39% of total forest produce. Two taluks namely, Neyyattinkara and Meenachil, do not provide any forest products. Medical herbs, honey, wax and cane are the minor forest products, their value had doubled from Rs.3.59 lakhs in 1970-71 to Rs.6.5 lakhs in 1974-75. Though the value of minor forest produce is less than of major products, it provides direct employment to local people as it requires manual labour for collection and processing.

Problems of Land Use, Agriculture, Livestock and Forestry Development.

Since agriculture and forestry are the predominant users of land, their quality and quantity is directly related to land forms and the use of land is influenced by geomorphic, pedological and hydrological factors. Accordingly, forests are seen to predominate in the hilly areas and agriculture in the plain areas of the Sub-region.

One of the major problems of forestry is that of large scale deforestation in the Sub-region. As mentioned earlier, National Forest Policy aims at a 33% forest cover. The Sub-region, however, has been deforested so much that the total area covered by forests is only 44.10% (including 1.53% under pastures and tree crops) Ecological stability is crucial for development and depends largely on the maintenance of forest cover in this area. For this, necessary steps need to be taken to prevent encroachment by agriculture, mining, hydro-electric and industrial development.

The Sub-region exhibits agricultural backwardness mainly due to the presence of factors like hilly terrain, relatively poor soils, inadequate irrigation facilities and lack of markets. Moreover, there exists in farmers a conservative attitude towards the adoption of improved technology. In fact, there is a lack of managerial and technical skill required for the same. In order to diversify, stabilise and commercialise agriculture, there is an acute need for change in rural attitudes and institutions. A break through in this respect may be achieved through (a) knowledge (b) incentives (c) means and (d) efficient supply of inputs. Efficient use of resources for agricultural development need to be viewed in the light of combining scarce resources with skilled labour, available in abundance, for achievement of maximum food output.

The Sub-region produced about 8 lakh tonnes less than its requirement of food grains in 1974-75. This deficit needs to be seen against the background of the physical environment, which largely determines what farmers will grow and what people will eat. The distinguishing features of the people's diet in the Sub-region, as in the State, are (a) the relatively higher share of tapioca and coconuts and (b) the lower share of cereals in the food basket. Tapioca provides about 27% of total calorilintake as against per capita availability of potatoes and other tubers, which together amount to less than 30 calories in the country. Pulses contribute only 19% of calorie intake as compared to twice the amount in the country. Keeping in view, the peculiar food habits of the people, the quantum of food grains defecit is reduced to 4.42 lakhs tonnes.

Problems of livestock development, labour supply and use of labour saving devices are inter-related. Use of **tractors**, power tillers etc. seems to be limited. Mechanisation has little scope for expansion due to the hilly topography, hesitant attitude of farmers and tribal population.

Inadequate rural linkages is a serious problem affecting distribution of agricultural inputs as well as development of markets. A heavy strain is laid on animals like bullocks especially when kharif marketing and rabi tilling coincide. Road conditions greatly affect prices the farmer pays and receives and, consequently, these affect his incentives to supply more inputs for production. Sustained efforts for improvement of roads would provide high returns in stimulating agricultural production.

Fishery Development

The Sub-region, with its coastline of 70 kms. and a vast resources of inland water bodies, provides good scope for the development of fishery resources. The coastal and inshore waters are known to be very rich in fishing resources specially in mackerels and sardines which yield abundant catches during the fishing season. Prawns constitute an economically important demersal resources.

The prospects of development of inland fisheries in the Sub-region is also quite good considering the vast resources of inland water bodies such as reservoirs, tanks, ponds and rivers (Fig. 12).

Neyyattinkara, Quilandy, Badagara, Mukundapuram,

Vaithiri, Sultan-Battery, Chittur, Palghat, Mannarghat and Ernad are important fishing taluks of the Sub-region. Out of these, Neyyattinkara, Quilandy and Badagara are maritime taluks (Fig.13). In 1979, the fish catch from these three taluks was 32,231 tonnes which accounted for 98% of the total fish catch in the Sub-region. The annual fish production is solely dependent on the appearance of mackerels and sardines in the coastal waters of these taluks; but the appearance of these two are very much erratic. There is huge disparity in fish landings during different periods of the year. The average daily fish landing is far in excess of the actual demand during the period between October to January resulting in steep fall in the retail price of fish in the local markets. During the rest of the year the fish supply being limited, the price of fish tend to rise. Marine fishing is practically closed during the initial two months of the monsoon when the sea is very rough. During this period, the fish supply is mainly from inland catches.

Although inland fish production was negligible (262 tonnes) as compared to the total fish production in the Sub-region, it has certain advantages. They can be exploited at less capital cost than most marine fisheries and because they usually occur in or near well-populated areas, so that distribution and marketing problems are simple. Over and above, inland fishing is much remunerative during monsoon when marine fisheries is particularly closed.

There are 86 mechanised boats engaged in marine fishing in the Sub-region. Mechanisation of fishing crafts is one of the most important steps in the improvement in the fishing industry, as it is directly responsible for the increase in fish production.

KERALA SUB-REGION

FISHERY RESOURCES Rivers and Water Bodies

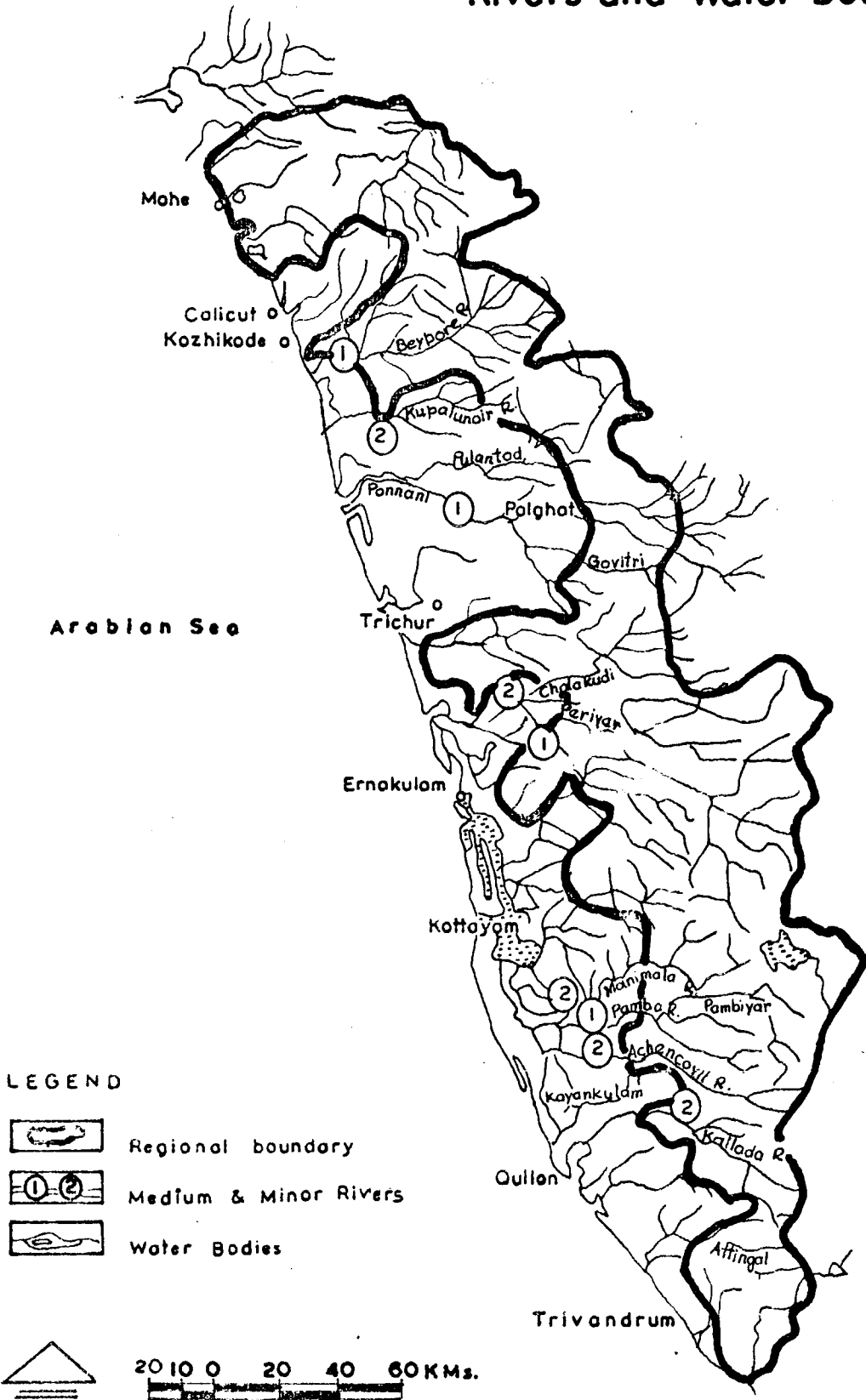
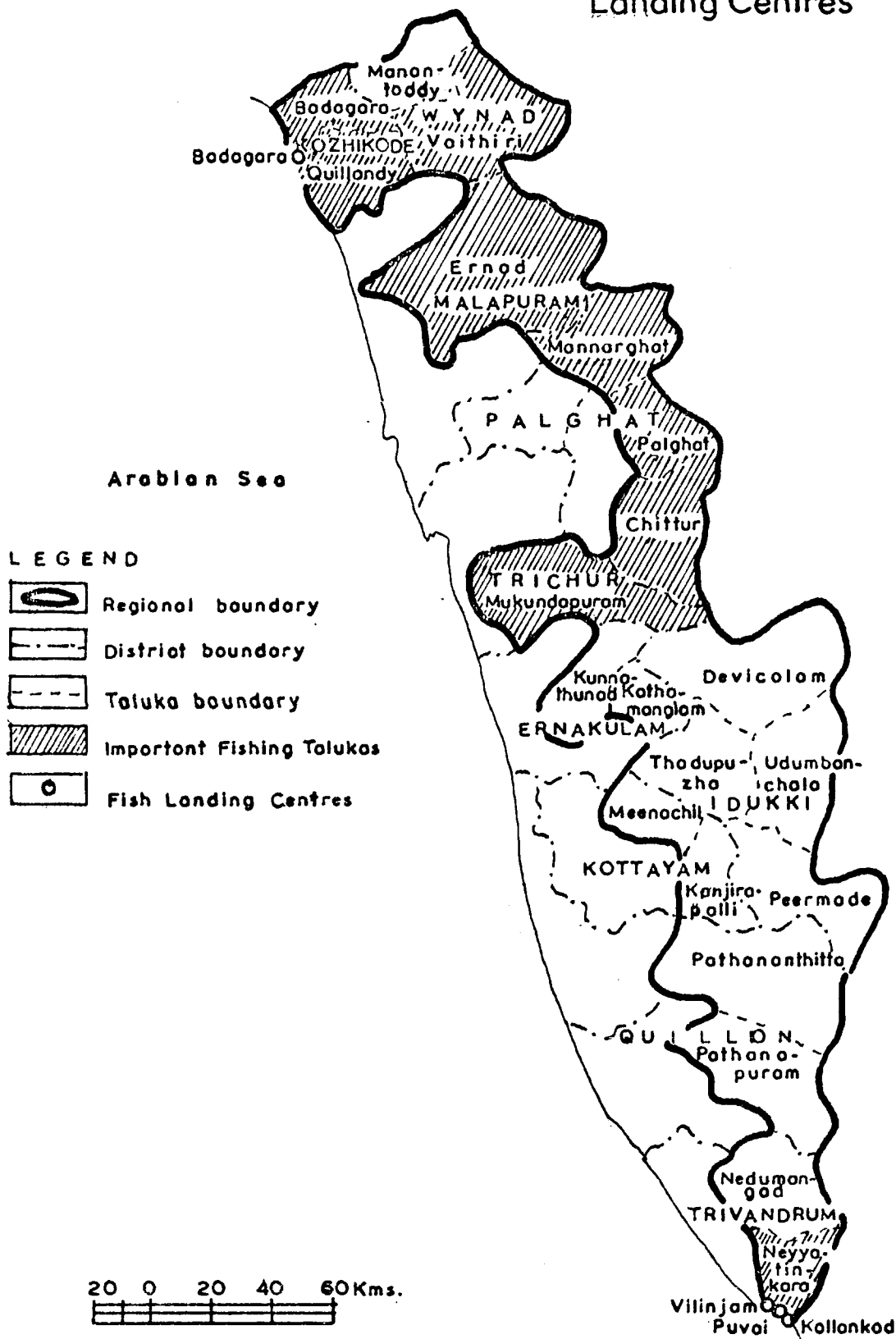


Fig.13

KERALA SUB-REGION

Important Fishing Taluks & Fish Landing Centres



Production of fish can be viewed from two angles, for local demand and for export. Fish finds a very important place in the diet of the local population and with the increase of population, the demand of fish for local consumption will increase accordingly. There is high demand for frozen and canned fish specially prawns in foreign countries. This provides good scope for stepping up the fish catch and their export abroad.

According to the estimate made by the Directorate of Fisheries, the total fishermen population engaged in marine and inland fisheries in 1979 were 94084 and 8150 respectively. Fishermen in the maritime taluks are mostly settled all along the coast and the estuaries of the rivers and are engaged in marine fishing while those in the inland fishing, villagers pursue fishing in the rivers, ponds, tanks, reservoirs, etc. Kollengode, Poovar, Vizhingam and Badagara are important fish landing centres. There are 39 marine and 27 inland fishing villages (Fig.14).

Fishing is a seasonal industry, offering employment for a period of nine months in a year. Owing to this seasonal character, fishermen are compelled to resort to more than one occupation. Fishermen who are actively engaged in catching fish and which form their principal means of livelihood have been classified as "Active fishermen". More than 90% of the total number of active fishermen are engaged in marine fishing. During the peak fishing season which generally lasts for 4 months the fishermen specially the active marine fishermen have little time to engage themselves in any subsidiary occupation. A small section of the community considers fishing as a secondary source of livelihood and

devotes more time to other occupation as cultivation, agricultural labourer etc. Most of them have very small piece of agricultural land of their own. The annual income of the fishermen households from fishing activities generally varies from rupees 500 to rupees 3000, while majority of them have an annual income from fishing activities much below rupees 1000 per annum.

The prosperity of the fishing industry depends to a large extent on the nearness of the market. In the absence of a local market, fishermen find their business unprofitable. The increase in catch alone will not improve the present position of distribution and supply of fish to consumers without adequate facilities for preservation and transport. Non-availability of preservation facility leads to fluctuation in prices and low returns to producers. Besides, anywhere upto 20% of fish caught will lose its prime quality if not will iced, and will lead to lowering of the price.

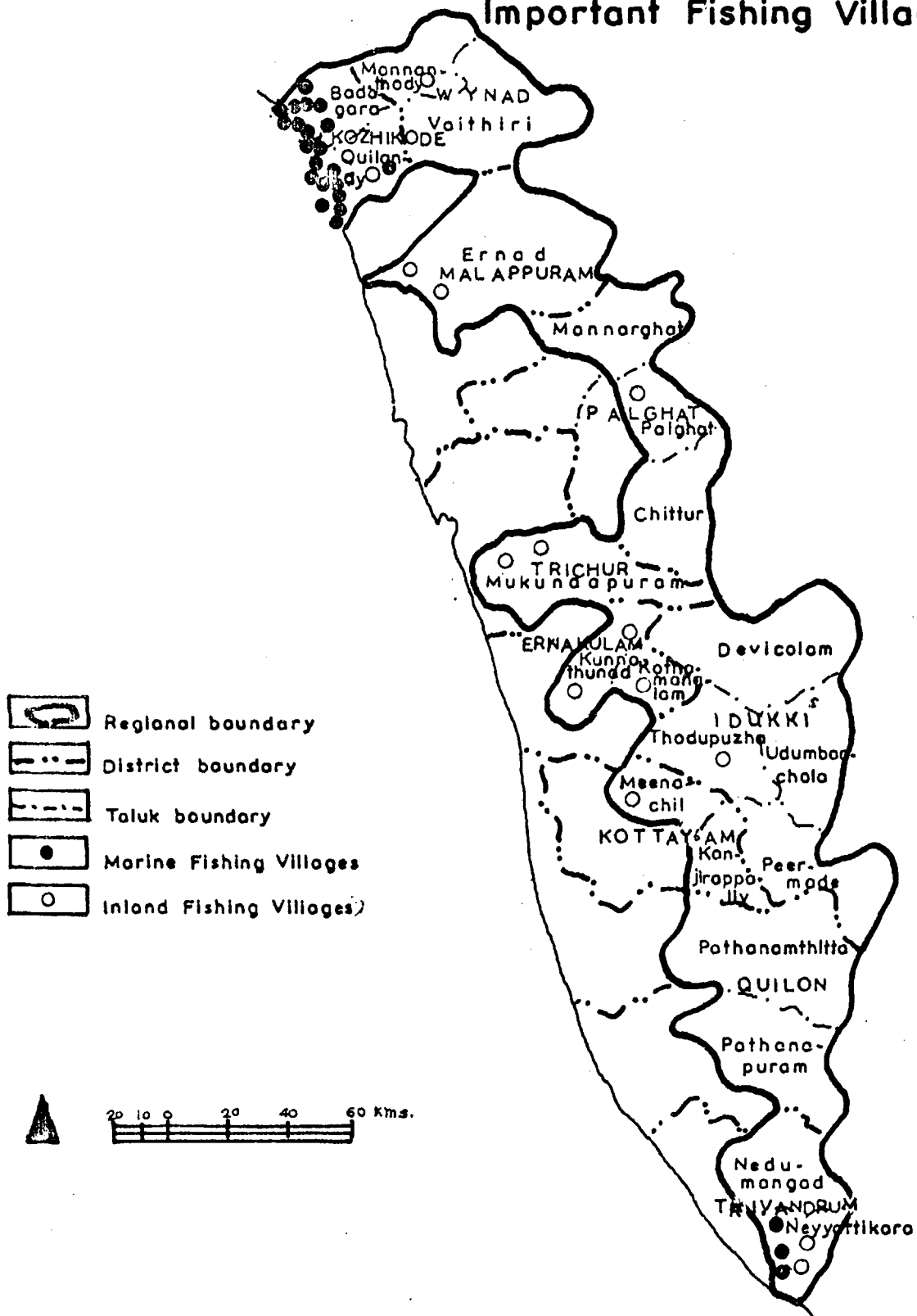
With increase in fish catch it would be desirable to create the necessary infrastructure for handling, processing, preservation, curing, transport and marketing of fish. These facilities have not been adequate. The increase in catch without proper avenue for its disposal will lead to gluts and wastage of fish. Again during the lean period there is dearth of fish. It is, therefore, necessary to process the fish and hold it under frozen conditions for a longer period and distribute it during the lean season.

Mining and Minerals Development

The Sub-region does not have a rich variety of

KERALA SUB-REGION

Important Fishing Villages



minerals, but it contains good deposits of china clay, fire clay, steatite, quartz, mica, limestone, limeshell kankar limestone, iron ore, magnesite, graphite etc., some of which provide scope for the development of mineral based industries (Fig.15).

China clay, a raw material for ceramic, refractory, fertiliser, paper and a host of other industries is found in the taluks of Mananthavadi(North Wynad), and Kunnathunad. Total deposits as estimated by the State Directorate of Mining and Geology, in these taluks have been placed at 11.70 lakh tonnes.

Fire clay, a raw material for refractory, ceramic and foundry industries, has been reported from Mukundapuram, Kunnathunad and Meenachil taluks. The reserve as estimated by the State Directorate of Mining and Geology is of the order of 15.20 lakh tonnes.

Graphite is used in the manufacture of refractory crucible and retorts for metallurgical operation, foundry facings, protective paints, lead pencils and as moderators in certain atomic reactors. Important deposits of graphite are reported from the taluks of Thodupuzha, Kanjirapally, Pathanamthitta, Pathanapuram, Neyyattinkara, Udumbanchola and Peermade. The total estimated reserves of graphite have been put at about 3.71 lakh tonnes, of which 3.65 lakh tonnes are in Thodupuzha taluk alone.

Quartz, which is used in ceramics, pottery, glass, refractory and abrasives industries, is reported from Mananthavadi, Vaithiri and Pathanamthitta taluks of the Sub-region. Total reserves as estimated by the

State Department of Mining and Geology, has been placed at 7.80 lakh tonnes.

Steatite or talc which in pulverised form is used in various industries like rubber, textiles, plastic, paper, cosmetics, etc., occurs in Mananthavadi, Vaithiri and Mannarghat taluks of the Sub-region. In Mananthavadi taluk, a reserve of 1.20 lakh tonnes has been estimated. In Mannarghat the extent and nature of reserves are under investigation.

Iron ore deposits have been reported from Errad and Kunnathunad taluks. Of these, the deposits at Errad which are estimated at 69 lakh tonnes are rich and extensive, whereas the deposits at Kunnathunad are very small and of no significance.

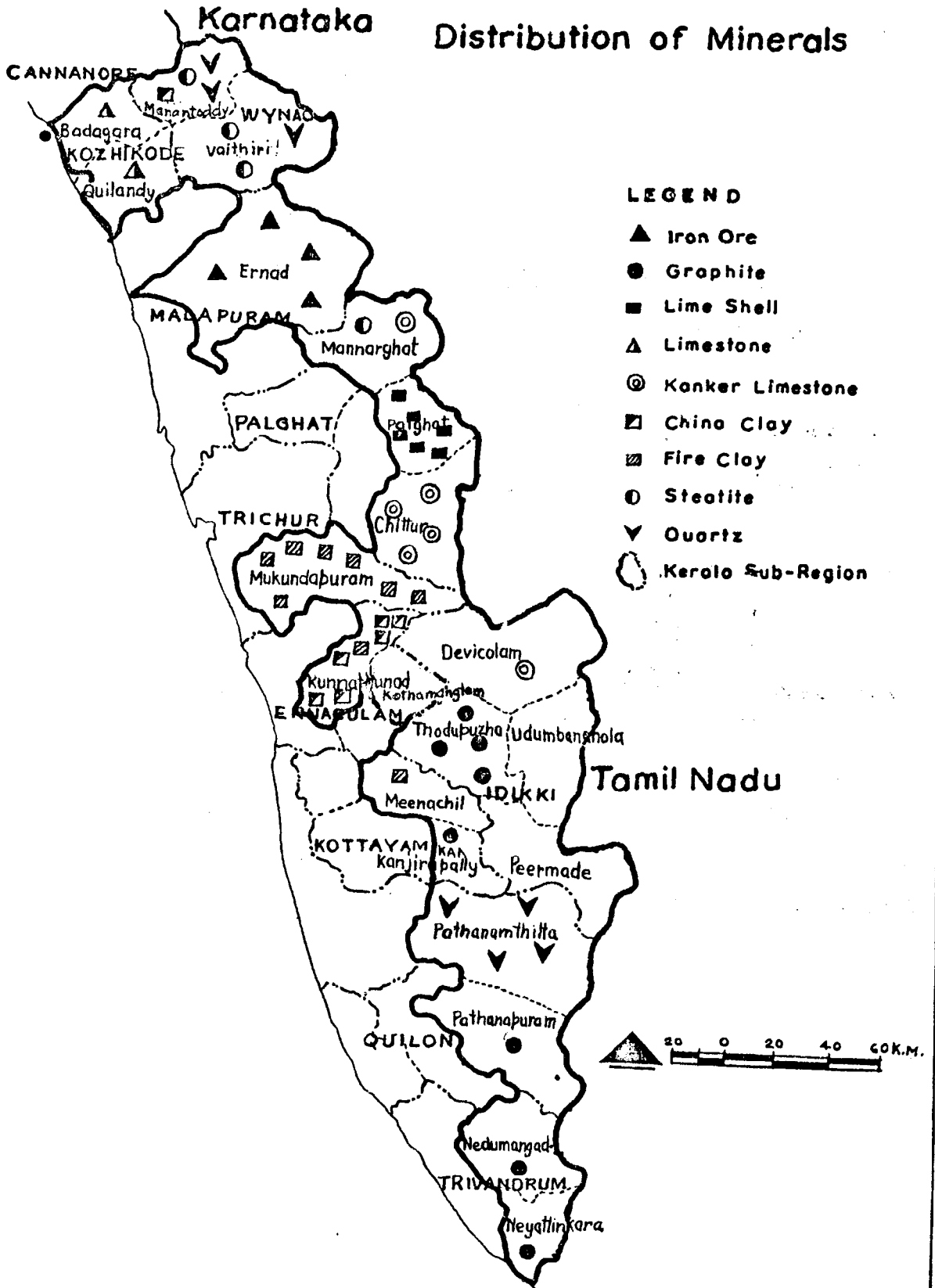
Limestone, a raw material for the manufacture of cement, steel and chemicals has been reported from the Palghat taluk of the Sub-region. According to investigations made by the Geological Survey of India and the Mineral Exploration Corporation Ltd., the deposit has been estimated to be about 230 lakh tonnes. Adequate tonnage of good quality limestone is available for supporting a cement plant of 1000 tonnes per day capacity.

Kankar limestone has been reported from Mannarghat, Chittur and Devicolam taluks with an estimated reserve of 40 lakh tonnes whereas limeshell which is used in the manufacture of cement, sand limebrick and calcium carbide is found in Quilandy and Badagara taluks. The reserves are estimated at about 0.10 lakh tonnes.

Magnesite, an important basic material for

KERALA SUB-REGION

Distribution of Minerals



refractories is reported from Mulhe area of Mannarghat taluk. The extent and nature of the occurrences are under detailed investigation.

Water Resources

The Ghats of Kerala receive heavy precipitation from the South-West and North-East monsoons during June to November. The fast falling terrains facilitate formation of many a swift rivers. The Sub-region contains twenty (out of 44) river basins of which three are of the east flowing rivers.

The utilisable runoff of the rivers in the Sub-region is assessed at about 26000 m cum and the intensity of run-off varies from 0.46 metre in the Neyyar basin to 2.21 metre in the Kabbini. The relevant features of the basins of the Sub-region are as in Table-7 and Fig.16.

The Sub-region covering 56 percent of the geographical area of the State, contributes 82 percent of annual yield and 61 percent of the utilisable yield of the State. Groundwater potentials being negligible, the utilisable water potentials of the Sub-region may be taken only that of surface water which equals to 26000 M. cum.

The major water user groups are the agricultural, industrial and domestic sectors.

Agriculture uses water through various irrigation means - major and medium, and the minor schemes including lift irrigation, wells etc.

There are 9 existing large irrigation schemes

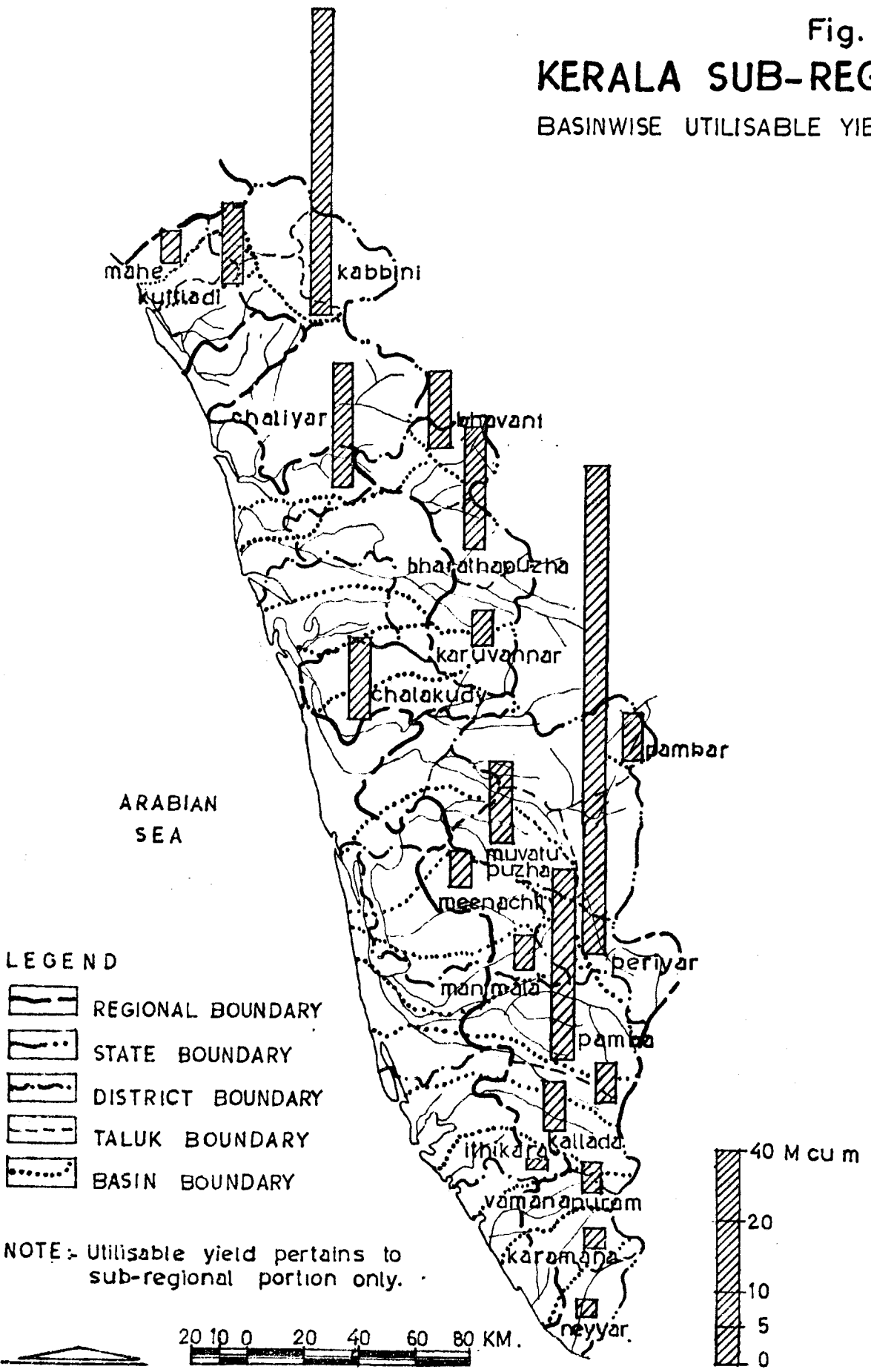
Table - 7 : Salient Features of the Basins in the Sub-region.

River Basin	'Catchment 'within the 'Sub-region	'Utilisable' 'run-off in' 'the Sub- 'region	Taluks in the basin
1. Mahe	229	259	Badagara, Mananthavadi
2. Kuttiadi	583	1015	Badagara, Quilandy
3. Great Chaliyar	2832	1693	Ernad, Mannarghat, Quilandy
4. Bharathapuzha	2174	1655	Mannarghat, Palghat, Chittur
5. Karuvannar	480	438	Palghat, Chittur
6. Chalakudy	1057	1158	Chittur, Mundakkayam Kunnathunad
7. Periyar	4507	6866	Kunnathunad, Kotha- mangalam, Devicolam, Udumbanchola, Peer- made, Thodupuzha
8. Muvattupuzha	1240	1121	Kunnathunad, Kotha- mangalam, Thodupuzha
9. Meenachil	598	522	Meenachil, Thodupuzha
10. Manimala	328	429	Peermade, Kanjirapally
11. Pamba	1825	2583	Pathanamthitta
12. Achencoil	604	508	Pathanamthitta, Pathanapuram
13. Kallada	993	708	Pathanapuram
14. Ithikara	167	111	Pathanapuram
15. Vamanapuram	437	448	Pathanapuram, Needumangad
16. Karamana	442	290	Needumangad, Neyyattinkara
17. Neyyar	497	229	Neyyattinkara
18. Kabbini	1920	4238	Mananthavadi, Sultan Battery
19. Bhavani	562	1019	Mannarghat
20. Pambar	384	708	Devicolam
Total	21859	25998	

Fig.16

KERALA SUB-REGION

BASINWISE UTILISABLE YIELD



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with a total net ayacut of about 57400 hectares. Nine more schemes are under construction to irrigate a net ayacut of 54000 hectares. Twenty five schemes are being contemplated to provide irrigation to over 1.77 lakh net hectares. The irrigation is atleast upto the second crop. Thus, the ultimate irrigation by the known large schemes will be in the order of 2.88 lakh net hectares by 1991 or so. The existing (1974-75) minor irrigation schemes irrigate a net 34400 hectares and, the proposed minor schemes will add another 9150 hectares.

Talukwise position of irrigation on the completion of all the known schemes will be as in Table - 8 (Fig.17): Ultimately, thus, all the known schemes will accrue a total benefit of 3.32 net lakh hectares to the Sub-region. During 1974-75, 91800 hectares of cultivated land was under irrigation. The schemes under construction and contemplation will bring 2.4 lakh hectares more under irrigation.

On completion of all these schemes, Ernad taluk will be the largest beneficiary with a 78,400 hectares to be brought under irrigation followed by Mannarghat, with 35,700 hectares and Chittur with 35,400 hectares. The least benefited will be the Kanjirapally taluk (19 hectares) followed by Udumbanchola (55) and Peermade (60). Only seven taluks will have more than 20,000 hectares under irrigation.

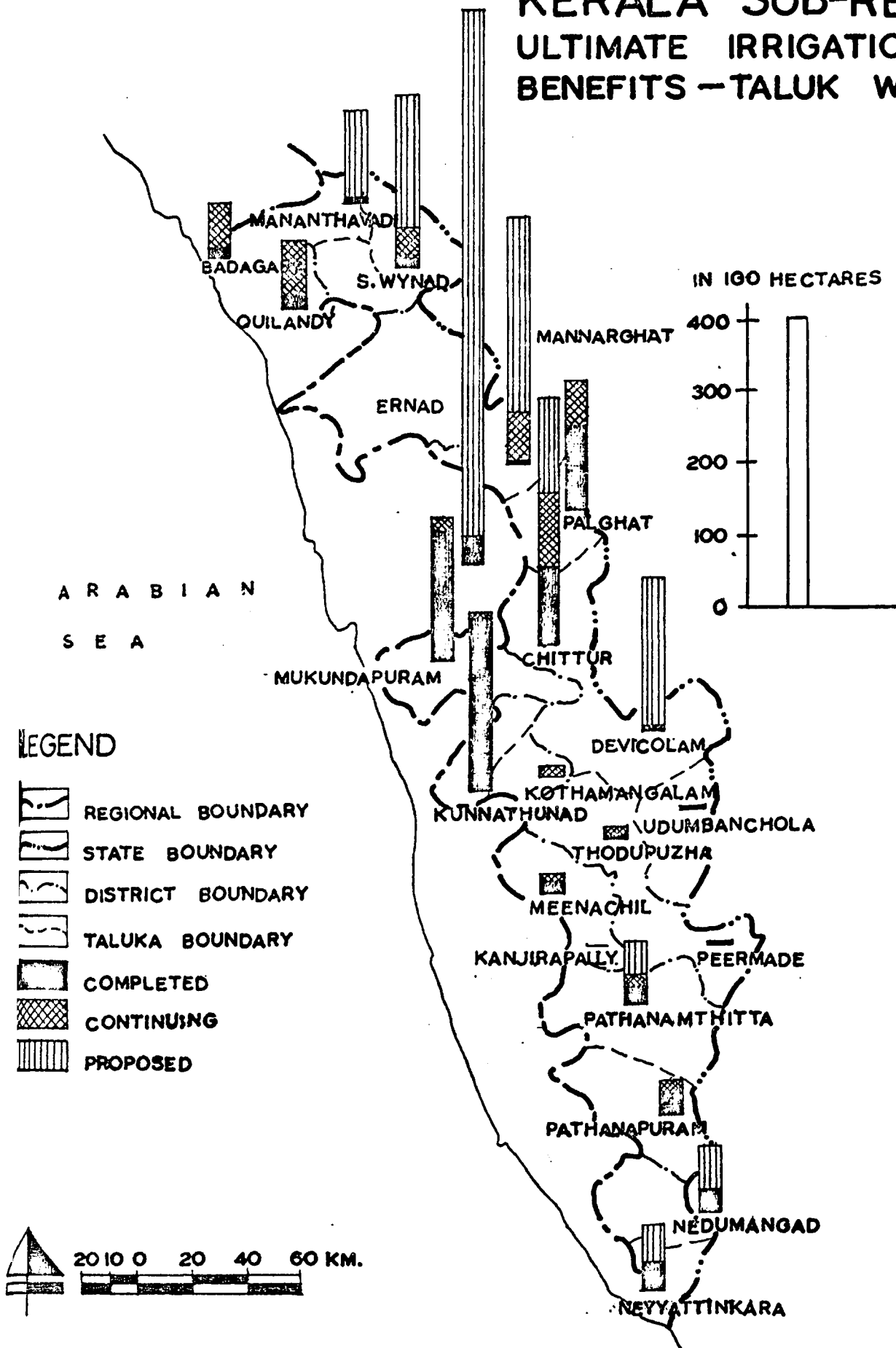
The irrigated area in the Sub-region accounts for 10.3 percent of the net sown area in 1974-75. Irrigation varies from 0.08 percent in Kanjirapally to 38.4 percent in Mukundapuram taluk. The main source of irrigation is canal, irrigating 82 percent of the net irri-

Table - 8 : Ultimate Benefits by Known Irrigation Means (1974-75).

Taluk	(Unit Hectares)				Total	
	'Completed		'Continuing			
	'Large	'Minor	'Large	'Minor		
1. Mananthavadi	-	983	-	7900	4403	13286
2. South Wynad	-	1210	4650	18990	-	24850
3. Quilandy	-	2095	8213	-	-	10308
4. Badagara	-	1665	6940	-	-	8605
5. Ernad	-	3133	-	74358	950	78441
6. Mannarghat	-	747	7280	25040	2656	35723
7. Palghat	11996	238	6486	-	-	18720
8. Chittur	10266	731	10287	14085	-	35369
9. Mukundapuram	13878	4182	2000	-	-	20060
10. Kunnathunad	19330	4829	900	-	-	25059
11. Kothamanglam	-	-	2000	-	-	2000
12. Meenachil	-	1892	965	-	-	2857
13. Kanjirapally	-	19	-	-	-	19
14. Devicolam	-	900	-	20200	1137	22237
15. Udumbanchola	-	55	-	-	-	55
16. Thodupuzha	-	835	1320	-	-	2155
17. Peermade	-	60	-	-	-	60
18. Pathanamthitta	-	2580	1738	5000	-	9318
19. Pathanapuram	-	2790	1345	-	-	4135
20. Needumangad	810	2464	-	6000	-	9274
21. Neyyattinkara	1093	3006	-	5300	-	9399
Total	57373	34414	54124	176873	9146	331930

Note: No continuing minor scheme is reported.

KERALA SUB-REGION ULTIMATE IRRIGATION BENEFITS - TALUK WISE



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TOWN & COUNTRY PLANNING ORGN. MINISTRY OF W & H GOVT. OF INDIA.

gated area. Bunds and tanks together irrigate 13 percent and the lift irrigation measures 5 percent.

At a rate of 275 cm. depth of water for two crops, the quantity of water utilised for irrigation in 1974-75 works out to 4445 M.cum. All the known schemes of large and minor categories will ultimately utilise about 12570 M.cum. by say 1991.

On the basis of norm of 160 litres per capita a day for drinking and sanitation purposes, water utilisation for the projected population of 74.3 lakhs in 1974-75 is estimated at 434 M.cum, and will go up to 617 M. cum for an extrapolated 105.7 lakhs population in 1991.

The industrial scene is dominated by agro-based industries, and water intensive industries are rare in the Sub-region. The water utilisation in 1974-75 is estimated at 90 M.cum and about 250 M.cum. for 1991.

Including a 5 percent allowance for miscellaneous uses, the total water utilised in 1974-75 is worked out at 5214 M.cum which is estimated to reach a figure of 14110 M.cum. by 1991, thus, accounting for only 54 percent of the utilisable runoff of 26000 M.cum. in the Sub-region.

The Sub-regional areas do not suffer the fury of floods but it is no matter for complacency, for it is these steepy terrains that render the precipitation to roll down in flashy streams to cause floods in the low lands. For the maladies of floods in the low lands, the remedies lie in the highland ghats for the flows are to be moderated in their catchments.

Rational, optimal and wise use of water and soil largely constitutes the gamut of watershed management. This assumes importance where development and conservation compete with each other. All growth is not development and vice versa.

Flood control measures, afforestation, exploitation of underground resources, establishment of plants, factories, provision of socio-economic overheads, agricultural development - all should be thought of over a long perspective in an integrated and comprehensive manner to strike a balance between development and conservation so that living is not at the cost of quality of life.

The normal soil conservation measures are contour bunding, terracing, construction of check dams and silt traps, training of water courses and protection of reservoirs.

Power Development

Electric power is one of the basic developmental overhead in the present day economy. The generation and supply of power in the State is being done by the Kerala State Electricity Board. The State is endowed with only hydel power potentials, and incidentally all the potential sites lie within the Sub-region. The ultimate firm power that could be generated from all the known possible sites of water power potentials is estimated at 2600 MW at 60 percent load factor with an installed capacity of 3600 MW.

Presently, there are nine hydro-electric projects in operation generating 850 MW (at 60% LF) with an installed capacity of 1010 MW. Five of these schemes lie

in the Periyar basin, two in the Chalakudy basin and one each in the Kuttiadi and Pamba basin.

The per capita consumption of electricity in the Sub-region is 44 KWh (1974-75) as against 94 units in the State. Only the taluks of Mukundapuram, Kunnathunad, Thodupuzha and Pathanamthitta have registered more than the State's average per capita power consumption whereas in as many as 12 taluks, it is less than 25 units.

Industrial sector is the major user consuming 156 MKWh of electric energy accounting for 53 percent of the total consumption of 294 MKWh in the Sub-region during 1975-76. In eight taluks, the industry is the leading sector using more than 50 percent of the power consumption in the respective taluks. Domestic sector is the largest user of power in four taluks, namely, Kanjirapally, Quilandy, Pathanamthitta and Badagara.

The increase in power consumption has been about 97 percent in the Sub-region as against 31 percent in the State as a whole during 1970-71 to 1975-76. This means an annual compound rate of increase is 14.5 percent for the Sub-region as against 5.5 percent for the State. Agricultural sector registers the highest annual increase of 31 percent followed by public works whereas that of industrial use is only 8 percent in the Sub-region during the five years ending 75-76 led by Thodupuzha.

Among the taluks, only 9 have growth rates of power consumption above the Sub-regional average of 14.5 percent. Less than 5 percent growth rate is registered in Peermade and Kunnathunad.

On the rural electrification front, out of 425 inhabited villages, 396 were electrified by March 1975, and 14900 irrigation pumpsets have been energised upto the end of 1975-76. All but the taluks of Mananthavadi, South Wynad, Quilandy, Badagara, Ernad, Kothamangalam, Mannarghat, Devicolam and Udumbanchola have their entire villages electrified (upto March 1976).

Load demand for the Sub-region is forecast to increase from about 55 MW in 1974-75 to 350 MW by 1991. This rather higher growth rate of power demand compared to the State is in view of the fact that conscious efforts are now afoot to develop the vast potentials of the highlands and improve the standard of living of the local people.

There is plenty of potentials still untapped in the State and even presently, there is no dearth of power. The only problem, especially in the Ghats is the installation the power carriers over the long dead and rugged distances at a huge investment to reach comparatively a fewer points of consumption, but there is no escape.

The State Government have contemplated nearly 30 new hydro-electric projects to generate about 2200 MW (at 60% LF) and some of them are multi purpose scheme.

Industrial Development

Because of diversified topography, poor infrastructure facilities, and lack of industrial raw materials like minerals, the development of industries in the Sub-region on the whole, has been comparatively poor.

In 1974, it has 1706 industrial units in the organised sector of industry, employing 16310 persons, and 12,122 units in the unorganised sector, employing 27538 persons. The total investment in the organised sector of industry in 1974, was 12.29 crores while the value of production was Rs.38.92 crores. During the period 1971-74, there has been considerable progress in the development of industry in the Sub-region. The industrial units in the Sub-region have increased from 990 in 1971 to 1706 in 1974 and employment from 11413 persons in 1971 to 16310 persons in 1974, registering a growth of 72.3% and 41.6% respectively. The increase in investment was from Rs.10.50 crores in 1971 to Rs.12.29 crores in 1974 and in the value of production from Rs.26.81 crores in 1971 to Rs.38.92 crores in 1974, thus registering growth of about 17% and 47% respectively. Despite, this overall progress in the industrial sector, the growth has not been adequate enough to provide relief for the people in the over-crowded agricultural sector.

The distribution of industrial activity in the Sub-region has been very much uneven. Industries have agglomerated in four taluks of the Sub-region namely Palghat, Chittur, Mannarghat and Mukundapuram. These four taluks taken together have accounted for more than 78% of the total number of units, 75% of the total employment, 86% of total investment and 82% of the total industrial production of the Sub-region. Those taluks which were better in 1971 have improved their position, in 1974 while those taluks which were lagging behind are still continuing the same trends. Figures 18 and 19 show the concentration of industries in the Sub-region and Figure 20 shows the distribution of industries in some important taluks.

The existing structure of organised industries in the Sub-region is very much the outcome of the type of raw materials found in the area. Agro-based industries constituted the single largest category of industry in the Sub-region with largest number of industrial units (60%), largest number of industrial workers (47%) and production (80%). Among the agro-based industries also, the development has been confined mainly to rice mills, which accounted for 78% of the total number of units, 42% of the total workers in the agro-based group of industries.

Forest based industries occupied the second position with 19% of the total industrial units, 22% of the total employment, and 8.7% of the total industrial investments in the Sub-region.

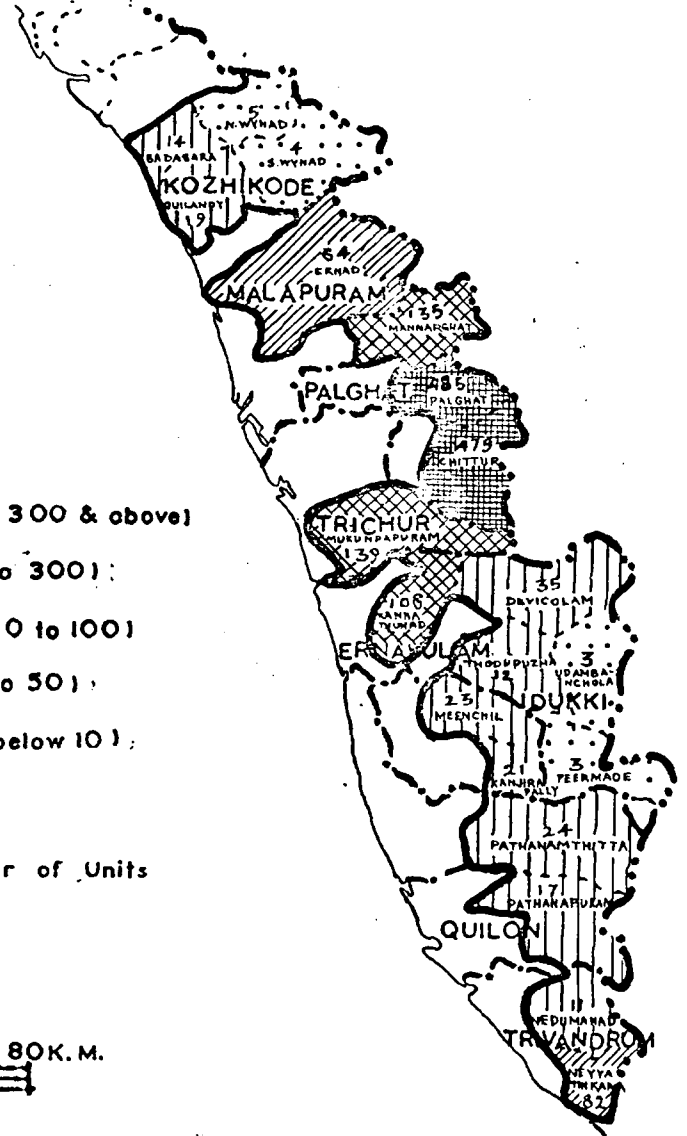
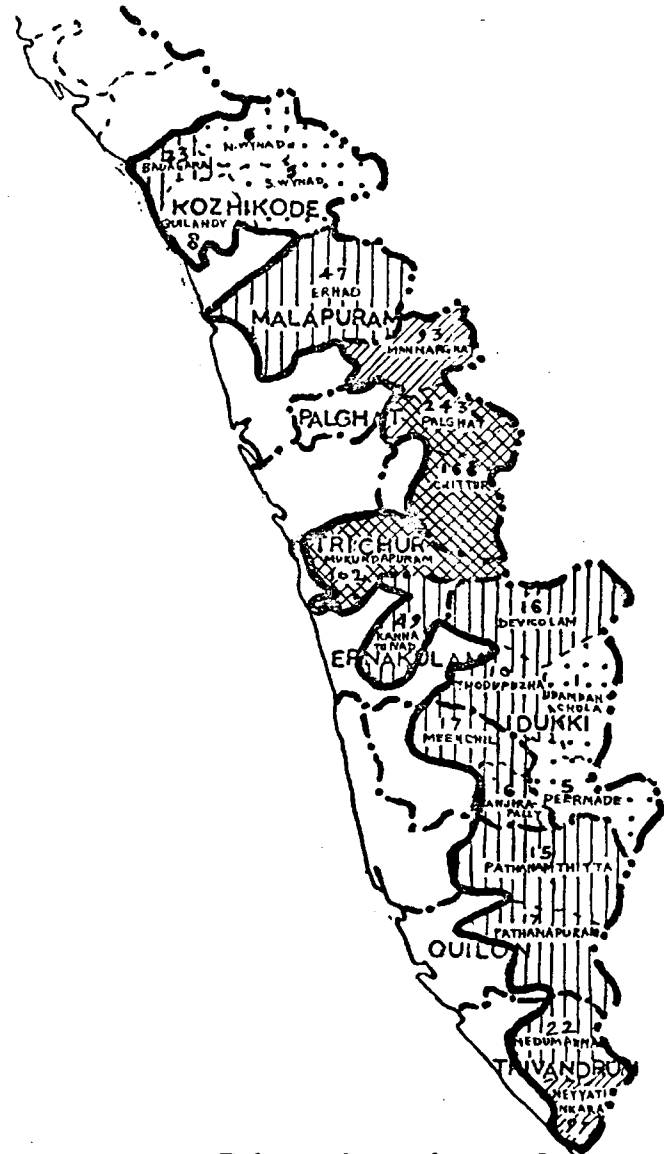
Barring few units manufacturing lime, bricks and tiles, the Sub-region is devoid of mineral based industries. This is because of the absence of industrial fuel like coal and development of metallic minerals. Fish-based and livestock-based industries occupied a very insignificant position (Figs. 21 & 22).

In 1974, there were 274 non-resource based industries in the Sub-region employing 3,079 persons. The growth of non-resource based industries has been mainly confined to the engineering industries which accounted for 85% of the total number of units and 60% of the total employment in this group of industries. Though the non-resource based industries are widely dispersed, it is much more marked in the taluks of Palghat, Chittur, Mukundapuram, Kunnathunad and Neyyattinkara.










STUDY OF INDUSTRIAL DEVELOPMENT : Kerala Sub-Region

Concentration of Industries (Units-1971)

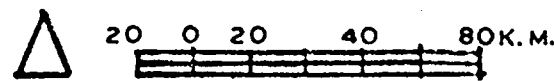
Concentration of Industries (Units 1974)



LEGEND

-  Regional boundary
-  State boundary
-  District boundary
-  Taluk boundary
-  Very high concentration (300 & above)
-  High concentration (100 to 300)
-  Medium concentration (50 to 100)
-  Low concentration (10 to 50)
-  Very low concentration (below 10)

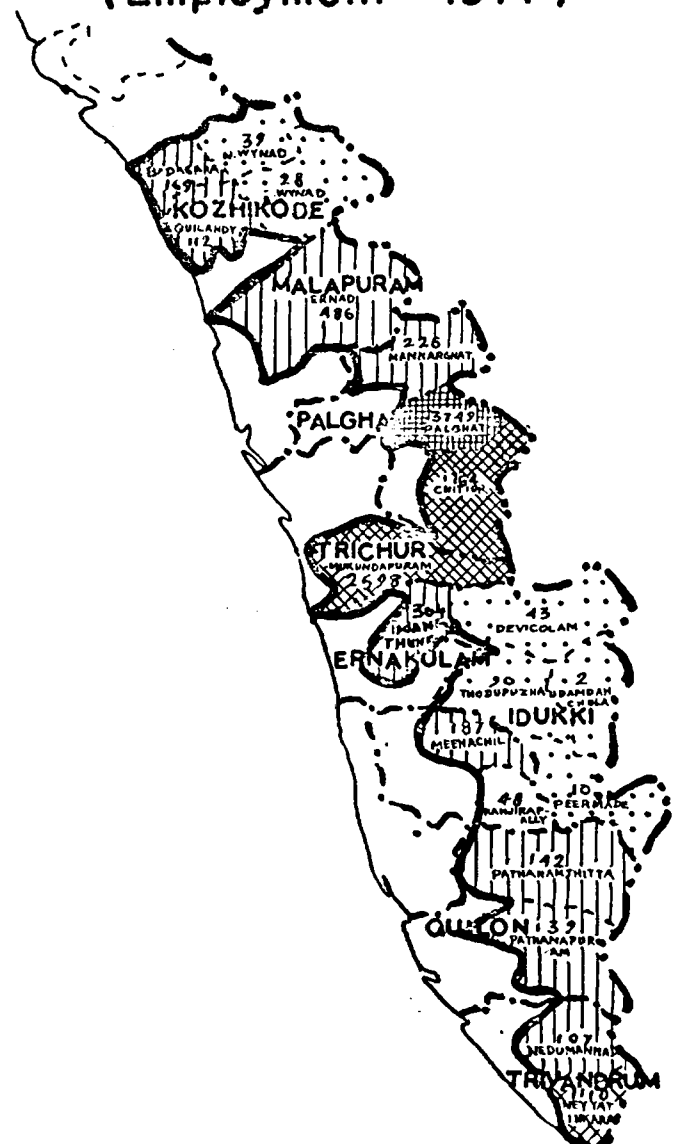
N. B: Figures indicate Number of Units



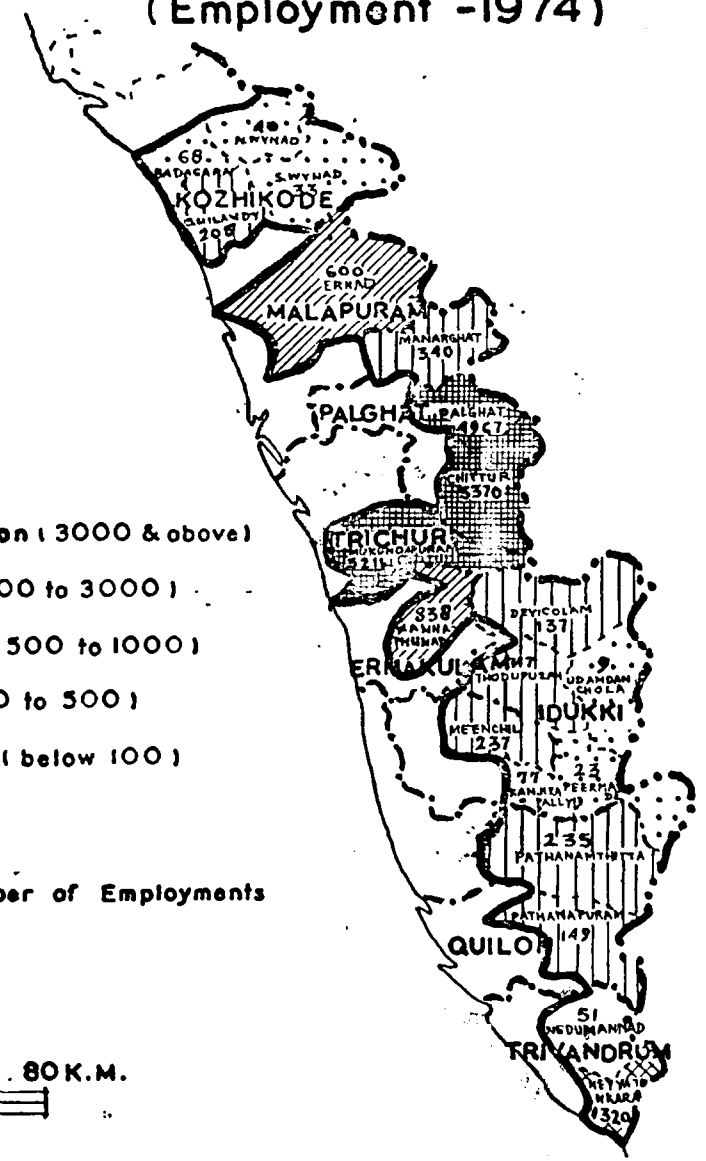
SURVEY & PLAN FOR WESTERN GHATS

STUDY OF INDUSTRIAL DEVELOPMENT: Kerala Sub-Region










Concentration of Industries (Employment - 1971)



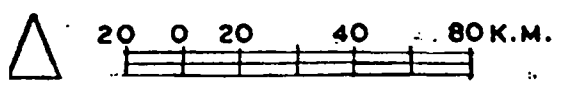
Concentration of Industries (Employment - 1974)



LEGEND

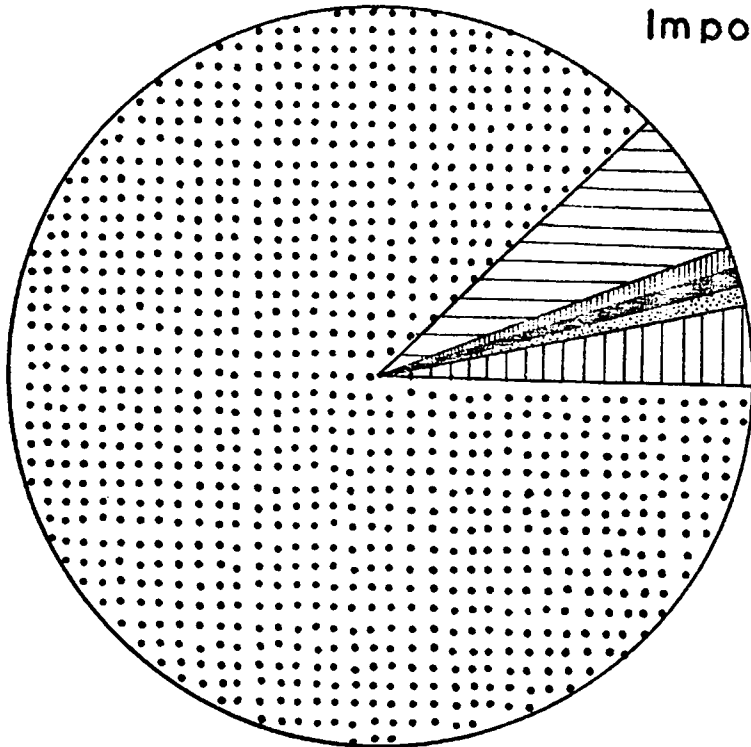
-  Regional boundary
-  State boundary
-  District boundary
-  Toluk boundary
-  Very high concentration (3000 & above)
-  High concentration (1000 to 3000)
-  Medium concentration (500 to 1000)
-  Low concentration (100 to 500)
-  Very low concentration (below 100)

N.B: Figures Indicate Number of Employments

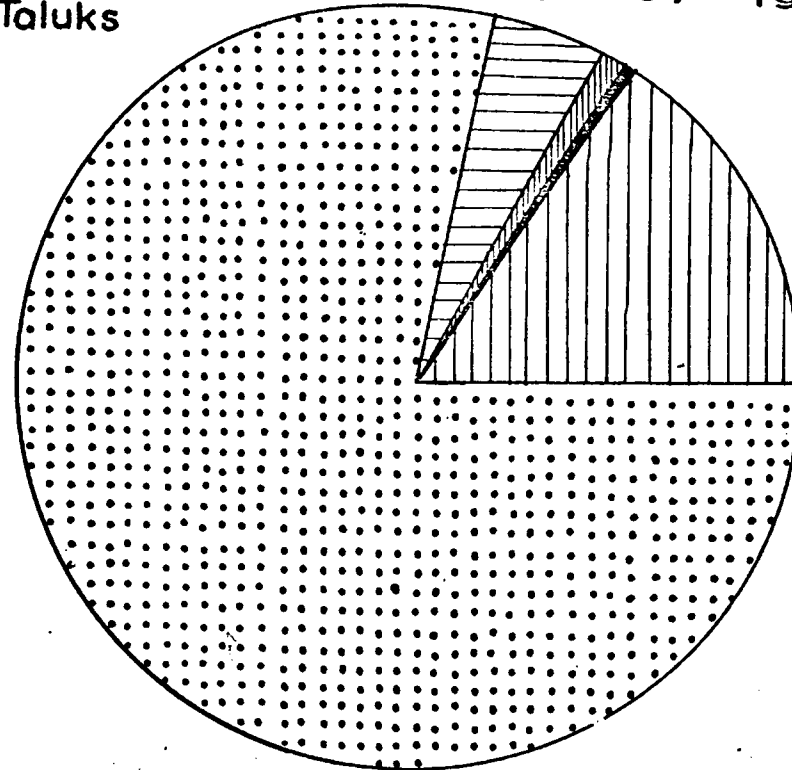


SURVEY & PLAN FOR WESTERN GHATS

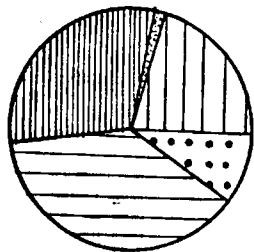
KERALA SUB-REGION ; INDUSTRIAL UNITS (Categorywise) — 1974
Important Taluks



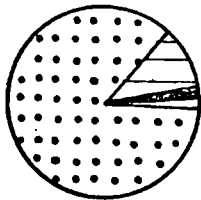
Chittur



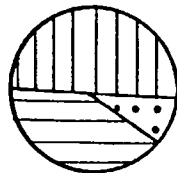
Palghat



Ikkandapuram









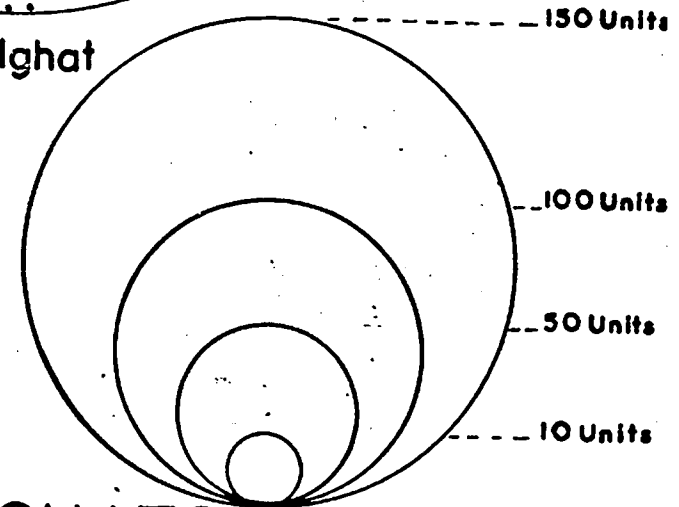
Mannarghat



Kunnathunad

LEGEND

-  Agro Based
-  Forest Based
-  Mineral Based
-  Limestone Based
-  Fish Based
-  Non Resource Based



SURVEY & PLAN FOR WESTERN GHATS

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Fig. 21

STUDY OF INDUSTRIAL DEVELOPMENT: KERALA SUB-REGION — Type of Industries(Units)1974

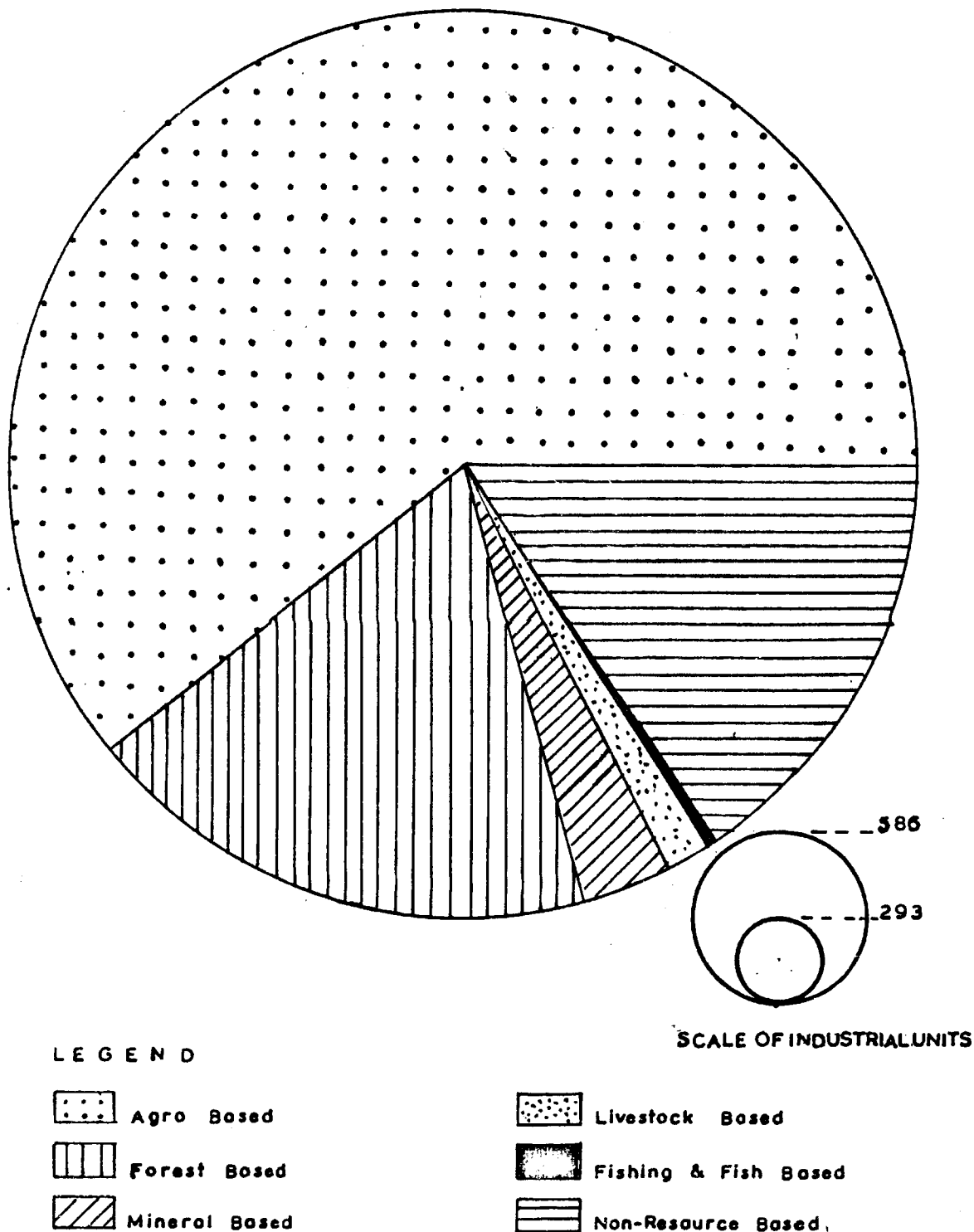
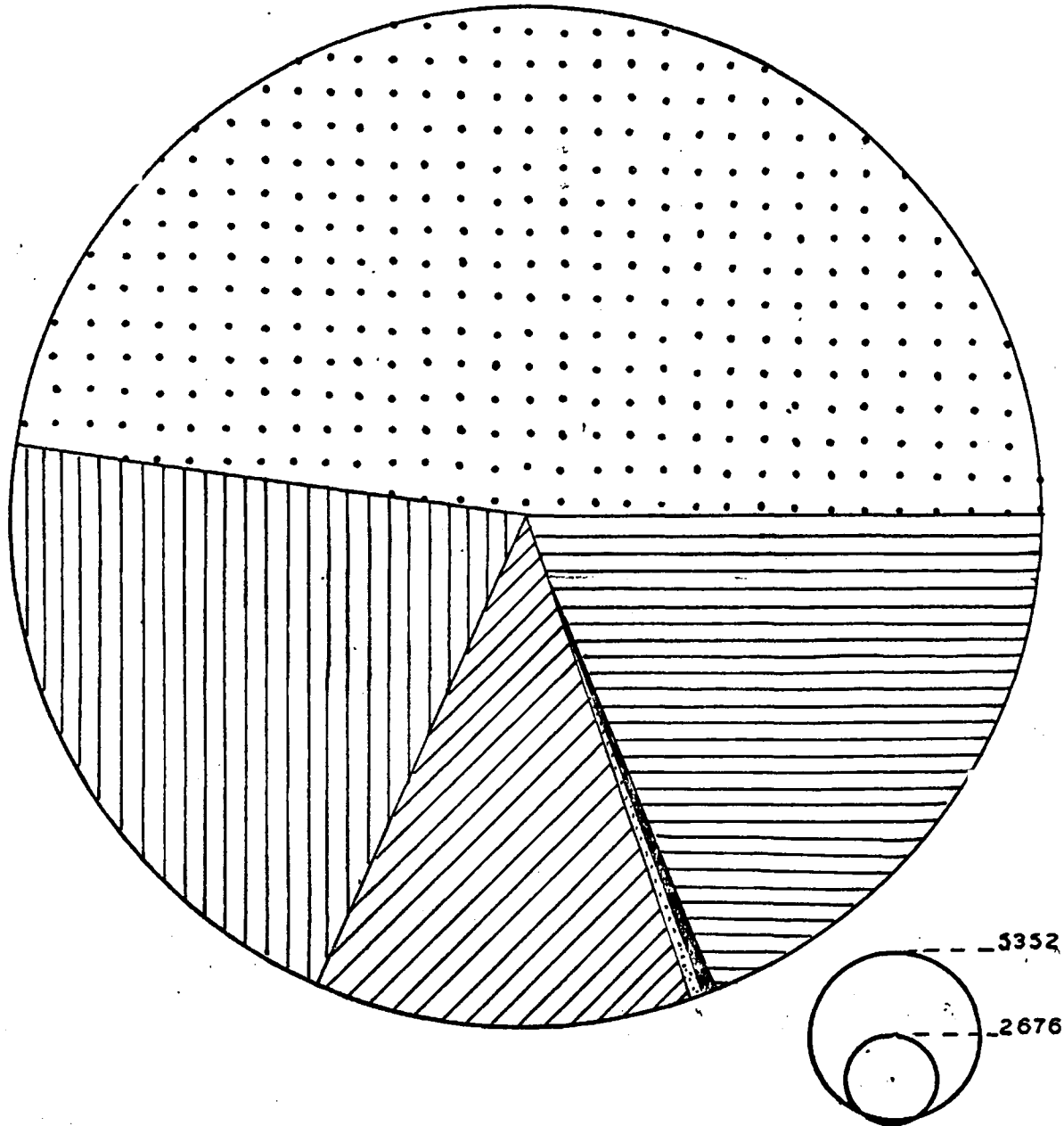


Fig. 22

STUDY OF INDUSTRIAL DEVELOPMENT KERALA SUB-REGION - Type of Industries (Employment) 1974



LEGEND

- Agro Based
- Forest Based
- Mineral Based

SCALE OF INDUSTRIAL EMPLOYMENT

- Livestock Based
- Fishing & Fish Based
- Non-Resource Based

The Sub-region had in 1974 a total number of 12122 units of village and small industries. These consisted of 11041 handloom industries, 1007 handicrafts, 61 village industries and 13 khadi industries. Thus handloom industries are found to be the dominating sector constituting more than 91% of the total village and small industries in the Sub-region. Handicrafts come next to the handloom industry. These village and small industries provided employment to 26315 persons on full time basis and another 1223 persons were employed on part time basis. Neyyattinkara with 3529 units accounted for more than one-third of the total number of units in the Sub-region. The maximum concentration of small scale industries in Neyyattinkara is because of the preponderance of handloom industry in this taluk.

The major findings that emerge from the above analysis are: that industrially the Sub-region on the whole, is less developed. There are serious intra-regional imbalances in industrial development, and also there are large inter-industry and intra-industry imbalances.

Tourism Development

Endowed with evergreen dense forests, rich fauna and flora, innumerable rivers and streams, a salubrious and enchanting climate and, bounded on the west by the lovely beaches and sandy coasts and on the east by a mountainous amphitheatre, the Kerala Sub-region which is aptly called, the 'Kashmir of the South' is a paradise to the tourists, in general, and to the nature lovers in particular.

The Sub-region possesses a variety of interest=

ing places of tourist attraction such as beaches (Kovalam), wildlife sanctuaries (at Wynad, Periyar, Parambikulam, etc.), hill stations and health resorts (Ponmudi, Munnar), dams and reservoirs (Idukki, Malampuzha, Neyyar, etc.), historical monuments, ruined forts, (at Panamaram, Balusery, Sultan Battery etc.), pilgrim centres (scattered all over the Sub-region) (Table-9).

The volume of tourist traffic provides a definite indicator of the popularity of a tourist spot. Unfortunately, information regarding flow of tourists, their needs and requirements, duration of stay etc. is not available. However, an attempt has been made to work out a schematic flow of tourists, in an appropriate manner, to the important urban centres taking into consideration the various modes of transport in and around the Sub-region (Figs. 23 & 24).

The major constraints related to tourism development stem from an inadequate information base, as mentioned above. This is mainly due to the absence of an agency that could record and provide systematic information pertaining to various aspects of the tourism industry. As such, it becomes difficult to assess the deficiencies and requirements. Easy accessibility, efficient transport system, adequate infrastructural facilities and amenities, to suit the tastes and comforts of various categories of tourists, are the prerequisites, for successful tourism development. Ruggedness of the ghats terrain, however, provides major constraints for the development of transport. It is necessary to link major tourist spots efficiently within and outside the Sub-region and also to develop accommodation and other tourist facilities to meet the demands of the expected growth of tourist traffic in future.

KERALA SUB-REGION

Places of Tourist Importance In Sub-Region and around

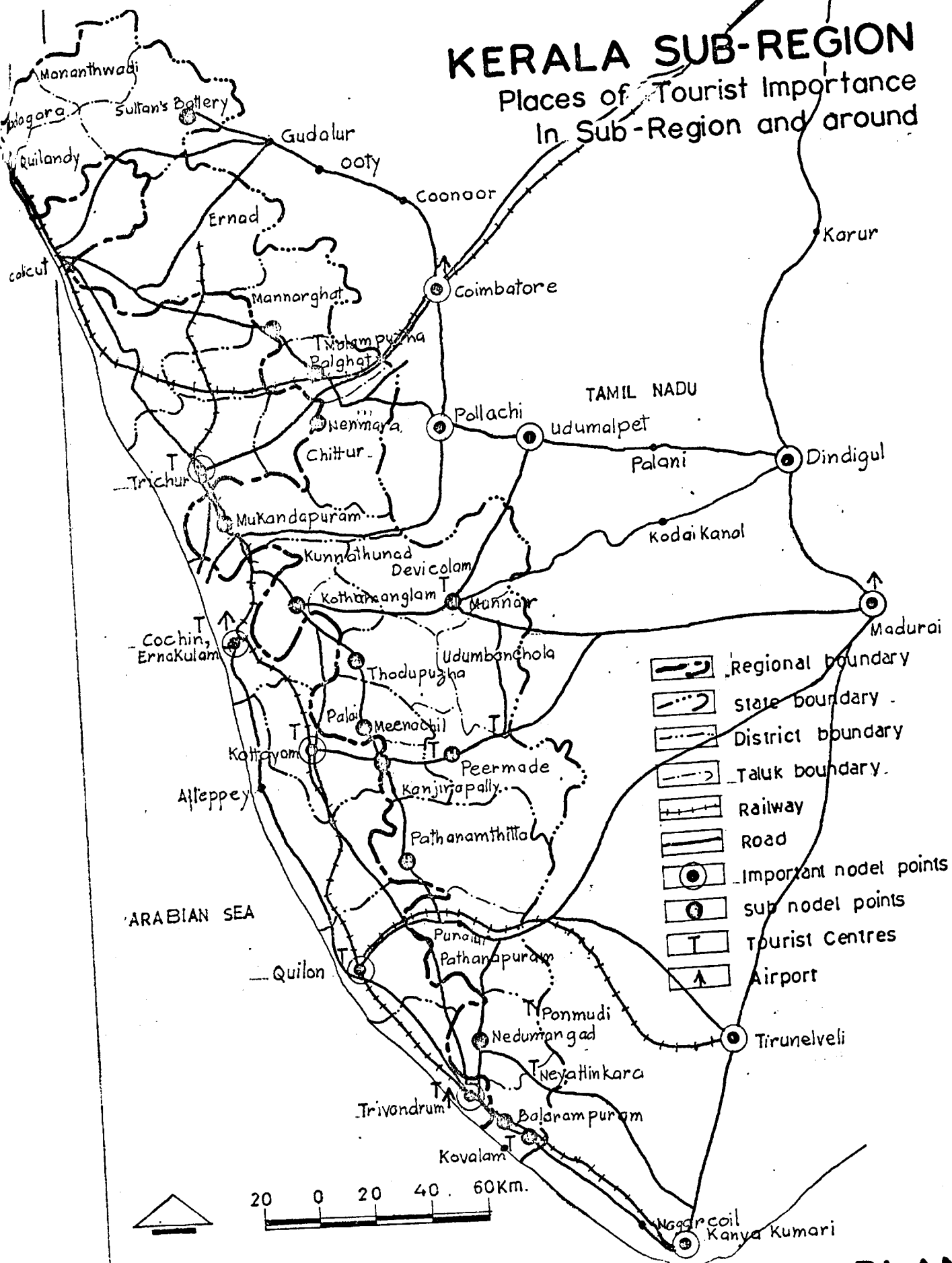
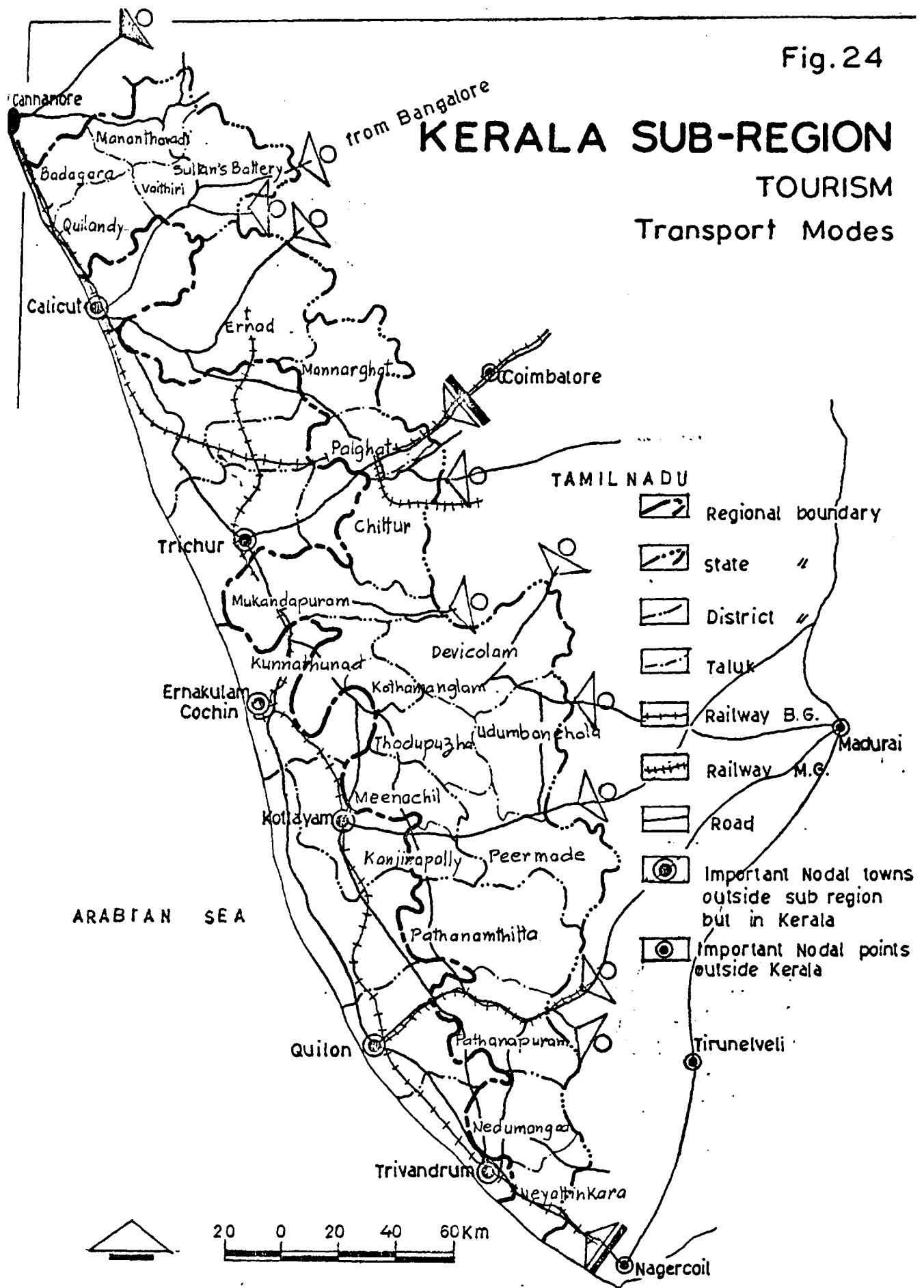


Fig. 24



WESTERN GHATS: SURVEY & PLAN

TOWN & COUNTRY PLANNING ORGN., MIN. OF WORKS & HOUSING; GOVERNMENT OF INDIA

Table - 9 : Places of Tourist Interest and Religious Importance (Talukwise)

Taluks	Places of Internal Importance*	Places of National Importance*	Local Importance*	Religious**			Historical Importance
				Hindu Temples	Muslim Mosques	Chris- tian Church	
1. Mananthavadi	-	-	-	Three	-	-	-
2. South Wynad	-	Game Sanctuary	Tippu's Fort	One	-	One	Pananaram Fort** Pulpuli Cave.
3. Badagara	-	-	-	Six	-	-	-
4. Quilandy	-	Kappad Beach	-	Three	-	-	Kappad Beach*, Baluserry Fort and kunnu Caves**
5. Ernad	-	-	-	Seven	One	-	-
6. Mannarghat	-	-	-	One	-	-	-
7. Palghat	-	-	Malampuzha Dam	Four	-	-	-
8. Chittur	-	-	Parambikulam Game Sanctuary	Three	-	-	-
9. Mukundapuram	-	-	-	Four	-	One	-
10. Kunnathunad	-	-	-	Three	-	One	-
11. Devicoolan	-	-	Munnar Hill	-	-	-	-
12. Thodupuzha	-	Idikki Dam	Station	Three	-	-	-
13. Meenachil	-	-	-	One	-	One	-
14. Kanjirapally	-	-	-	Four	One	-	-
15. Peermade	-	Periyar Wild Life Sanctuary	-	One*	-	-	-
16. Pathanamthitta	-	-	-	Two	One	-	Sabari Malaya Temple of national importance.
17. Nedumangad	-	-	Ponmudi Hill Station	One	-	-	-
18. Neyyattinkara	kovalam Beach	-	Neyyar Dam	Two	-	-	-
19. Udumbanchola	-	-	-	-	-	-	-
20. Pathanapuram	-	-	-	-	-	-	-

Source: *Information supplied by the State Govt., contained in tourist information literature.

**Information given in the district census handbooks.

Social Development

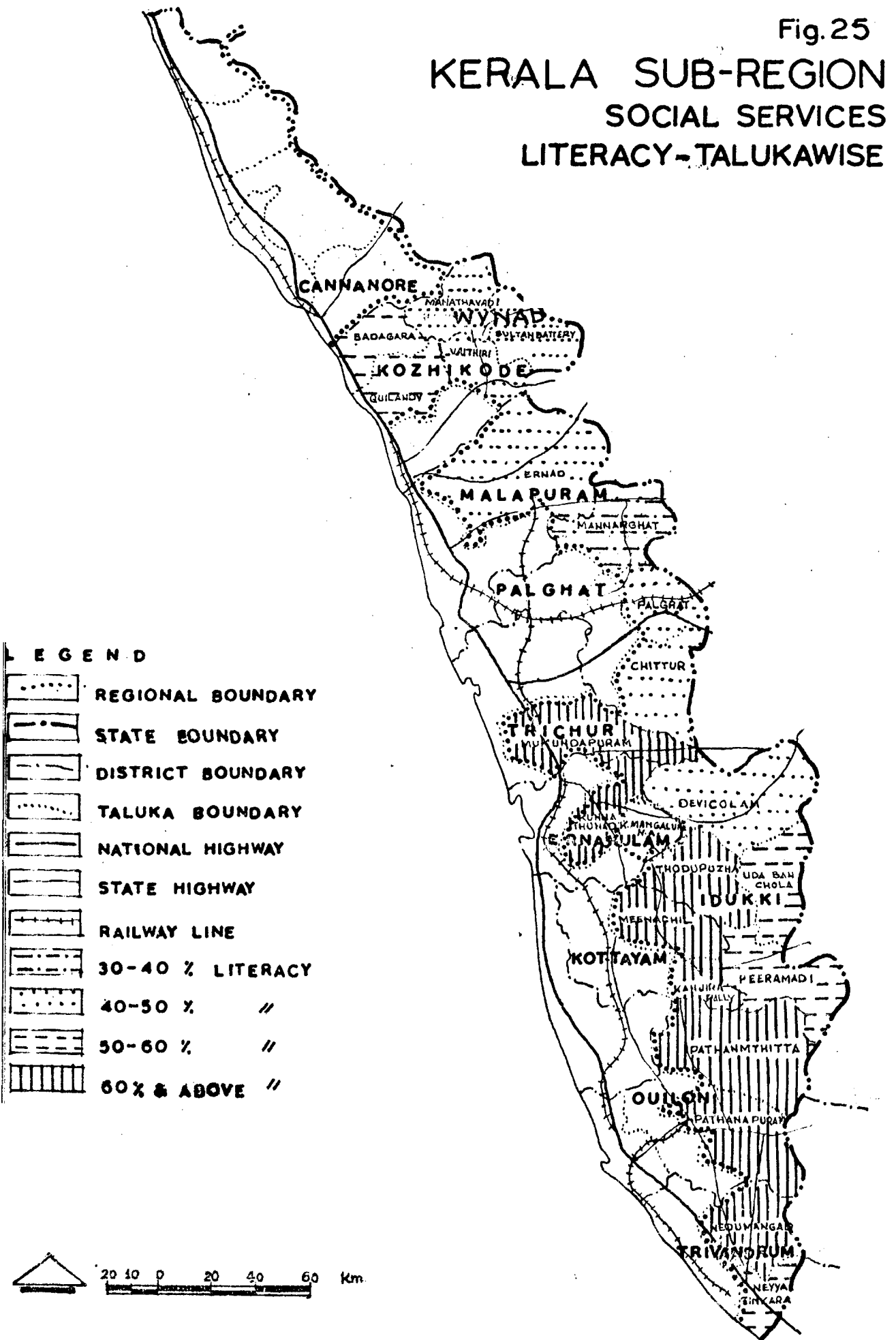
Social services, particularly education and health, play a crucial and important role in the process of economic development and modernisation. The proper planning of educational and health facilities, therefore, is essential for bringing about rapid social change. As far as social services are concerned, the Sub-region is well placed. Not only is its literacy high but it also has a sizeable number of educational and health facilities. The development of these facilities since the inception of planning has been quite impressive.

The Sub-region had a literacy rate of 57.12% which was almost double the all India average (29.4%) in 1971. Variations in literacy rate at taluk level ranged from 38.47% in Mannarghat to 73% in Meenachil (Fig.25). Literacy rates were generally higher in the well developed taluks as compared to less developed ones. Male and female literacy were also higher than all India average.

A commendable job regarding the development of schools at all three levels - primary, secondary and high - has been done both by Government and private agencies. At all the above levels, not only was the number of schools but also enrolment, attendance and percentage of trained teachers (almost 95%) higher than all India averages. E.g. there were 432 students studying per primary school as compared to 147 students at all India level (1974-75). There were also an adequate number of higher and vocational education institutions in the Sub-region but these were universally distributed amongst the taluks, resulting in underutilisation of these facilities. Taluks characterised by hilly terrain and low accessi-

Fig.25

KERALA SUB-REGION SOCIAL SERVICES LITERACY-TALUKAWISE



bility suffered from relatively poor educational facilities.

The number of medical institutions, of all types, had grown at a rate of 22% between 1971-75 but marked by wide disparity in their growth rate at the taluk level, the rates ranging from 5% in Devicolam to 51.85% in Man-narghat. *The number of beds per thousand population had also increased from 0.90 in 1971 to 1.22 in 1975, which was much higher than the all India average of 0.68. However; both the number of beds and the number of medical institutions per thousand population were below the Sub-regional average in 50% of the taluks especially the hilly ones. Such an availability pattern highlights the lopsided development of health facilities within the taluks. Out of 9.2 million patients (1974-75), 86% were treated for miscellaneous diseases, therefore, it is difficult to say which diseases were more prevalent. However, from the information available, it seemed that dysentery and cholera were more prevalent in some taluks than in others.

Transportation

A good transport network is a vital prerequisite of developmental efforts in an area. Its development is dependent upon the existing physical and socio-economic conditions and the prevailing technology. The two major modes of transport in the Sub-region are roads and railways. The road network has a complete hierarchy from national highways to village roads. The total length of highways and district roads is about 8,333 km. and that of rural roads is about 20,232 km. The Sub-region is served by two national highways viz. N.H. 17, and N.H.47

with a length of 132 km. and by a number of state highways measuring 1141 km. The study of road accessibility shows that all but two taluks viz. Mananthavadi and South Wynad are served by either national/state highways or both. Thus, the Sub-region seems to have a good highway network.

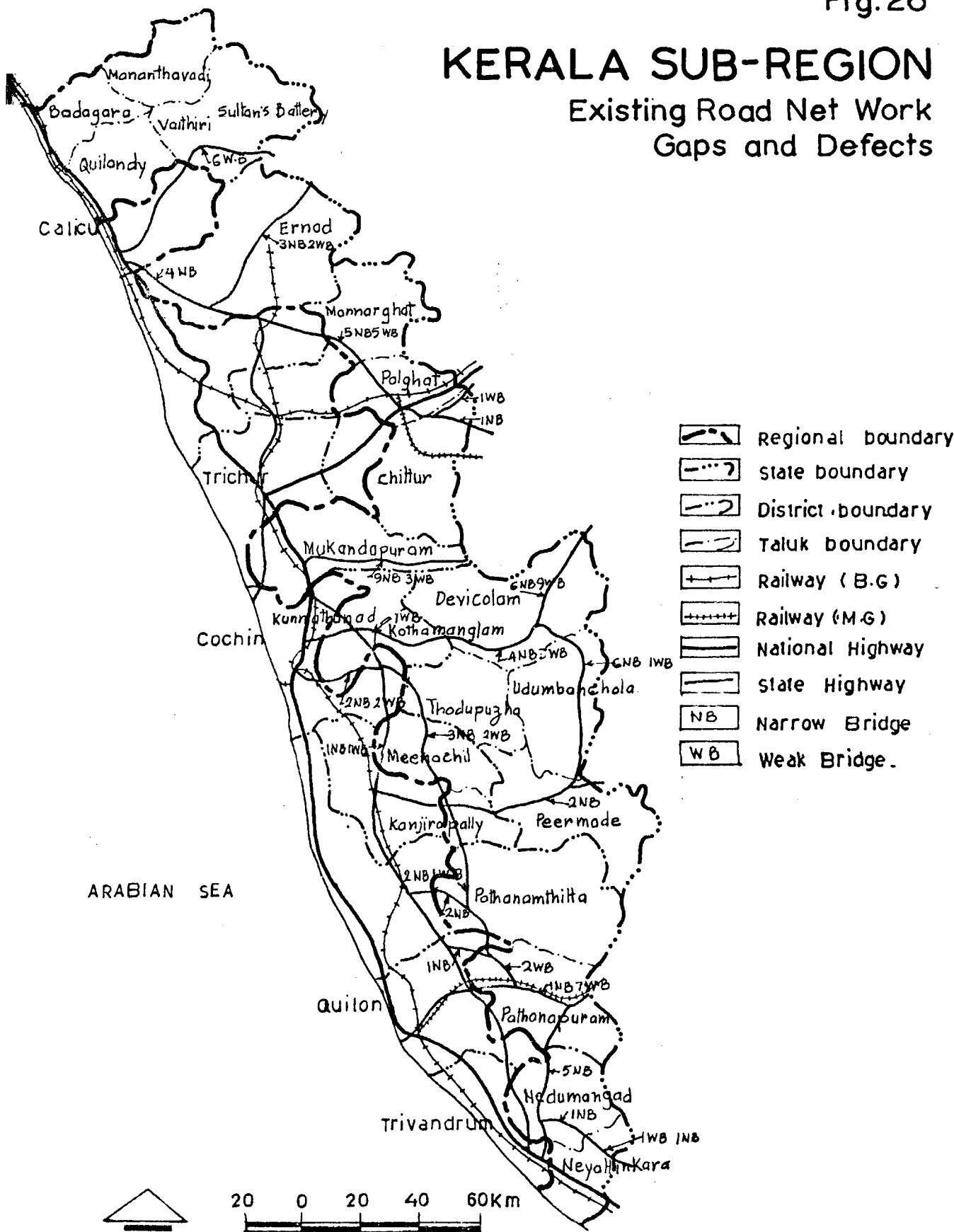
The major gaps present are in the form of missing links and bridges. The deficiencies relate to narrow bridges, weak bridges and non-motorable road surfaces. It is found that all the state highways, except S.H.14 and S.H.15, have gaps and defects in the form of narrow and weak bridges (Fig.26). Moreover, most of the highways which pass through the urban centres may have to be realigned to a bye-pass, wherever possible.

The total length of district roads in the Sub-region is 4389.0 km. of which the major district roads and other district roads form 2163.34 km. and 2225.67 km. respectively. About 145 km. (i.e. 36.3%) of the other district roads are unsurfaced. In other words, all the taluks except Mananthavadi and Mukundapuram have unsurfaced other district roads. Out of 21 taluks, only 8 taluks have fully surfaced major district roads. There are 29 missing links with a total length of 142.86 km. and as many as 192 defective or substandard bridges on the district road network.

The total length of rural roads within the Sub-region is 22,903 km. of which 2,672 km. are under the jurisdiction of P.W.D. and the rest under the Panchayat Department. Only 12.5% of the total rural road length within the Sub-region has metalled surface. The major deficiencies are 609 missing bridges, 3,962 missing cul-

KERALA SUB-REGION

Existing Road Net Work Gaps and Defects



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verts; these missing links are to the tune of 4,973 km. as far as rural roads are concerned. Thus, it is clear that, considerable efforts would be required to provide proper infrastructure at the basic settlements level.

Almost all the towns in the Sub-region are directly served by highways and district roads. A majority of the rural settlements are also well served by the District and Panchayat roads. Only 18 rural settlements, of which 8 are located in forests ranges, the remaining 10 are inaccessible and are not adequately served by rural road.

The State of Kerala is lagging behind, as far as, railway network is concerned. The railway network (B.G.) runs in the north-south direction along the length of the State and also close to the national highway. There are two major eastern outlets viz., Shoranur-Coimbatore - a broad gauge line, and Quilon-Tenkasi-Madurai - a metre gauge line. In addition to the above lines, three branch lines viz. Shoranur-Nilambar (B.G.), Ernakulam Jn. - Cochin Harbour Terminus (B.G.) and Olvakkot-Pollachi-Dindigul (M.G.) constitute the rail network. However, as these run close to the coast, they confer limited benefits on the Sub-region. In regard to the area accessible by railways in the Sub-region, the wholly accessible area amounts to 48.23%, fairly accessible to 18.59%, partially accessible to 14.18% and entirely inaccessible to 19.00%. However, as far as population is concerned, only 18 percent of the population does not derive much benefit from the existing rail lines. The rest are accorded the benefits of railways directly and indirectly.

The Sub-region does not have any airport within

its jurisdiction. However, the five airports around the Sub-region, viz. Trivandrum, Cochin, Coimbatore, Mangalore, and Madurai are directly connected with four other airports, Madras, Bombay, Male, and Bangalore.

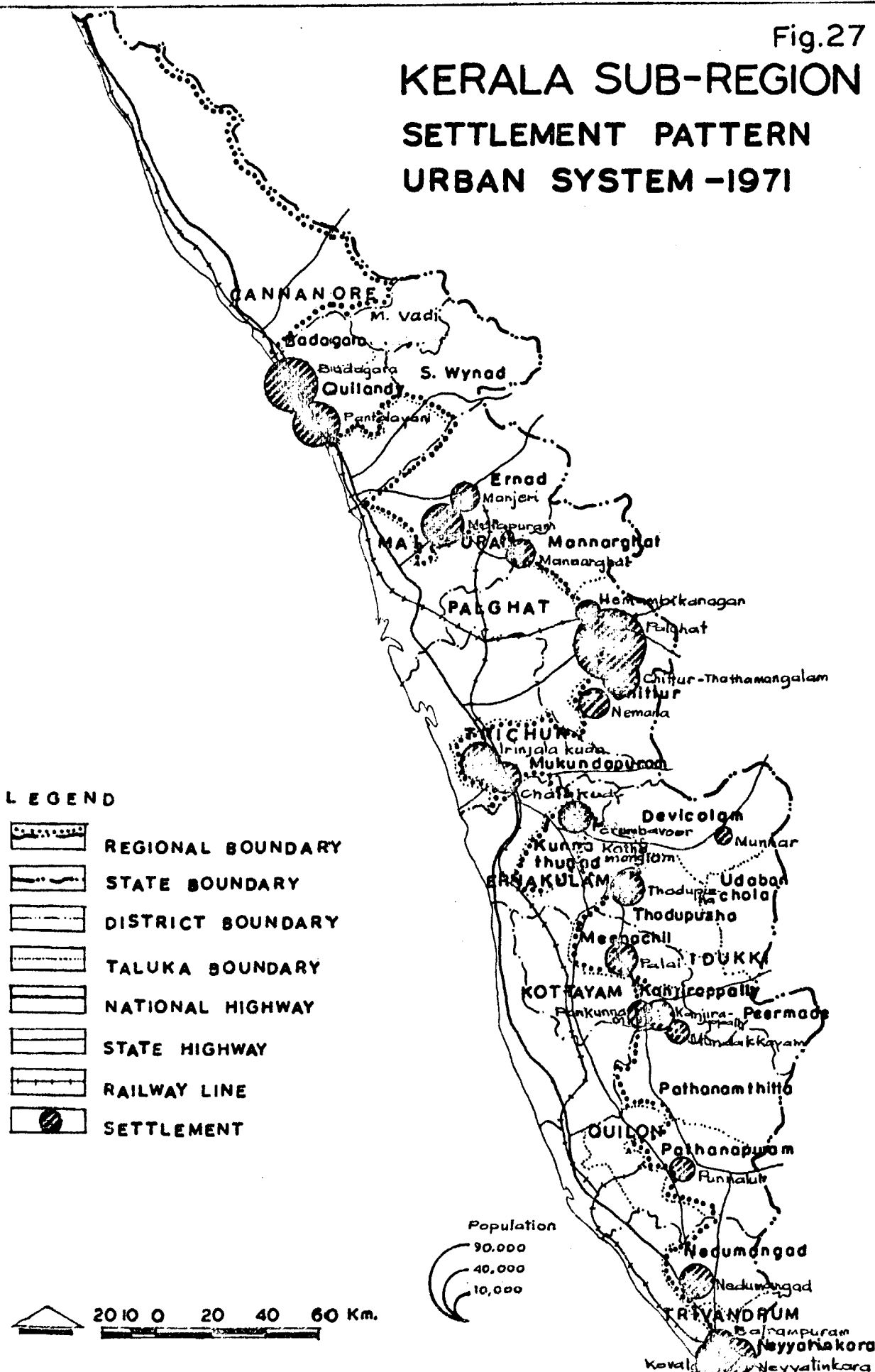
Urbanisation and Settlement System

Kerala is characterised by diversified physical features. Human settlements are scattered in endless succession of farmsteads from the narrow coastal plains to the mountainous walls bounding the State on its east. The 456 settlements including 24 urban centres (1971 census) of the Sub-region are distributed over 22 ghat taluks stretching from Mananthavadi in the north to Neyyattinkara taluk in the south. Typical of Kerala, the settlements are linearly situated along the transport routes spread over large areas often in small clusters locally called 'muris', 'karas' or 'desoms':

The level of urbanisation is a positive indicator of the level of development of an area. The Sub-region reached an urbanisation level of only 8 percent compared to 16 percent of the State, in 1971. Of the 24 urban centres, there are 19 medium sized towns (with 20000 to 50000 population). There is no large town (with a lakh or more population) and, interestingly, there are only 3 towns with less than 10000 persons. (Table-10 and Fig.27). Five taluks do not have any urban settlement. Plaghat is the most densely populated town followed by Kovalam. Munnar, Kanjirapally and Nemmara are sparsely populated. Palghat, Chittur, Thathamangalam, Iránjalakuda and Badagara are the oldest towns at least, 7 decades old whereas Mannarghat, Hemambiganagar and Malapuram are new categorised as urban only in 1971. The

Fig.27

KERALA SUB-REGION SETTLEMENT PATTERN URBAN SYSTEM -1971



urban population registered an increase of 61 percent in the Sub-region against 37 percent in the State between 1961 and 1971. There have been some changes in the area and population content of some of the towns.

Among the 24 towns, 5 are entirely 'Primary', 14 towns have 'Primary' as one of the main functions and 5 have a dominant non-primary function (Table-10). The change of functions of the towns over 1961-71 indicates a tendency towards dilution of the urban character. Urbanisation, populationwise, shows a significant increase but qualitatively it has been steadily losing strength. In fact, there have been some shifts from non-primary to primary/part-primary functions of the towns and the reverse process has been totally absent. The accretions to urban population over the decade ending 1971 have, thus, been mostly absorbed in primary activities, which indicate the relatively vast development potentials of the primary sector.

Considering the smallest settlements at the sub-census village level, the medium sized villages (with 1000 to 5000 population) dominate the rural sector, with as much as 63 percent of the total rural settlements belonging to this category. Sixteen percent of the rural settlements belong to the large sized category (more than 5000 population). All, but four, taluks namely Vaithiri, Sultan Battery, Kanjirapally and Udumbanchola have a majority of their rural settlements in the medium size. Fortynine percent of the rural inhabitants live in medium sized while 46 percent live in large sized rural settlements. The 'desoms' in the 46 forest ranges account for 1.4 percent of the rural population.

Table - 10 : Population, Density and Functional Classification of Urban Centres in 1971.

Town	Popula- tion	Density	Functions
1. Pantalayani	28530	2239	Prim-Ind-Comml.
2. Badagara	53938	2528	Ind-Comml-Prin.
3. Malappuram	32002	952	Serv-Prim.
4. Manjeri	15734	1186	Prim-Serv-Comml.
5. Mannarghat	12580	1651	Prim-Serv-Ind.
6. Hemambikanagar	7032	1762	Transport
7. Palghat	95788	3601	Serv-Comml-Ind.
8. Chittur-Thatha- mangalam.	28510	1958	Prim-Ind-Serv.
9. Nemmara	12897	811	Primary
10. Irinjalakuda	25405	2260	Serv-Comml-Prim.
11. Chalakudy	37562	1489	Prim-Ind.
12. Perunbavoor	20888	1537	Ind-Serv-Prim.
13. Palai	20273	1273	Prim-Serv-Ind.
14. Mundakayam	10142	1932	Primary
15. Ponkunnam	13672	991	Primary
16. Kanjirapally	20687	783	Primary
17. Kothamangalam	6534	1132	Serv-Prim-Ind.
18. Punalur	13562	3349	Ind-Serv-Ind.
19. Balaramapuram	17384	2092	Ind-Prim.
20. Neyyattinkara	23983	2472	Prim-Serv.
21. Kovalam	13999	3406	Primary
22. Nedumangad	14643	1887	Prim-Ind-Serv.
23. Thodupuzha	20880	956	Prim-Serv-Comml.
24. Mirunor	4382	743	Serv-Ind.
Total	551007	1676	

(i) Prim = Primary

(ii) Comml = Commercial

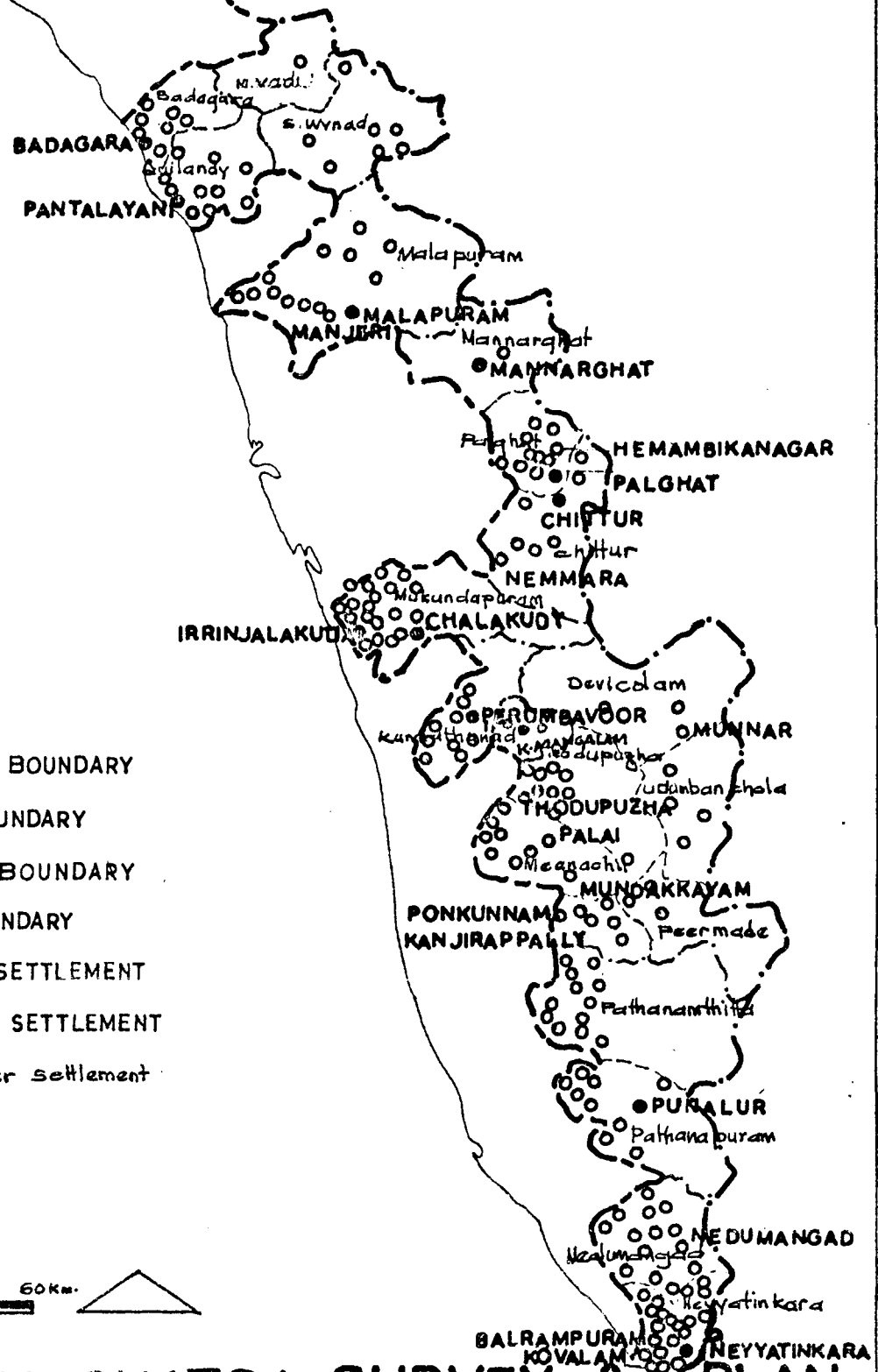
(iii) Ind = Industrial

(iv) Serv = Service

KERALA SUB-REGION

SETTLEMENT PATTERN

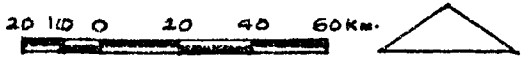
ORDER OF SETTLEMENTS (UPTO 3rd ORDER)



LEGEND

- REGIONAL BOUNDARY
- STATE BOUNDARY
- DISTRICT BOUNDARY
- TALUK BOUNDARY
- 2nd ORDER SETTLEMENT
- 3rd ORDER SETTLEMENT

NOTE : NO 1st order settlement



Ordinal placement of settlement is a necessary step in evolving a settlement system of organisational and functional stability. The centrality of a settlement depends upon the importance it yields in its socio-economic and functional setting in terms of facilities and amenities and, collection and distribution of goods and services in its catchment area. By assigning weights to the various services and facilities, the settlements in the Sub-region have been grouped into four categories. Only these settlements which were more than 7000 population have been taken into account. It is seen that, no settlement qualifies for the first order, 10 settlements qualify for the second order, 24 for the third order and 146 for the fourth order category. (Fig. 28). Absence of higher order settlements clearly shows the degree of inadequacy of facilities and amenities in the settlements of the study area.

SECTION - III : DEVELOPMENT PERSPECTIVE AND STRATEGY:

In building up a development perspective for a region, it is necessary to take into consideration the trends of growth the inter-relationship and the gaps vis-a-vis potentials and constraints of development in different sectors. The perspective will, therefore, emerge as a result of our attempt to marry the goals and objectives with the assessed development potentials, to correct the present shortcomings during the process of development and to identify the inter-sectoral priorities among the development programmes. It may be noted, however, that information at taluk level regarding the trend of growth or investment in the Sub-region is not available and, thereby, the perspective which has been evolved, is mainly based on the existing situation and the development potentials, which have been assessed in the different sectors.

The present state of development, potentials, problems, current trends and directions in which the future development would take place, in the Sub-region, have been discussed in detail sector-wise in Volume II of the report. While dealing with each sector, the problems faced in the different sectors, the remedial measures needed to achieve the sectoral development as envisaged, and the inter-relationships of sectors has also been brought out. Further, the proposals have been woven together so as to provide mutual support and sustenance and to eliminate any conflict that may arise in the development programmes. For instance, while discussing agricultural development, the need for proper infra-structure for such development in the form of marketing and distribution services, extension work, processing of agricul-

tural products etc. has been recognised and the provision for such infrastructure has been made under the proposed system of settlements, water resources and power supply.

In the following paragraphs the development perspective of the Sub-region has been outlined in brief.

Protection of Ecology and Environment

With the increase in population and rise in affluence, man's need of natural resources to sustain his existence has increased. The strategy for increasing and maximising agricultural production, however, should not be at the cost of the ecological base on which the entire food production system depends; this must be achieved on a long term sustained basis. The productive capacity of the biosphere can be sustained and improved only by adopting strategies that are environmentally sound. The aim of these strategies should not be growth at the cost of environmental degradation or destruction of natural resources, but rather development with due concern for conservation of natural resources and the environment. If these concerns are not explicitly incorporated within the development strategies, environmental deterioration becomes a distinct possibility - which, in turn, is bound to under-mine the very development process itself. Keeping this in view, the unvaluable flora and fauna of the Sub-region¹ need to be protected.

1. The Sub-region is a part of the Western Ghats area which is a rich store house of botanical wealth. The evergreen rain forests are prime centres for faunal and floral options for future generation. Very recently a Task Force has been constituted to recommend effective measures to conserve eco-

Increase in agricultural production can be achieved in two ways: by increasing the land available for food production and by increasing the yield per unit area. It is, however, important to ensure that while attempts are made to bring more land under cultivation, further loss of agricultural land does not occur, and also that maximization of yield does not contribute to environmental problems.

Loss of soil is one of the most pressing and difficult problems facing the Sub-region. The top soils are being removed by the combined effects of water and wind. Run-off carries away fine sediments, a substantial portion of which is deposited in lakes, reservoirs and water-courses, creating environmental problems. The economic cost of such siltation is quite significant. Of the 42.57% of the total forest area in the Sub-region, less than half is actually under adequate tree cover as against 60% prescribed by National Forest Policy in hill areas. The large scale deforestation in recent decades has rendered the sensitive catchment areas in the Sub-region particularly vulnerable to soil erosion. Similarly, although 33,350 hectares termed as "permanent pastures" are without any vegetative cover due to

gical balance to the Ghats Area. To get the best use from the rain bearing clouds which cross and are arrested by the Ghats, it has to be ensured that the natural cycles of precipitation, percolation, evaporation and transpiration are not disturbed and that rain water which descends to the ground is conserved either underground or in rivers, streams and reservoirs. This can only be achieved if the character of the soil, the vegetation cover, humidity and temperature are not altered drastically from their present conditions by future development. The Task Force is of considered opinion that without the ecological regeneration of Western Ghats there can be no economic salvation for the millions of people living in the vast adjoining area.

either over grazing or encroachments. In addition to erosion, arable lands are being lost through urbanisation and construction of roads and highways. Mining activities, if not properly planned, may lead to loss of soil and vegetation and affect the environment due to acid drainage and accelerated erosion.

The strategy for the development of the Sub-region needs to be different in approach not only because it is characterised by vast natural endowments such as rich flora and fauna and invaluable export oriented plantation crops but also because its economy is subservient to other parts of the state/country. On ecological considerations, it is necessary to lay emphasis on intensive development of forestry and plantation and development of agriculture and allied activities to achieve self-sufficiency in food as far as possible.

Agricultural Development

Agriculture, being the predominant user of land and the principal economic activity in the Sub-region, its primacy in economic development is too obvious to be emphasised. It will continue to remain the main occupation in the Sub-region. The importance of increasing agricultural productivity as a precondition for its overall development is, therefore, necessary.

The development of agriculture, however, shows that it is deficient in many ways and the assessment of agricultural resources reveals that even the available potentials have not been fully utilised. Obviously, in order to harness fully, and to the optimum extent, the agricultural resources of the Sub-region, a comprehensive

strategy for agricultural development has to be framed. Although limited, there is scope for bringing additional land under cultivation; therefore, efforts towards enhanced production in agriculture will have to be focused both towards extension and intensification of agricultural programmes. These may consist of the following steps:-

- i) Expansion of cultivated area.
- ii) Expansion of irrigation facilities both from surface water resources as well as underground water resources in an integrated manner; reorientation in irrigation practices with emphasis on productive irrigation rather than protective irrigation; improvement in the utilisation of existing irrigation potential through spacial programmes.
- iii) Increase in the intensity of cropping and diversification by promoting multiple cropping in irrigated areas and by the introduction of several drought resistant varieties under rainfed conditions and replacement of long duration paddy with short duration varieties which will enable fuller use of moisture available for raising second crop; mixed and inter-cropping and multi-level cropping in the Sub-region, which is suitable for a wide variety of plantation crops, fruit trees and other trees crops. Crop planning in the future will have to take into account the effective use of both horizontal and vertical spaces.¹

1. Swaminathan, M.S. - Emerging Agricultural Development Strategy: Mazingira Vol.4, Number-1, P.41-42.

- iv) Expansion in the supply of fertilizers, plant protection materials, farm machinery and agricultural credit.
- v) A well-organised collection and marketing system for agricultural products in the interest of the producer along with assurance of minimum prices for major agricultural commodities.
- vi) Distribution of inputs for cultivation such as H.Y.V. seeds/sapling, fertilizers, insecticides, farm machinery and agricultural credit.
- vii) Development of livestock and animal husbandry which comprises tapping the economic potential available for animal husbandry activities through the prevention of overgrazing and scientific management of grazing lands; the improvement in breeding, feeding, marketing and management of dairy and poultry feeding.
- viii) Improvement in post-harvest conservation of both foodgrains and perishable commodities.

The implementation of the above programme which has been worked out in detail in Sectoral Reports² will enable the extension of agricultural land, increasing the area under double cropping, changes in the cropping pattern and irrigation development which are technically feasible and economically profitable under the prevailing conditions of soil, climate and rainfall. Specifically by 1985, the following changes may be anticipated:-

2. Section on Land Use, Agriculture and Forestry Development, Vol.II, P.111-122.

- i) The net sown area will increase from 9,84,077 hectares to 10,39,630 hectares by 1991 i.e. a net increase of 55,553 hectares over 1974-75.
- ii) Irrigated area will increase from 99,165 hectares in 1974-75 to 2,88,000 hectares by 1991, a net increase of 188,835 hectares.³
- iii) Intensity of cropping is estimated to go up from 122.86% in 1974-75 to 157%⁴ in 1991, giving a total cropped area of about 17,02,030 hectares in 1991 against 1,209,037 hectares in 1974-75, a net increase of about 492,993 hectares.

Having decided the gross area under different crops, the next step is to allocate the most suitable area for each particular crop. The allocation of areas under different crops required the knowledge of the capability (suitability) of the land in different parts of the Sub-region. In the absence of this information, the proposed cropping pattern⁵ has been worked out, based on the analysis of the existing pattern, and the study about the future prospects of some of the important perennial crops by the Kerala Land Use Board, and through discussions with the officials of the State Government as

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3. This is based on the assumption that all the continuing major schemes and proposed minor schemes would be completed by 1985. For details please refer to the section on Water Resources of Vol.II of the Report.
 4. Based on the assumption that the existing ratio of 10:23 between the net irrigated area and area under multiple cropping would be maintained.
 5. For details please refer Vol.II P.116-122.

indicated in Table-11.

Table - 11 : Existing and Proposed Area Under Different Crops in Kerala Sub-region.

Sl. No.	Crops	Existing (1974-75)		Proposed (1991)	
		Area in hectare	% to total cropped area	Area in hectare	% to total cropped area
1.	Paddy	293,561	24.28	510,600	30.00
2.	Other food-grains	10,302	0.85	42,500	2.50
3.	Tapioca	128,584	10.64	136,200	8.00
4.	Tea and Coffee	70,922	5.87	102,100	6.00
5.	Pepper	62,086	5.14	93,600	5.50
6.	Rubber	119,442	9.88	119,200	7.00
7.	Coconut	186,779	15.45	187,200	11.00
8.	Areca nut	34,918	2.89	51,100	3.00
9.	Cardamum	46,253	3.82	85,100	5.00
10.	Banana	20,241	1.67	34,000	2.00
11.	Other crops including vegetable	235,949	19.52	340,430	20.00
Total		1,209,037	100.00	1,702,030	100.00

It is, however, difficult to estimate precisely the additional production resulting from the package of operations suggested. With these measures, it is expected that the total output of food-grains would be about 1,161,510 tonnes in 1991⁶ against 469,100 tonnes in 1974-75. The quantum of foodgrain deficit⁷ in the Sub-region

6. For details please refer Vol.II P.121-125.

7. For details of assessment of surplus/deficit in cereals please refer Vol.II P.106-111.

would be about 233,500 tonnes in 1991 against 4,64,420 tonnes in 1974-75.

Other gains in output would also be substantial, notably in area and yield of plantation crops. Thus, there would be a substantial rise in terms of gross value per hectare of net sown area which will give a boost to the Sub-regional economy in general and the agricultural sector in particular.

Forest Development

The Sub-region is hilly and heavily forested but it has lately been deforested so much that only 42.57% of the total area is left under forest, an area much less than envisaged in the National Forest Policy⁸ for hilly regions. Ecological stability is, thus, crucial for its development and depends upon the maintenance of a tree cover, which is constantly being encroached upon by agriculture, mining, hydro-electrical and industrial developments. With the main objective of preserving ecology, protecting the environment, promotion of recreation, increasing production and employment opportunities, the development strategy envisages intensive management and rational utilisation of the existing forest resources through:

- (i) Identification of productive forests to obtain from them the maximum sustained yields.

8. The National Forest Policy stressed at maintaining one-third of the total national land under forest and 20% in the plains are to be developed as properly cited and well managed forest.

- (ii) Afforestation of denuded forest areas and areas under scrub jungle.
- (iii) Creation of large scale plantations of quick growing commercial species; undertaking agro-forestry practices⁹ in suitable areas and social forestry programme to meet the energy demand.
- (iv) Exploitation of forests in inaccessible areas as far as possible by providing better transport facilities, conversion facilities at site, stock-yard depot, marketing facilities for forest products and establishment of more forest villages to meet the increased labour force.
- (v) Increase in the productivity of forests by ensuring more economical and efficient utilisation of the forest products, including inferior timber and wood residues, and also efficient collection of minor forest products.
- (vi) Increased use of preservation and seasoning processes of inferior grade timber.
- (vii) Increase in the output through better techniques of timber extraction.

9. A novel scheme of cultivating cash crops such as pepper, cocoa and also medicinal plants as an inter-crop in selected areas within the forest plantations of teak, bombax, aini, silver, oak, etc. which is popularly known as a 'Vanalakshmi Plantation Scheme' in Kerala. The project is financially viable. The average annual per hectare income from such a plantation is estimated to be Rs.12,500/- against an expenditure of Rs.3400/- and will be able to provide employment to 1600 workers on a plantation of 1800 hectares. The results obtained so far are highly encouraging and on the whole promising for further expansion.

- (viii) Consolidation and scientific management of hitherto unorganised forests, and protection against conversion of forest land into other uses, unregulated cutting, grazing and fire.

The non-productive forests which are mainly for conservation and recreation should be developed at suitable locations in the Sub-region, as a national forest development policy, and their exploitation should be restricted to salvaging and sanitation operations whereas community forests should be developed to supply the villagers' needs for fuel, grazing and other minor needs.

Proposed Land Use Pattern and Potential Areas for Development:

From the foregoing account, it is evident that the topography, soil and climate of the Sub-region is best suited to forestry and plantation. An attempt should be made, therefore, to increase the area under productive forestry or plantation. In recent years, changes have been brought about and emphasis has been given to tree crops, i.e., coffee, tea, coconut, areca-nut and cashewnut plantation. While, proposing the land use pattern in the Sub-region, this trend has been kept in view and emphasis has been given to tree crops to achieve ecological balance at the regional level.

Keeping this in view and based on the study conducted by the National Bureau of Soil Survey and Land Use Planning, Regional Centre, Bangalore the following broad land use patterns have been suggested:-

- (i) Western Ghats hill area should continue to

remain under forest and used preferably for rosewood, teak, sandal wood and bamboo plantation. If such areas are under private ownership, it should preferably be used for plantation of rubber, arecanut, coffee, tea and herbs.

- (ii) The extended Western Ghats hill area under the control of forest department should be brought under teak, rosewood, sandalwood and bamboo plantation. Such areas which are cleared of forest and are under private cultivation should be used for rubber, cashewnut and coconut.
- (iii) On the hill and flat tops of the high level dissected laterite plateau scrub forest and grasses for cattle feed should be encouraged. On the hill slopes, rubber, pepper, coconut and cashewnut should be grown. Inter-cropping of coconut under rain fed conditions should be taken up with ginger, tapioca sweet potato, turmeric and banana. In the Valleys, coconut, arecanut, tapioca, paddy, chillies, banana and vegetables should be cultivated.
- (iv) Low level dissected laterite hill tops should be used for cashewnut and coconut, whereas on slopes, coconut, arecanut with inter cropping of tapioca under rainfed conditions should be encouraged. Ginger, turmeric, pepper, banana, papaya and cocoa may also be grown depending on the availability of irrigation. In the valleys coconut, arecanut, tapioca, paddy, chillies and vegetables may be grown but pineapple,

cocca, pepper should be grown with coconut plantation, if irrigation is available.

So far, the development perspective has viewed the Sub-region as a whole. Since the development potentials and the problems of development within the Sub-region vary greatly, the development perspective for different parts of the Sub-region would have to be structured at the taluk level as the development perspective for the Sub-region as a whole cannot be uniformly applied to the taluks. The outstanding feature of a regional (spatial) plan is to determine the right and balanced distribution of land among the basic uses, based on a Landuse Capability Survey and Map. In the absence of such a study, which takes considerable time, an attempt has been made to earmark potential areas for the development of the primary sector, agriculture, plantation and forestry resources based on variables such as topography, gradient, generalised picture about soil fertility, concentration of cultivated lands and forests, intensity of land use, quantum of fallow lands, percentage of irrigated area, potentiality of irrigation development and the availability of infrastructural facilities etc. The taluks of the Sub-regions have been classified into potential areas for intensive development of agriculture, plantation and forestry (Table -12 and Fig.29).

Table - 12 : Potential Areas of Development

<u>Potential Areas</u>	<u>Taluks</u>
Agriculture	Chittur, Palghat, Kunnathunad, Neyyattinkara, Ernad, Mannarghat, Nedumangad.
Plantation	N. Wynad, Badagara, Quilandy, Kothamangalam, Meenachil, Kanjirapally.
Forestry and Plantation	S. Wynad, Devicolam, Udumbanchola, Thodupuzha, Peermade.
Forestry	Mukundapuram, Pathanapuram, Pathanamthitta.

Fishery Development

The Sub-region, with its coastline of 70 kms. and vast resources of inland water, provides good scope for the development of fisheries, for augmenting the foreign exchange earnings, supplementing the protein contents in the people's diet, boosting ancillary industries like boat building, manufacture of nets and other fishing tackles, cans, boxes etc. and providing part-time and subsidiary employment.

The main thrust for the development of fishery resources would be:

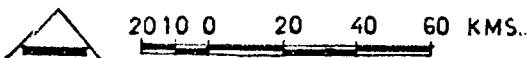
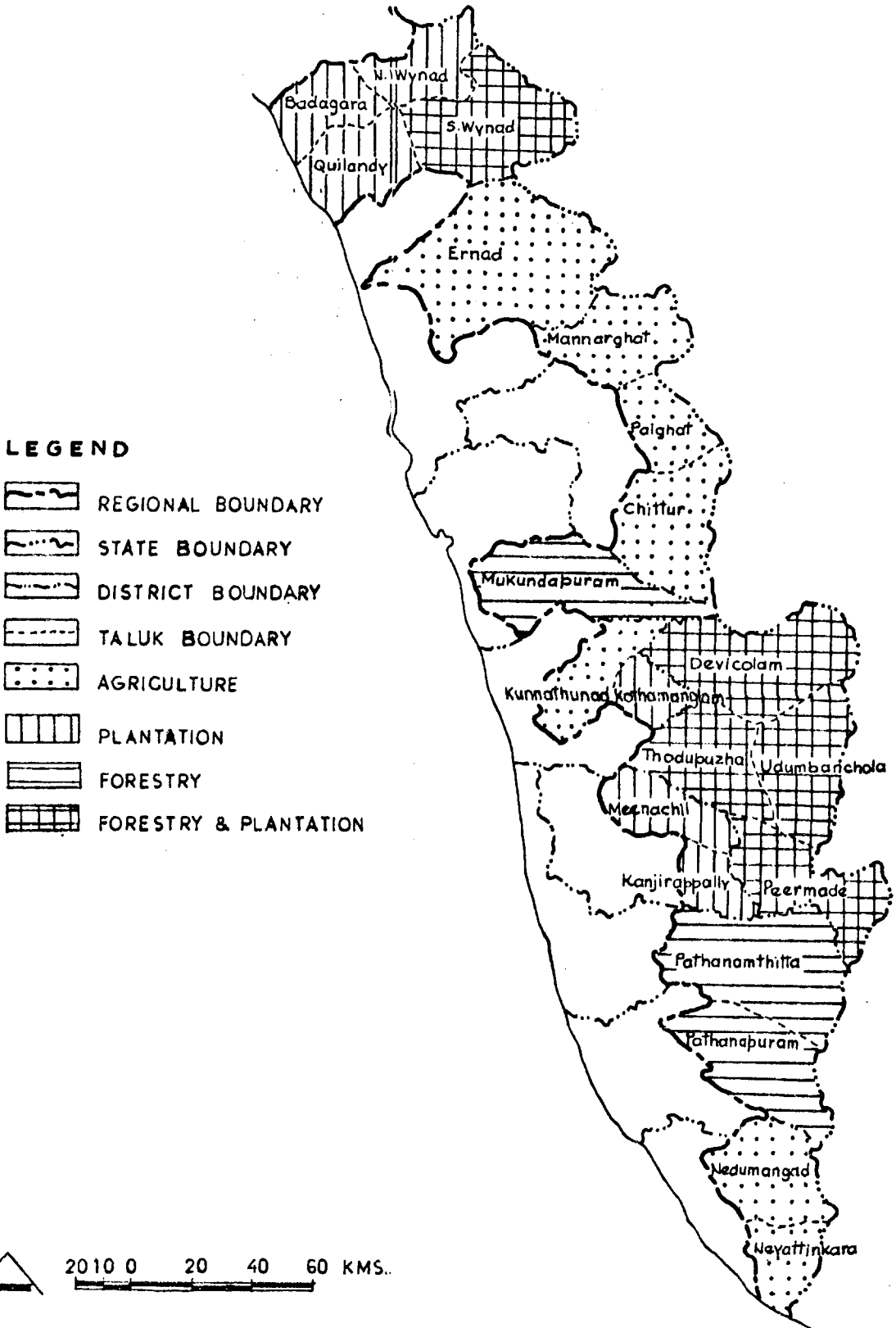
1. To step up the level of fish production in the Sub-region from 32,000 tonnes in 1978 to 56,000 tonnes by 1991¹. This may be achieved by;

- (i) expansion of fishing grounds and fishing operations beyond traditional marine fishery zones by the application of modern tools and techniques of fishing; use of large fishing vessels, development of fishing jetties and harbours along with facilities for processing and marketing;
- (ii) development of inland fisheries by utilising reservoirs for fish culture, establishment of seed farms, centres for stocking and distribution of fish; training institutes for fishermen and fisheries officials, co-operative societies to provide financial assistance to fishermen.

1. For detail please refer Vol.II P.199.

KERALA SUB-REGION

Potential Areas for Development



WESTERN GHATS : SURVEY & PLAN

TOWN & COUNTRY PLANNING ORGN., MIN. OF WORKS & HOUSING, GOVERNMENT OF INDIA

2. To improve the system of preservation, processing, distribution and marketing of fish by provision of:
 - (i) adequate cold storage and ice plants;
 - (ii) processing centres with modern facilities;
 - (iii) well-knit transport system linking fish producing areas with places of consumption.

3. To improve the socio-economic conditions of fishermen and increase the employment potential in this sector by making available to the fishermen:
 - (i) facilities for improvement in building and design of boats and other equipment;
 - (ii) training institutes to impart training to fishermen youth especially the tribals;
 - (iii) financial assistance to Co-operative Societies for purchase of marine gear and material etc;
 - (iv) infrastructural facilities in the coastal fishing villages.

4. To develop an integrated approach for the development of the fishing industry i.e. to develop facilities for various fishing activities like catching, processing and marketing of fish, in an integrated manner e.g. by not only providing good boat and harbour facilities but adequate storage and improved transportation facilities at the same time. Linkages with markets must be improved not only within the Sub-region but with the State and

country as well.

The taluks which have been identified as potential areas for fishery development are shown in Fig.30.

Mineral Development

Exploitation of mineral resources specially of graphite, quartz and limestone, which are now reported to be available in plenty in the Sub-region and for which there is a good demand, should be undertaken. Thus, the strategy for overall development of mineral resources in the Sub-region would be a full investigation and correct evaluation of the resources and detailed prospecting of all concessions in advance of commencement of extraction; rational utilisation i.e. full extraction of ore from mines, beneficiation of ores specially of graphite; the improvement in the means of transport i.e. roads, rails for economic and quick movement of ore from the pitmouth to the place of consumption and the inter-sectoral linkages of mineral development with the allied sectors of economy like agriculture, forest, power, industry, transport and services.

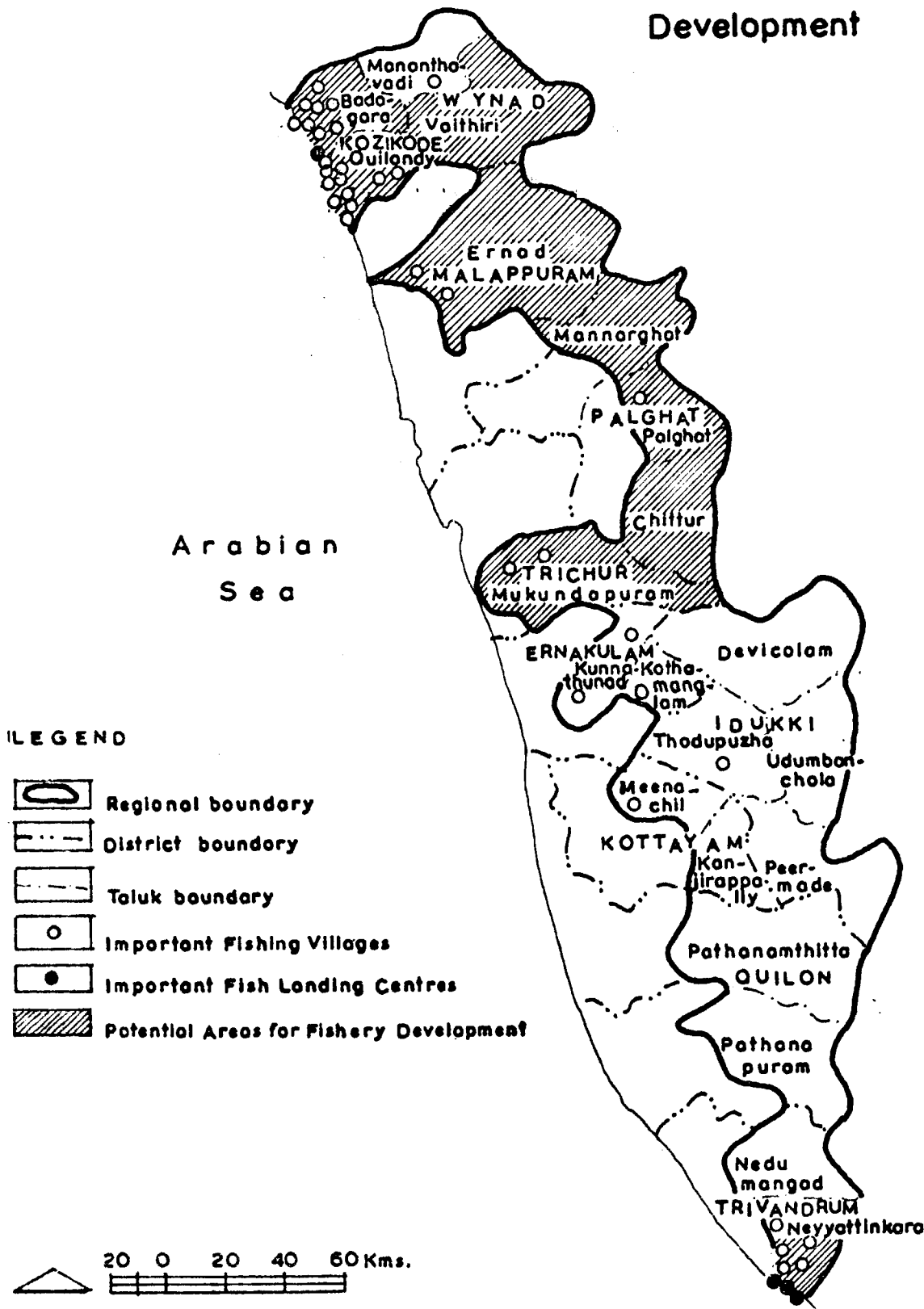
Water Resource Planning

The Sub-region is endowed with ample water resources. The utilisable quantum of run off amounts to 26000 M.Cu.m., of which only about 5215 M.Cu.m (20 percent) are being utilised in 1974-75. The estimated level of utilisation by 1991 is 14,100 M.Cu.m (54 percent).

The appraisal of the available irrigation by various sources reveals that the Sub-region suffers from

KERALA SUB-REGION

Potential Areas for Fishery Development



the shortage of irrigation facilities. Only 10 percent of the net sown area are being irrigated which in terms of utilised quantum forms only 17 percent of the utilisable run off. Agriculture being the backbone of the Sub-region's economy and the main occupation of the people, it is imperative that creation of irrigation measures are given appropriate attention and importance in the economic development of the Sub-region.

In particular, priority needs to be accorded to new schemes of all types in the taluks of Udumbanchola, Peermade, Kanjirapally and Mannarghat. Second priority should be to the taluks of Devicolan, Thodupuzha, Mananthavadi, South Wynad, Ernad, Meenachil, Pathanamthitta, Nedumangad, Badagara and Quilandy. In Udumbanchola, Peermade, Kanjirapally, Meenachil, Thodupuzha, Kothamangalam, Badagara, Quilandy, Pathanapuram, Pathanamthitta, Nedumangad and Neyyattinkara, where the possibility for creation of large irrigation schemes is remote, minor irrigation facilities should be resorted to in large measures. Further chances of diversion of water from the adjoining areas should be investigated.

For flood moderation, measures such as afforestation, silt traps, check dams, treatment of mined and quarried lands, training of water courses and strengthening of embankments need attention. In addition to soil conservation, rational allocation of water resources according to the importance of uses, non pollution of water, avoidance of water logging and waste of water should be taken up seriously to maintain a balance between development and conservation.

Power Development

Kerala depends on water power for its electric energy demand. Its rivers, specially of the Ghats possess abundant electric power potentials. Non-tapping of the waters of their most needed power wealth results in irretrievable losses; a national loss particularly when a number of states are power-starved, their vital and heavily invested establishments are more often run far below their designed productive capacities merely for want of power. It is of utmost importance, in the context of national as well as the regional development, to tap the hydel power potentials of the rivers in the Sub-region. Hence, priority should be accorded in developing the hydro electric projects, and to start with, the multipurpose schemes may be taken up to meet the urgent needs of irrigation as well as electric power.

Industrial Development

The broad objectives of industrial development would aim at strengthening the economic base of the rural economy by creating large non-agricultural employment opportunities, in order to utilise fully the local natural and skilled manpower resources, as well as to provide essential inputs and consumer goods to the farmers and the rest of the rural population. Such a strategy would help prevent out migration from the Sub-region and would stimulate agricultural production, thus creating a greater demand for industrial products and services. The main features of the strategy for industrial development would, therefore, be:

- i) identification of suitable industries;

- ii) development of industries, especially small scale and labour intensive, in intermediate and small towns and selected rural growth centres;
- iii) promotion of industrial trade and transmission of benefits of industrial development to the rural population through the establishment of a functional hierarchy of centres;
- iv) achievement of self-sufficiency in basic consumer goods;
- v) provision of infrastructural and training facilities in growth centres;
- vi) adoption of policy measures to set up industries in backward areas by providing special incentives (e.g. temporary tax exemption, credit facilities at cheap rates) to entrepreneurs and disincentives in large urban centres (e.g. restrictive licensing policy etc.), provision for supply of scarce raw materials, provision of land, building and machinery, marketing assistance be given to the existing units and the new ones that are likely to be set up.

Based on the above objectives and policy measures, a tentative action programme has been drawn up (as depicted in Table-13), preceded by an assessment of resource potentials and gaps in the existing level of industrial development in the Sub-region. In the next 15 years i.e. 1975-1991 it is expected that additional 3283 industrial units, providing an employment of 21855 workers, can be set up in the organised sector of industry.

Table - 13 : List of Possible Industries and their Employment Potential.

Type of Industry	No. of Units	Employment	Taluks
1	2	3	4
<u>1. Agric-Based Industries</u>			
(i) Rice/oil/flour mills.	10	80	Nedumangad, Pathanapuram, Udumbanchola, Thodupuzha, Kunnathunad, Ernad.
(ii) Starch making.	15	125	Ernad, Badagara, Quilandy, Mananthavadi, Vaithiri, Sultan Battery (should be set up away from thickly populated areas).
(iii) Khandsari units.	4	30	Devicolam, Pathanamthitta.
(iv) Coconut based.	60	480	Quilandy, Badagara, Ernad, Mukundapuram, Thodupuzha, Meenachil, Pathanamthitta, Pathanapuram, Neyyattinkara, Nedumangad.
(v) Rubber based.	150	1200	Kunnathunad, Meenachil, Kanjirapally, Pathanamthitta, Pathanapuram, Peermade, Chittur, Vaithiri, Sultan Battery, Kotamangalam, Neyyattinkara, Nedumangad.
(vi) Tea and coffee processing.	15	120	Mananthavadi, Vaithiri, Sultan Battery, Devicolam, Thodupuzha, Udumbanchola, Peernade, Pathanamthitta.
(vii) Cashew based.	8	55	

Table - 13 (Contd..)

Table - 13 (Contd...)

1	2	3	4
(viii) Processing of other agro-products.	100	1400	Can be located in almost all the taluks of the Sub-region depending on the availability of local resources and local demand.
Sub-total	362	3490	
2. Forest-Based			
Saw mills. (furniture, wooden tools, paper, match factory, body building and host of other industries)	223	1765	Devicolam, Pathanapuram, Pathanamthitta, Peermade, Thodupuzha, Udumbanchola, Nedumangad, Kunnathunad, Kanjirapally, Mannarghat, Chittur, Vaithiri, Sultan Battery and Mananthavadi.
Bee keeping.	300	1500	
Sub-total	523	3265	
3. Mineral Based			
Cement factory.	1	150	Palghat
Lime, tiles, ceramic glass refractory and abrasives.	24	1000	Mannarghat, Chittur, Devicolam, Quilandy, Badagara.
Sub-total	25	1150	
4. Live Stock-Based			
(i) Leather tanning.			
(ii) Leather goods.			
(iii) Dairy and milk products	140	1500	May be located near the sources of raw materials.

Table-13 (Contd...)

(Table-13 Contd..)

1	2	3	4
(iv) Bone meals.			
(v) Cattle and poultry feeds.			
(vi) Others.			
Sub-total	140	1500	
5. <u>Fish-Based</u>			
Boat building, nets, cans boxes, ice, etc.	15	175	Quilandy, Badagara, Neyyattinkara.
Sub-total	15	175	
6. <u>Non-Resource Based</u>			
(i) Engineering and allied products.	320	1575	
(ii) Chemicals and allied.	140	1150	
(iii) Building materials.	65	2500	
(iv) Textiles.	1918	5600	
(v) Miscellaneous.	315	1600	
Sub-total	2758	12425	May be set up in all the taluks of the Sub-region, especially in selected rural growth centres and small and medium towns.
Grand Total	3823	21855	

Tourism Development

Scenic beauty and wild life of the Sub-region, in terms of both abundance and variety, offer the tourists plenty to see and enjoy. Its beautiful beaches, wild life sancturaries, hill stations and hill resorts, dams and reservoirs and historical monuments are big tourist attractions.

Keeping this in mind, the proposals for tourism development are as follows:

- (i) creation of suitable machinery for collection and compilation of data related to tourists and tourism;
- (ii) development of tourist spots with high potential i.e. beaches, wild life sanctuaries, historic ~~monuments~~ etc.;
- (iii) improvement in accessibility to all important tourist spots.
- (iv) provision of infrastructural facilities by adoption of innovative techniques in the design of tourist complexes - log cabins, forest huts etc.;
- (v) evolution of tourism development schemes that will provide employment for the local population;
- (vi) accordingly tourism development schemes need a high priority and provision of adequate fund for these.

Social Development

An assessment of the level of social services in

the Sub-region shows that the educational facilities are quite sufficient. The literacy rate is 57.12% against 29.40% in the country. In regard to the number of medical institutions, it has recorded a growth rate of 22% between 1971-75. There were about 1.22 beds per thousand of population in comparison to the national figure of 0.68. There is, however, wide disparity in the distribution of these social facilities within the Sub-region. The hilly nature of the terrain and scattered nature of settlements makes the situation serious.

The strategy for the development of the Sub-region has to be based on the expeditious development of resources and on the provision of special programmes for uplifting the social and economic status of the tribal population simultaneously. For ameliorating the condition of the tribal population, it is necessary firstly, to get them back the lands from which they have been alienated and, secondly, it is desirable to train them in vocations in which they are adept and for that a more imaginative programme like the "Leadership Training Course" (run by Rama Krishna Mission at Ranchi)¹ could be introduced. Even in regard to the educational programmes, instead of making them learn the three rs, it

1. In this Mission the sophisticated tools of agriculture are shown to the tribals, their use is demonstrated and they are taught to handle them without bothering them with the theoretical knowledge about them. This programme is followed up by an extension service which helps them not with words but with the provision of the improved tools on a hired basis and competence is built into the tribal people, specially the leadership. This has helped the tribal population around Ranchi to adopt the modern tools easily. Once they are aware of the advances, there is an urge to learn more and they may voluntarily offer to be educated in the regular manner.

would be desirable to have a 'telescopic programme' in their own dialect and heavily vocation oriented so that it enables them to enhance their income in a short-time horizon. (Table -14)

Transportation

Despite the fact that the Sub-region has a complete hierarchy of roads, from national highway to village roads, it suffers from an inadequate transport network. The major factors that contribute to the inefficiency of the transport system, as already mentioned, are the missing links, the sub-standard geometrics of roads, bridges and culverts and the poor quality of road surfaces.

It is essential that the various categories of roads be repaired and improved in addition to the provision of the missing links, where necessary. Priority needs to be accorded to the development of highways providing regional linkages followed by the state highways, particularly SH 16, SH 17 and SH 19, and the district roads - both 'major' and 'other'. In all these, the above mentioned deficiencies need to be removed. The rural roads, which are under the maintenance of Panchayats, require special attention as they play an important role in economic development by transmitting developmental impulses throughout the area. Moreover, the transport network needs to be co-ordinated with the settlement pattern as both are interrelated and influence their mutual development. Keeping in mind all these factors, it is proposed that the development of transport network in the different taluks should take place in the following order of priorities:

Table - 14 : Proposed Educational Programme for the Tribal Population

Population	6-11 years	11-14 years	14-17 years	17 - and above
Non-Tribal Population	Primary Education for 5 years as presently organised	Middle Education	Higher Secondary Education	College and Universities.
Tribal Population.	Elementary vocational education through audio-visual methods. If situation permits formal education of reading and writing introduced. Medium of education should be in the local tribal dialect.	Vocational education telescoped to include advanced knowledge, techniques and their application on agriculture, forestry, mining and cottage industries through audio-visual aids and demonstrations. Formal education introduced to include reading, writing and arithmetic. Teaching of some common language for medium of education should be started.	Multipurpose vocational training of the I.T.I. level telescoped to bring the training to high level of technical efficiency. Formal education of higher secondary level introduced. Full time teaching through Ashram schools to be started.	College and University Engineering, teachers' training science and other branches.

- i) Quilandy, Ernad, Nedumangad, Pathanapuram and Udumbarachola.
- ii) Thodupuzha and Baçagara.
- iii) Mananthavadi, Palghat, Neyrattinkara, Devicolam and Peermade.

In addition, it is hoped that the following schemes proposed by the P.W.D. department, Kerala Government, will be completed as planned:

- (1) Proposed hill highway in the form of a through artery traversing the high ranges of the Western Ghats, from the Northern to the Southern boundary. The scheme includes upgradation of district and village roads, improvement of highways and construction and improvement of bridges and missing links.
- (2) Proposed upgradation of two major district roads, viz:
 - (i) road connecting Mananthavadi-Tirunelveli and Virajpet (Karnataka) and
 - (ii) road connecting Mananthavadi and H.D. Kote in Karnataka.

Almost all the proposed urban centres, upto the level of service towns are well served by the existing road network. The proposed urban pattern and existing and corresponding desirable transport facility are indicated in Table-15. The future urban pattern, transport network indicating the major deficiencies are shown in Figure-31.

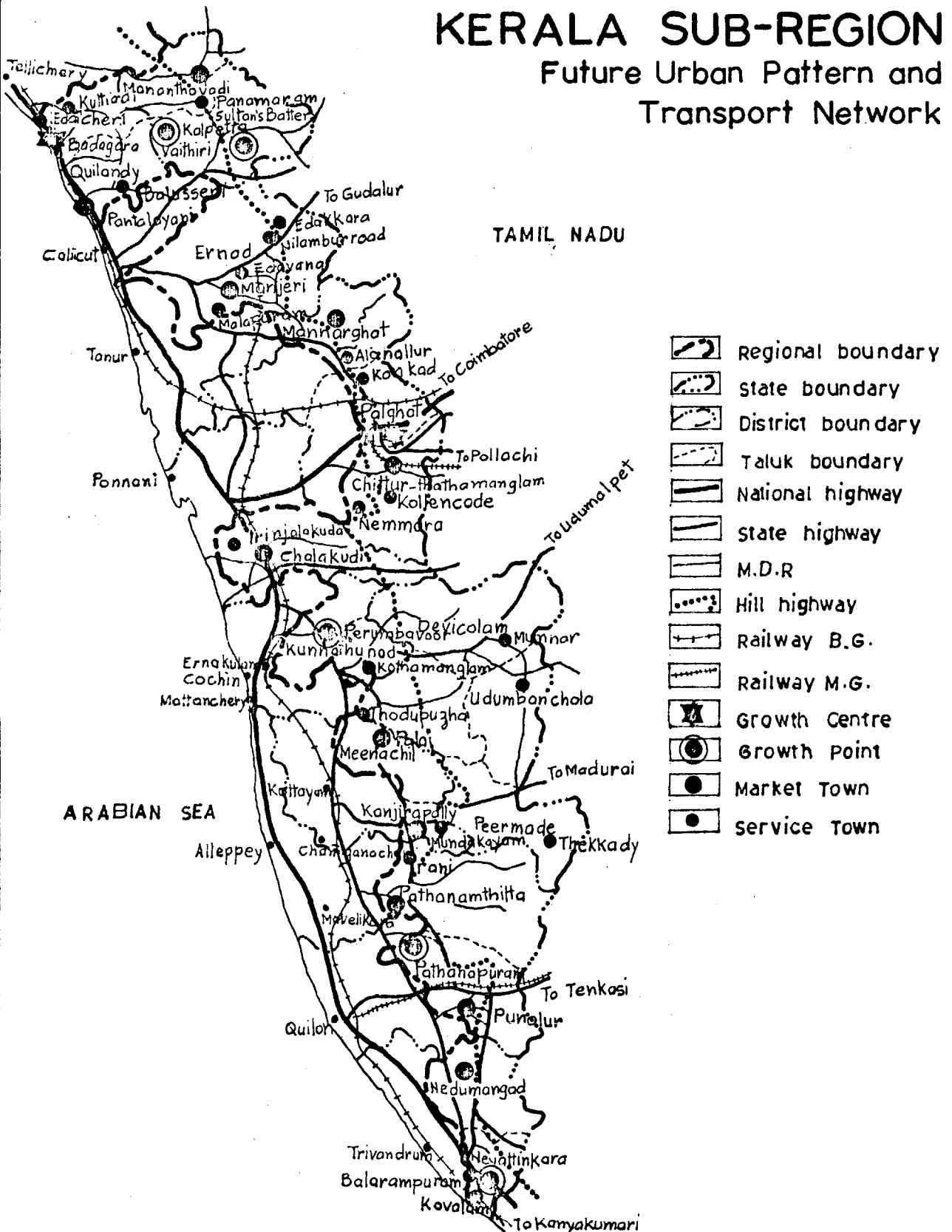
Table - 15 : Proposed Urban Pattern and Transport Facility.

Functional Hierarchy	Settlement:	Existing	Desirable
Growth Centre	1. Palghat	NH, Rail	SH/NH + Railhead
	2. Badagara	NH, Rail	SH/NH + Railhead
Growth Point	3. Sultan Battery	MDR	SH/NH
	4. Kalpetta	MDR	SH/NH
	5. Perumbavoor	SH	SH/NH
	6. Pathanapuram	SH	SH/NH
	7. Neyyattinkara	NH + ODR	SH/NH
Market Centres	8. Mananthavadi	MDR	SH
	9. Pantalayani	NH + Rail	SH
	10. Manjeri	SH + MDR	SH
	11. Mannarghat	SH + MDR	SH
	12. Chittur	SH	SH
	13. Chalakudy	SH + MDR	SH
	14. Palai	SH + MDR	SH
	15. Kanjirapally	SH + MDR	SH
	16. Pathanamthitta	SH + MDR	SH
	17. Punalur	SH + MDR	SH
	18. Nedumangad	SH + ODR	SH
Service Towns	19. Edacheri	NH + Rail	DR
	20. Kuttiadi	MDR	DR
	21. Balusseri	MDR	DR
	22. Panamaram	MDR	DR
	23. Malapuram	SH + MDR	DR
	24. Edavara	SH + MDR	DR
	25. Edakkara	SH	DR
	26. Nilambur Road	SH	DR
	27. Allanallur	MDR	DR
	28. Konkad	MDR	DR
	29. Hemambikanagar	NH	DR
	30. Nemmara	MDR	DR
	31. Kollencode	MDR	DR
	32. Irinjalakuda	SH + MDR	DR
33. Kothamangalam	SH + MDR	DR	
34. Minnar	SH + MDR	DR	
35. Udumbanchola	SH	DR	
36. Thodupuzha	SH+MDR+ODR	DR	
37. Ponkunnam	SH	DR	
38. Mundakkayam	SH	DR	
39. Thekkady	ODR	DR	
40. Rani	SH	DR	
41. Balaramapuram	NH	DR	
42. Kovalam	MDR	DR	

Fig.31

KERALA SUB-REGION

Future Urban Pattern and Transport Network



20 0 20 40 60 Km.

Urban Pattern

The level of urbanisation in 1971 in the Sub-region was only 8 percent against 16 percent in the State. It is expected, as also felt by the State Town Planning experts, that by 1991, the urbanisation level of the Sub-region should be about 24 percent particularly in view of the present tempo of developmental efforts in the ghats areas by the Central and State Governments.

Based on the population projections by the Registrar General of India (Census Operations) and on the 1971 prorata population proportion in the Sub-region, the urban population of the Sub-region may be in the neighbourhood of 14 lakhs in 1981 and 25 lakhs by 1991. At the prevailing average town size in terms of population, the urban population in the Sub-region may be contained in about 40 towns in 1981 and 70 in 1991. But on the basis of the distance criterion and reasonable functional network, about 45 urban centres can be developed and thus the average population size of a town may be more than that in 1971. In the choice and development of the urban centres the aim should essentially be to strengthen and stabilise the settlement system as a whole within an efficient organisational and functional framework.

In order to translate the goals and strategies of the development plan spatially, a functional system of settlements¹ consisting of service villages, market towns, growth centres, growth points etc. has been suggested. The functions and services provided in each level

1. For details of the concept etc. please refer section on proposal for future urban pattern of Vol.II P.508-522.

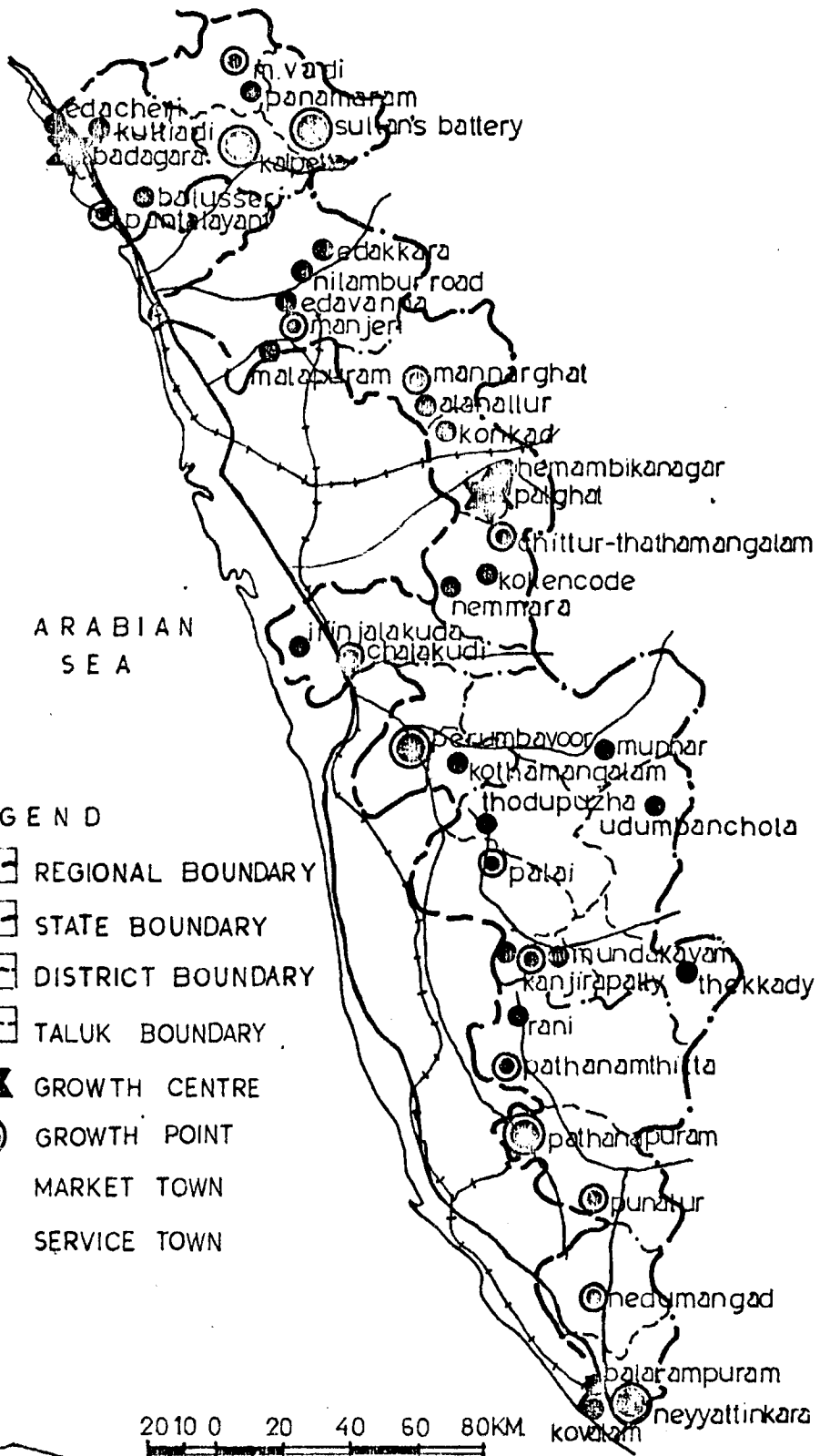
of this hierarchical system of settlements is indicated in Table-16.

Based on an analysis of the existing levels of development and future potentials of the Sub-region, the future urban pattern evolved Table-17 and Figure-32 take into consideration the following:

- organisational and functional needs for stability, sustenance and growth of the Sub-region, i.e. provision of services and facilities for the same;
- transmission of developmental and administrative impulses through an organised system of roads ;
- interlinkages and inter relationships with settlements in the adjoining areas both in the east and the west² i.e. in Karnataka and Tamil Nadu;
- development potentials and programmes of all the relevant economic sectors, to facilitate integrated development of the Sub-region;
- special role of agro-forest based industrial activities and interstate border centres like Sultan's Battery, Palghat, Chittur, Neyyattinkara;
- expected transformation in the economy through the execution of various irrigation and power schemes.









2. West of the Sub-region influence of magnets like Cannanore, Calicut, Ernakulam, Quilon, Trivandrum as well as Trichur and Kottayam; in the east, influence of Ooty, Coimbatore, Pollachi, Madurai, Tirunelveli, has been taken into account.

KERALA SUB-REGION FUTURE URBAN PATTERN



ARABIAN SEA

LEGEND

-  REGIONAL BOUNDARY
-  STATE BOUNDARY
-  DISTRICT BOUNDARY
-  TALUK BOUNDARY
-  GROWTH CENTRE
-  GROWTH POINT
-  MARKET TOWN
-  SERVICE TOWN

20 10 0 20 40 60 80KM

WESTERN GHATS : SURVEY AND PLAN
TOWN & COUNTRY PLANNING ORGN., MINISTRY OF WORKS & HOUSING , GOVT. OF INDIA.

Table -16 : Levels of Facilities and Services at Different Functional Centres

No.	States in Hierarchy	Distributary Services	Collection Marketing and Banking	Rural Development (Extension Work) Agricultural Credit Institutions	Industrial Development Corporation	Social Services (Educational)	Social Services (Health)	Law Revenue and Judicial Govt. Deptt.	Transport & Communications	Specialised Services and Skills	Remarks
1.	Village	One or two Shops	-	-	-	Primary School	Mobile Units	-	V.R.	-	-
2.	Service Village	Shops and a Co-op. Store.	Weekly/Biweekly/ Markets.	V.L.W.	Rural Craft Shed	Middle School	Dispensary	Village Outpost	D.R. D.R.	-	-
3.	Service Town.	Retail Shopping + Consumer Co-operative.	Banks Town/ Market mainly to local consumption, dairy products, vegetables etc.	Rural Credit Society	Rural Industrial Estate	Secondary School	Primary Health Centre.	Police Thana	D.R.	General Workshop	Cooperative Stores or Agricultural Credit Corporation.
4.	Market Town.	Wholesale Distributors and Retail Shops.	Banks, Wholesale Market, Regulated Market.	Block H.Q. Rural Credit Society.	-	Inter-College	Hospital with 50 beds.	Sub-Division H.Q.	S.H. S.H.	General Workshop	Land Development Bank or Agricultural Finance Corporation.
5.	Growth Point	-do-	Several Banks	-	Industrial Estate (Industrial Service Institute)	I.T.I., Inter-college	District Hospital	District H.Q.	S.H. or N.H.	-do-	-do-
6.	Growth Centre	Specialised /Retail Shopping and Wholesale distribution.	Several Banks	District H.Q.	Industrial Area.	Degree College, Polytechnic.	State Hospital /Specialised Hospital.	District/ Divisional Police H.Q.	Railhead N.H. or S.H.	Specialised Workshops.	-
7.	Growth Pole.	Metropolitan Shopping Centre.	-do-	-	Industrial Complex.	University and Technical College	Medical College specialised hospitals.	State, H.Q./ Divisional H.Q.	-	All skills available.	-
8.	Growth Cluster	-	Banks	-	-	-	-	-	-	-	-

V.L.W = Village Level Workers
V.R. = Village Road
D.R. = District Road

S.H. = State Highway
N.H. = National Highway
H.Q. = Headquarters.

Table - 17 : Proposed Urban Pattern in the Sub-region.

<u>Functional Hierarchy</u>	<u>Settlement</u>	<u>Location (Taluk)</u>	
<u>Growth Centre</u>	1. Palghat	Palghat	
	2. Badagar	Badagara	
<u>Growth Point</u>	3. Sultan Battery	Sultan Battery	
	4. Kalpetta	Vaithiri	
	5. Perumbavoor	Meenachil	
	6. Pathanapuram	Pathanapuram	
	7. Neyyattinkara	Neyyattinkara	
<u>Market Towns.</u>	8. Mananthavadi	Mananthavadi	
	9. Pantalayani	Quilandy	
	10. Manjeri	Ernad	
	11. Mannarghat	Mannarghat	
	12. Chittur-Thathamangalam	Chittur	
	13. Chalakudy	Mukundapuram	
	14. Palai	Meenachil	
	15. Kanjirapally	Kanjirapally	
	16. Pathanamthitta	Pathanamthitta	
	17. Punalur	Pathanapuram	
	18. Nedumangad	Nedumangad	
	<u>Service Towns</u>	19. Edacheri	Badagara
		20. Kuttiadi	Badagara
		21. Balusseri	Quilandy
		22. Panamaram	Mananthavadi
		23. Malappuram	Ernad
		24. Edavanna	Ernad
		25. Edakkara	Ernad
26. Nilambur Road		Ernad	
27. Alanallur		Mannarghat	
28. Konkad		Palghat	
29. Hemambikanagar		Palghat	
30. Nemmara		Chittur	
31. Kollencode		Chittur	
32. Irrinjalakuda		Mukundapuram	
33. Kothamangalam		Kothamangalam	
34. Miruncr		Devicolum	
35. Udumbanchola		Udumbanchola	
36. Thodupuzha		Thodupuzha	
37. Ponkunnam		Kanjirapally	
38. Mundakayam		Kanjirapally	
39. Thekkady		Peermade	
40. Rani		Pathanamthitta	
41. Balaramapuram		Neyyattinkara	
42. Kovalam		Neyyattinkara.	

For the implementation of the above proposals concerned with the future settlement pattern, priority, preferably in the following order, must be given to:

- (i) the development of villages selected for future urban status, in order to establish a strong base for collection and distribution of marketable goods as well as for delivery of services and facilities;
- (ii) the upgradation of selected urban centres, especially in the command areas of irrigation projects; accompanied by provision of whole-sale marketing and warehousing facilities, commensurate with the stages of completion of the irrigation projects;
- (iii) the development of tourist spots (e.g. Thikkady, Kovalam, Idikka) and interstate border towns need special attention due to their economic importance of interstate trade and transactions.

Strategy for Employment Generation in the Sub-region .

According to 1971 Census, about 30.23% of the total population are workers against 53.20% in the working age group, in the Sub-region. Thus, about 23% of the working force are unemployed. The Census figures, however, do not throw light directly on the real unemployment as it does not account for under-employment. An attempt has been made to assess precisely the unemployment rate¹ in the Sub-region which is estimated to be about 48.50% of the working force (assuming working force as 100). The magnitude of unemployment in the

1. For details please refer to Vol.II P.63-65.

Sub-region thus appears to be very staggering and needs to be taken care of while framing the development strategy.

Agriculture employed 57.18% of the total workers in the Sub-region as compared to 48.50% in the state, in 1971. Economic development implies a significant decrease in this share. Available empirical evidence shows that since, within the unorganised sector, employment opportunities in the non-agricultural activities have not been expanding, the labour force growth continues to press on the already crowded agricultural sector. Keeping this in view, an attempt has been made to estimate the employment potential in the primary sector, excluding mining and fishery, by 1985 in the Sub-region² which indicates that the total employment likely to be generated in this sector would be about 1,689,400 i.e. 49.95% of the total estimated workers³ against 68.34% in 1971 (Table-18). This, however, does not take into account the diversification of allied activities such as organised animal husbandry, dairy and intensive development of forestry, where scope for the expansion of employment is quite substantial.

The balance of the labour force i.e. about 1,693,000 workers, therefore, need to be absorbed in the intensive development of the above activities and in the secondary and tertiary sectors. There is, thus, a need to diversify the employment structure through the creation of non-agricultural occupation by creating a suitable climate for industrial development, provision and

2. For details please refer Vol.II page 131 -133.

3. Assuming participation rate of 32% in 1985 against 30.23% in 1971.

Table -18 : Estimated Employment Capacity in Agriculture, Forestry and Animal Husbandry in the Kerala Sub-region by 1985.

Sl. No.	Area of Activity	Area (in hectares)	Employment @ 300 days in a year
1	2	3	4
1.	Paddy	510,600	765,900 @ 1.5 persons per hectare.
2.	Other foodgrains	42,500	7,100 @ 50 mandays per hectare.
3.	Tapioca	136,200	61,100 @ 150 mandays per hectare.
4.	Tea and Coffee	102,100	93,600 @ 275 mandays per hectare.
5.	Pepper	93,600	85,800 @ 275 mandays per hectare.
6.	Rubber	119,200	59,720 @ 150 mandays per hectare.
7.	*Coconut	187,200	31,200 @ 50 mandays per hectare.
8.	*Arecanut	51,100	3,410 @ 20 mandays per hectare for adult palms.
9.	Cardamum	85,100	113,500 @ 400 mandays per hectare.
10.	Banana	34,000	39,700 @ 350 mandays per hectare.
11.	Other Crops.	340,430	113,500 @ 100 mandays per hectare.
12.	Forestry	981,212	42,520 @ 13 mandays per hectare.
13.	Animal Husbandry	-	52,000
Sub-total		2,683,242	1,469,050
** Allied Activities			220,350
Total			1,689,400

*Irrigation needs are not taken into account while estimating the labour requirements for coconut and arecanut.
 **Assuming that 15% of the workers engaged in Agriculture, Forestry and Animal Husbandry will be gainfully employed in allied and sideline activities.

strengthening of infrastructure and services. The bulk of investments under marketing or processing, medium, small and cottage industries, local infrastructure and social services including water supply, housing, health, education, sanitation and local transport, as proposed in the development perspective has a high work component and will be able to absorb a substantial portion of the rest of the estimated working force.

The implementation of a well conceived growth strategy would no doubt, imply absorption of labour in rural asset creation, and also generate increased employment opportunities through the operation of multiplier effects; the nature and dimension of the problem of unemployment in the Sub-regional economy is such that given the present demographic trends, growth alone would not suffice. It will have to be supplemented by undertaking special employment schemes¹ for creation of durable physical assets and development of social infra-structure under the "food for work" programmes.

Keeping in view the overall objective of the conferment of benefits directly to each of the population groups living in the Western Ghats Region, the programmes for development which can serve the twin objectives

1. Special employment schemes may include drinking water supply, raising of energy plantations, land reclamation projects, soil conservation, afforestation, desilting of rivers, the works relating to village infra-structures, such as link roads, irrigation channels, and levelling, drainage, deepening of wells, ponds and similar activities, development of social infra-structure which would contribute to better sanitation and public hygiene, protected water supply and the link, leading to a better quality of life and higher productivity of labour.

of raising the production levels as well as the earning capacity of the poorer sections of the population, through the generation of additional employment opportunities, would have to focus on marginal farmers, rural artisans and landless labourers. Accordingly, the programmes for development have been spelt out population groupwise, and the kind of primary and secondary activities that should be promoted as well as the needs of infra-structure and other support for such activities have been provided for. The overall programmes also include the provision of infrastructural facilities and amenities which are directed towards making it possible for the less privileged groups to use the additional resources made available to them for their betterment. In this process the upgradation of existing facilities to the needed level has been suggested.

For this purpose, the total population has been categorised as follows:-

1. Cultivators; (i) Big farmers (ii) Small farmers (iii) Marginal farmers.
2. Landless labourers.
3. Workers employed in forestry.
4. Workers employed in animal husbandry.
5. Population engaged in non-agricultural activities, e.g. in secondary and tertiary sectors.

In dealing with each of the population groups listed above, their present economic status has been assessed and their ability to earn a reasonable living has been estimated in terms of resources available to them. To supplement their income, secondary employment in alternative vocations has been proposed. Over and

above, the necessary infrastructural support which is to be given and a programme of incentives and disincentives has also been suggested for each of the population groups so that they could take advantage of these to improve their earnings. A detailed programme for the proposed restructuring of economy/social activities for all the population groups in the Sub-region, has been worked out and given in the statement attached (Table-119). The actual number of families in each of the population groups would be identified while preparing the taluk plan. Necessary support needs to be given as suggested to improve their earnings.

The contents and proposals of the development plan discussed earlier based on different sectoral studies, have thus taken into account the needs as well as the potentials of different sectors in the Sub-region. For each sector, policies and programmes have been suggested taking note of the visible resources, the modest and gradual beginning of the programmes, which pick up as time passes, and the contingency of giving a shock to the affected people. An attempt has been made to identify activities, that are suitable to the area and capacity of absorbing local labour surpluses for which supplementary funds in addition to those available for sectoral investments, may be directed.

In order to integrate the policies and programmes related to the development of the different sectors and to translate these spatially, the development perspective for the year 1991 has been presented in the form of a composite map indicating the potential areas, in terms of land use, infrastructural, social and economic development, for each activity. (Fig-33). The goals spelt

out in the plan are to be achieved by 1991.

It is relevant, finally, to express the doubt that some of the proposals, programmes and targets may seem to be too ambitious or even unrealistic, in view of the resource constraints or other developmental problems as well as the inability of the implementing agency to get adequate funds for implementation of the proposals. It is obvious that, though the overall success of the plan would depend upon the availability of financial resources, nevertheless, it provides the basic framework for future action based on the study of the dimensions of various problems, the needs and potentials of the Sub-region.

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Table - 19 : Proposed Restructuring of Economic/Social Activities in Rural Area

Population Group	AREA OF ACTIVITY		INFRASTRUCTURAL SUPPORT		Programmes for Incentives and Disincentives
	Primary Employment	Secondary Employment	Economic	Social	
1	2	3	4	5	6
1. Big Farmers (More than 2 ha.)	Plantation/ Agricultural	Left to individual farmer	A. Improved Plantation/ Agricultural Practi- ces Adequate and timely supply of im- proved saplings/seeds fertilizers, pestici- des and weed killers etc. at fair price. Farm implements; dis- tribution and repair. Irrigation (where feasible). B. Road Transport. C. Market and Storage. D. Credit institutions.	A. Veterinary services (Artificial insemination centres and Seman Banks) B. Recreation i.e. Cinema, Library, Club etc.	A. Incentive for tree crops B. Support for the gestation period of plantation crops introduction of new crops and intercropping . Risk coverage and crop insurance. Scientific phasing for the intro- duction of tree crops in a way that food for the consumption and management of farm could be met adequately.
2. Small Farmers (1 - 2 ha.)	Plantation/ Agricultural	Subsidiary employ- ment in poultry, piggery, dairy and cottage industries.	Items A to D as indi- cated above. E. Poultry and piggery feed supply. F. Livestock quality improvement, disease resistant and stall feed assistance.	As above	A. Incentive for consolidation of holdings and collective/group farming. B. Incentive and subsidy for HYV seeds fertilizers and pesticides. C. Free technical advice on farm planning i.e. cropping pattern, rotation of crops doses of inputs and agronomical practices. D. Support for the gestation period of plantation crops as suggested for big farmers. E. Disincentives for sub division and fragmentation of land holdings.
3. Marginal Farmers (less than 1 ha.)	Plantation on Cooperative basis/Agricul- tural.	Subsidiary employ- ment in poultry, piggery, cottage industries or labourers in plan- tation/Agricultural farms.	Items A to F as indi- cated above.	As above	Items A to E as indicated above F. Discourage land being left fallow.
4. Landless labourers	Service in plan- tation and Agri- cultural farms.	Labour in forestry, animal husbandry and cottage industry.	A. Rural industrial estate. B. Transport. C. Credit institutions. D. Career planning.	A. Housing sites.	A. Incentive for self employment in household industries such as rope making, mat making, soap making, coir, beedi and other articles based on local products.

(Table - 19 contd...)

(Table - 19 contd...)

1	2	3	4	5	6
5. Workers engaged in forestry.	Forestry	Beekeeping, dairy, poultry, piggery and cottage industries.	<p>A. Transport including forest roads.</p> <p>B. Minor forest produce collection cooperative.</p> <p>C. Processing units for forest produce.</p> <p>D. Working plan for all forest areas.</p> <p>E. Forest produce collection and processing implements distribution and repairs.</p> <p>F. Credit institutions (Mobile banks)</p>	<p>Due to difficult terrain and staggered small group of huts, mobile units for medical, post and telegraph, veterinary services, cinemas and extension work should be arranged for the population living in forest villages.</p>	<p>A. Collection rights of forest produce to tribals/local people.</p> <p>B. Employment to local people in extraction of major forest produce.</p> <p>C. Incentive for afforestation of trees of economic importance and ecological value.</p> <p>D. Disincentive for open grazing.</p>
6. Workers engaged in Animal Husbandry.	Dairy/Poultry/Piggery.	Related household industry.	<p>A. Cattle/Poultry/Piggery sheds.</p> <p>B. Collection Centres.</p> <p>C. Processing Units.</p> <p>D. Improved breeding and stall feeding facilities.</p> <p>E. Produce marketing cooperative.</p> <p>F. Transport.</p> <p>G. Credit institutions.</p>	<p>A. Housing sites for landless workers.</p>	<p>A. Incentives for farming cooperative units.</p>
7. Workers engaged in secondary Sector.	Industry, Household industry, construction etc.		<p>A. Innovations for introducing new industries like iron silk etc., forest based industries (saw mills), wood working units, industries based on plantation and agricultural products.</p>		<p>A. Financial support credit facilities, assured supply of raw materials, marketing cooperatives, assured/ Govt. markets for finished goods, technical training facilities for short term and long term courses.</p>
8. Workers engaged in Tertiary Sector.	Transport and Communication, Trade and Commerce, Other services.		<p>A. Roads (village and arterial roads).</p> <p>B. Housing and housing sites.</p> <p>C. Credit/institutional finance.</p> <p>D. Drinking water supply.</p> <p>E. Domestic power.</p> <p>F. Pucca markets.</p>		<p>A. Local population could be encouraged to take to these vocation and trucks/bus permits could be given to them, loans for building house/markets at important focal points could be advanced to trigger growth.</p>

KERALA SUB-REGION DEVELOPMENT PERSPECTIVE-1991



LEGEND

- REGIONAL BOUNDARY
- SUB-REGIONAL BOUNDARY
- STATE BOUNDARY
- DISTRICT BOUNDARY
- TALUK BOUNDARY
- RIVERS
- RAILWAYS
- NATIONAL HIGHWAYS
- STATE HIGHWAYS
- DISTRICT ROADS
- ARABLE LAND
- RESERVE FOREST
- PROTECTED FOREST
- UNCLASSIFIED FOREST

POTENTIAL DEVELOPMENT AREAS

- AGRICULTURE
- PLANTATION
- FORESTRY
- FORESTRY & PLANTATION
- FISHERY
- UPGRADE MDR TO SH
- HILL HIGHWAYS

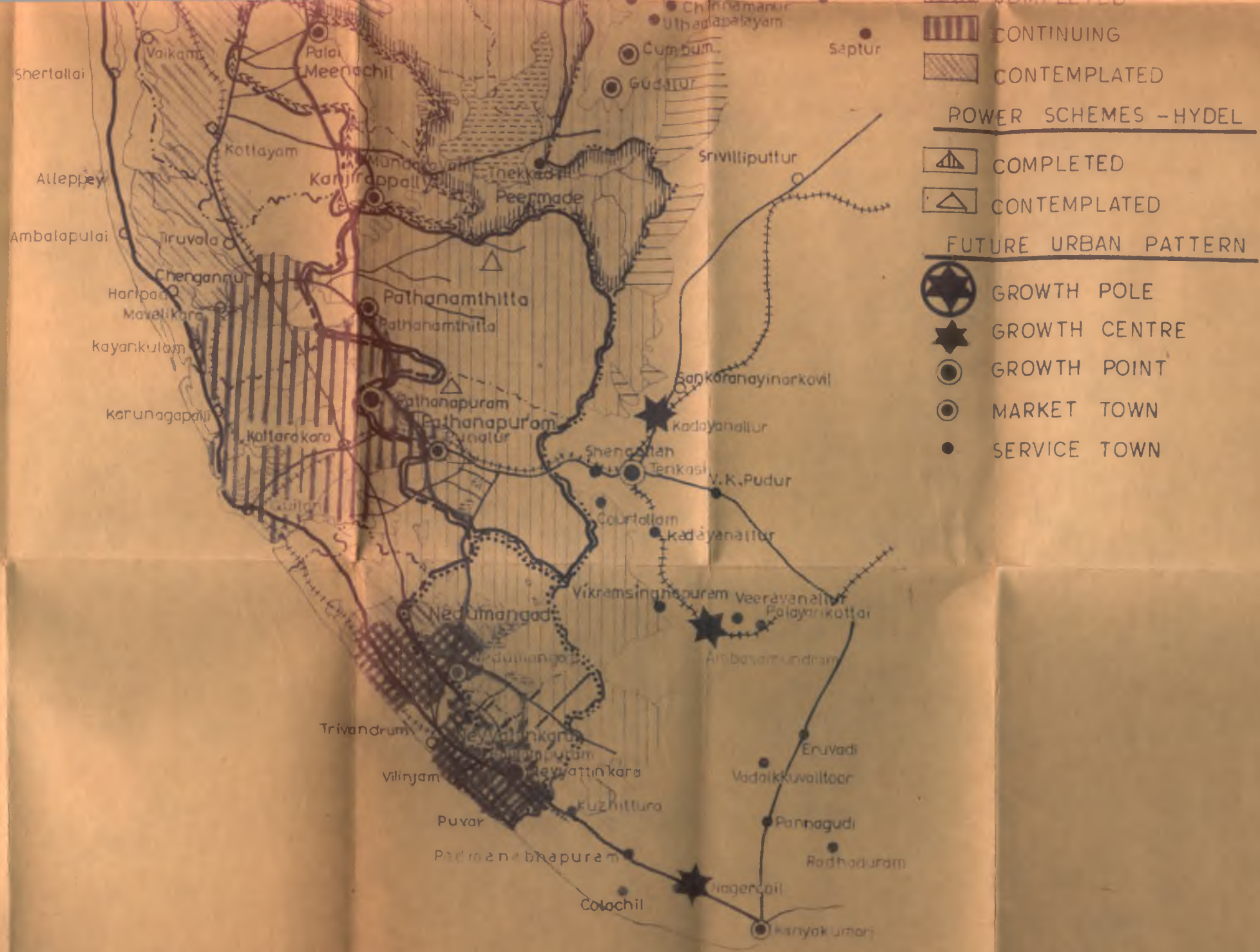
LARGE IRRIGATION SCHEMES AYACUT

- COMPLETED
- CONTINUING
- CONTEMPLATED

POWER SCHEMES -HYDEL

- COMPLETED
- CONTEMPLATED

ARABIAN
SEA



WESTERN GHATS : SURVEY & PLAN

Town & Country Planning Organisation, Ministry of Works & Housing, Government of India

