

No. 10

THE GOVERNMENT OF MALAYSIA

**REGIONAL STUDY ON
THE INTEGRATED DEVELOPMENT OF
SOUTH TERENGGANU**

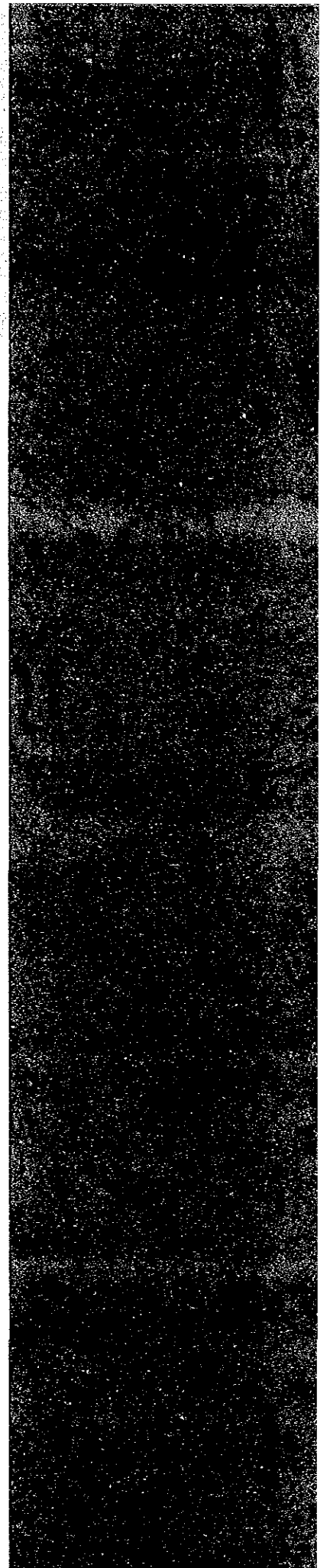
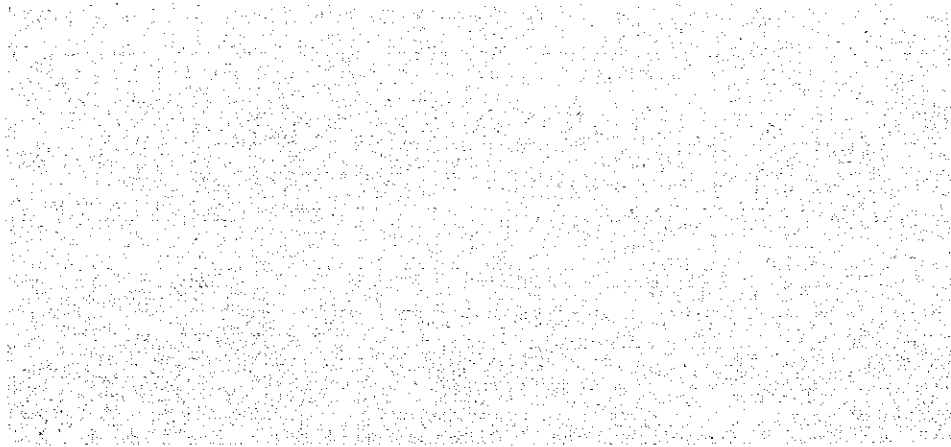
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AUGUST 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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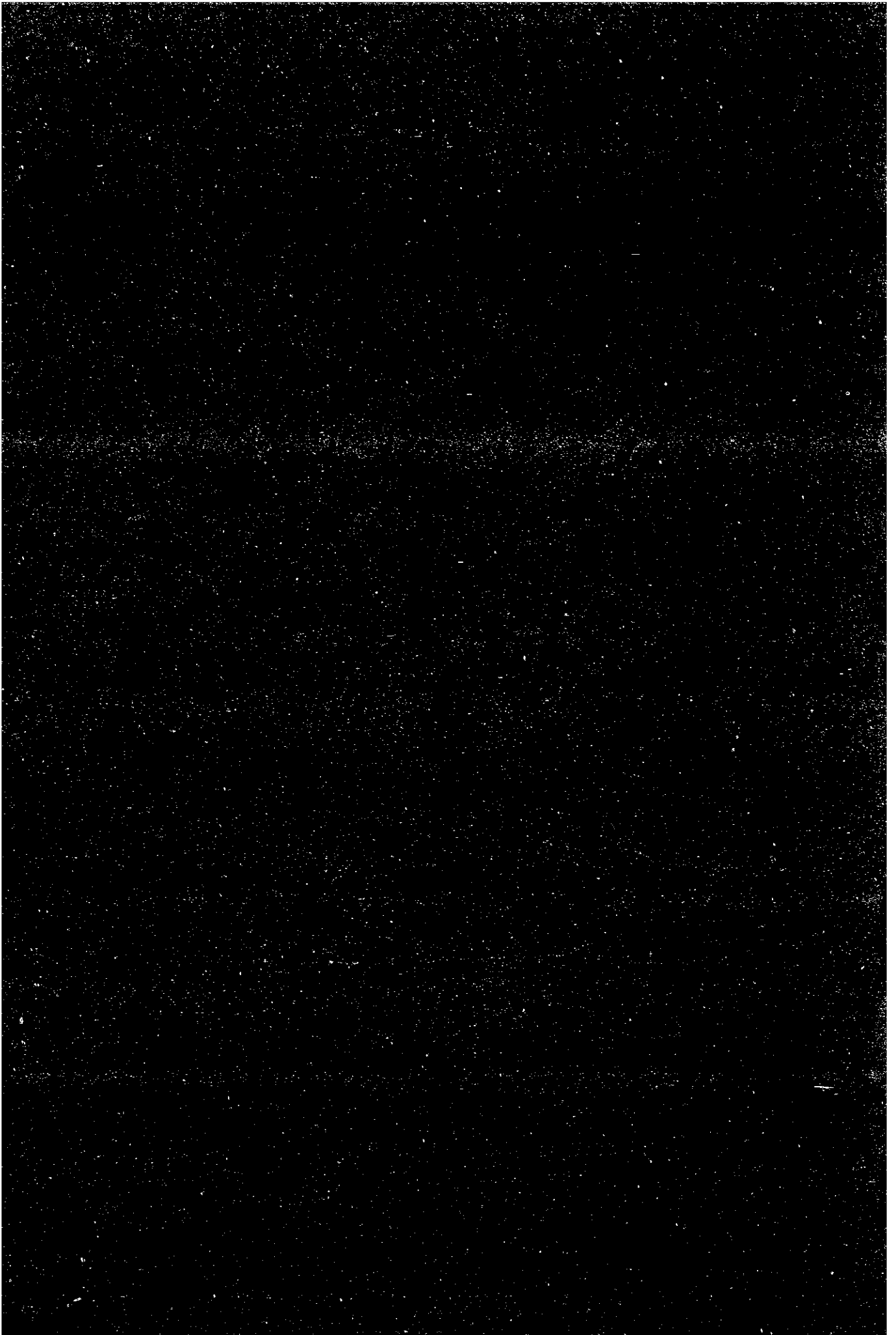
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GLOSSARY

1. Organisations

ASEAN	–	Association of South East Asian Nations
AIST	–	American Institute of Steel Industries
DCA	–	Department of Civil Aviation
DID	–	Drainage and Irrigation Department
DOA	–	Department of Agriculture
DOE	–	Department of Environment
EPMI	–	Esso Production Malaysia Inc.
EPU	–	Economic Planning Unit, Prime Minister's Department
FAMA	–	Federal Agricultural Marketing Authority
FAO	–	Food and Agriculture Organisation (United Nations)
FELCRA	–	Federal Land Consolidation and Rehabilitation Authority
FELDA	–	Federal Land Development Authority
FIMA	–	Food Industries of Malaysia Sdn. Bhd.
HICOM	–	Heavy Industry Corporation of Malaysia
HPU	–	Highway Planning Unit
IKM	–	Institut Kemahiran MARA
ITI	–	Industrial Training Institute
ITM	–	Institut Teknologi MARA
JICA	–	Japan International Cooperation Agency
JKPB	–	Committee on Planning and Building
JKR	–	Jabatan Kerja Raya
JPJ	–	Jabatan Pengangkutan Jalan
KETENGAH	–	Lembaga Kemajuan Terengganu Tengah
LLN	–	Lembaga Letrik Negara
MARA	–	Majlis Amanah Rakyat
MARDI	–	Malaysian Agricultural Research and Development Institution
MIDA	–	Malaysian Industrial Development Authority
MOA	–	Ministry of Agriculture
NICS	–	Newly Industrialized Countries
PERMINT	–	Permint Plywood Sdn. Bhd.
PESAKA	–	Pesaka Terengganu Berhad.
PETRONAS	–	Petroleum National Berhad.

PORIM	–	Palm Oil Research Institute of Malaysia
RISDA	–	Rubber Industry Smallholders Development Authority
SDO	–	State Development Office
SEDC	–	State Economic Development Corporation
SEPU	–	State Economic Planning Unit
SGI	–	Sabah Gas Industries
SJKR	–	Jabatan Kerja Raya Terengganu
SQ	–	Singapore Airline
TCPD	–	Town and Country Planning Department
TDC	–	Malaysia Tourist Development Corporation
TDMB	–	Terengganu Development Management Berhad.
THDA	–	Terengganu Handicraft Development Authority

2. Studies

- NWRSM: National Water Resources Study, Malaysia, 1982, Government of Malaysia and JICA.
- SCTWR: Water Resources Development For Domestic And Industrial Water Uses In The South Terengganu Region, 1981, EPU and Binnie Dan Rakan (M), SMEC and SGV-Kassim Chunsdan Bhd. (South Coastal Terengganu Water Resources)
- TCRS: Terengganu Coastal Region Study, 1980, Australian Development Assistance Bureau, The Government of Malaysia And The State Government of Terengganu.
- TMPS: Terengganu Master Plan Study, 1983, The Government of Malaysia, The State Government of Terengganu and SYSPLAN.

3. General

ABS	–	Acrylonitrile Butadiene Styrene
B-B	–	Butene and Butadiene
BOD	–	Biochemical Oxygen Demand
BPD	–	Barrels per Day
BSD	–	Barrels Stream per Day
CBD	–	Central Business District
Cu.m/y	–	Cubic Meters Per Year
DBH	–	Diameter at Breast Height
DCB	–	Dried Cocoa Bean

DR	–	Direct Reduction
DRC	–	Direct Rubber Content
DWT	–	Dead Weight Ton
EEZ	–	Exclusive Economic Zone
EL	–	Elevation
FFB	–	Fresh Fruit Bunch (Oil Palm)
FMP	–	Fourth Malaysia Plan
GDP	–	Gross Domestic Product
GNP	–	Gross National Product
GPD	–	Gallon Per Day
GRP	–	Gross Regional Product
ha	–	Hectare
HSC	–	High School Certificate
HDPE	–	High Density Polyethylene
J-J	–	Jabor-Jerangau
JKKK	–	Village Development Committee
KV	–	Kilovolt
KW	–	Kilowatt
KWH	–	Kilowatt Hour
LCE	–	Lower Certificate of Education
LCN	–	Load Classification Number
LDPE	–	Low Density Polyethylene
LFPR	–	Labour Force Participation Ratio
LNG	–	Liquefied Natural Gas
LPG	–	Liquefied Propane Gas
MB	–	Thousand Barrels Per Day
MCE	–	Malaysian Certificate of Education
mgd	–	Million Gallons per Day
Mg/l	–	Miligrams per liter
MM	–	Million (10 ⁶)
MMB	–	Million (10 ⁶) Barrels, Per Day
MMSCFD	–	Million (10 ⁶) Standard Cubic Feet Per Day
MPTD	–	Metric Ton per Day
m/s	–	Milestone
MTPA	–	Metric Ton Per Annum
MTR	–	Mid-Term Review of Fourth Malaysia Plan
M\$	–	Malaysian Ringgit

MVA	–	Mega Volt Ampere
MW	–	Megawatt
NASP	–	National Airport System Plan
NEP	–	New Economic Policy
NPV	–	Net Present Value
COIP	–	Oil Originally in Place
PP	–	Polypropylene
PVC	–	Polyvinyl Chloride
ROI	–	Return on Investment
RSS	–	Ribbed Smoked Sheet (Rubber)
SAN	–	Styrene Acrylonitrile
SCFD	–	Standard Cubic Feet Per Day
SMR	–	Standard Malaysian Rubber
SMS	–	Selective Management System (Forestry)
SS	–	Suspended Solids
T	–	Ton
TCF	–	Trillion (10^{12}) Cubic Feet
TCOT	–	Terengganu Crude Oil Terminal
TMP	–	Third Malaysia Plan
T/Y	–	Tons Per Year
USS	–	Unsmoked Sheet (Rubber)
VCM	–	Vinyl Chloride Monomer
WQR	–	Water Quality Regions

CHAPTER 9

URBAN DEVELOPMENT PLAN

CHAPTER 9 URBAN DEVELOPMENT PLAN

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CHAPTER 9 URBAN DEVELOPMENT PLAN

1. Objectives of The Study

1.1 Objectives

Industrialization of the east coast of the Peninsular Malaysia is one of the national policies on diversification of industries into underdeveloped regions.

However, there is no core town which has sufficient agglomeration of industries in the east coast. Therefore, the development of core towns as well as industrial development are the main parts of the regional strategy.

Significance and role of the core towns are as follows:

- Location of manufacturing industries in the area which has no core urban areas is not attractive for most of the manufacturing enterprises, because of no ancillary and supporting industries.
- Modern industries cannot grow without inter and intra-sectoral linkages with other sectors. It is a general principle. So, development policy proclaims the agglomeration at the initial stage in most cases. Spread effects can be expected after a certain level of agglomeration is achieved.
- Agglomeration of industries cannot be achieved without a coordinated urban development.

The objective of the study is to formulate a conceptual urban structure plan for the development of the core towns in the study area: Dungun and Cukai.

1.2 Definition of Urban Areas

The town area and local Government boundary are designated the Committee on Planning and Building (JKPB).^{1/}

However, the existing town area is a part of built-up area. The population listed on the population census indicates the number of people living in this urban area, and it is different from the actual population in the built-up area.

Local Government area is administered by Town Council. JKPB decides infrastructural improvement and planning in the area. This area can be named as an urban planning area.

Boundaries and areas to be used in this report are defined as illustrated on Fig. 9.1. Consequently, the area of urban planning in this report is studied in accordance with the future expansion prospect of the urban area. The resultant recommendation will show a boundary within which the structure plan is prepared.

^{1/} JAWATAN KUASA PERANCANGAN DAN BANGUNAN, (Committee on Planning and Building) consists of the members of TCP, DID, District JKR, LLN, Health Department and Land Office.

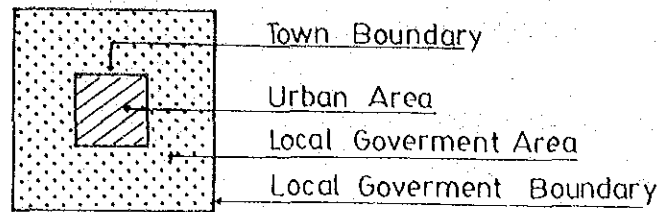


FIG. 9.1 AREA DEFINITION

2. Urban Development Strategies

2.1 Potential and Constraints

In order to formulate an industrial agglomeration in South Terengganu, the following potentials are identified:

- Because offshore petrol and gas products are landed at Kerteh, they can be used to locate leading industries which should be part of the growth pole of South Terengganu.
- A direct reduction type steel mill is located at Telok Kalong. Therefore, it should be another leading industry. It is expected that it will lead the development of steel related industries.
- Two large ports, Tanjung Berhala Port at Cukai and Tanjung Gelang Port at Kuantan, will ensure the capability of sea transport adequate for the large scale industrial and commercial activities.

On the other hand the constraints of developing the core towns accompanying the industrial agglomeration are also found, affecting the type of development as follows:

- Manpower for supporting the growth of modern industries is not sufficient, in terms of qualitative requirement. This problem exists not only in Terengganu but also all over the country.

For effective use of limited manpower resource, a concentrated type of development is favourable. Also a long range location plan of education, research and vocational schools is considered necessary in the study area which will supply qualified personnel to industry.

- Suitable land for industrial development is located along the coastal strip area, however, it is limited to certain extent. Consequently, the development will be concentrated on the existing urban agglomerated areas. The location of development of urban towns in the study area forms a linear shape.

The urban development strategy should be aimed at formulating the Growth Corridor within the context of the spatial structure of the area.

2.2 Direction of Urban Development

The coastal strip from Dungun to Cukai had a population of 89,000 (Mukim base) in 1980. It accounts for 70% of the total population in the study area, and inhabitants within urban areas reach 45,628 (36% of the total population).

Two major towns in this region are Dungun and Cukai. Kerteh which is one of potential towns, is located in the mid-point of the two towns.

The three towns of Dungun, Cukai and Kerteh should be considered the core areas of one large town complex like a metropolis, where each core area has its own specific characteristics in urban activities closely related to its functions.

Urban functions will increase by the year 2000, when 60% of the population inhabit the towns when the Kerteh new town is completed. The town population in the coastal region will reach approximately 131,000 in the year 2000.

Within this framework of conceptual town complex, each town should be developed in congruity with others. It is a rational that the three towns have their own functional allocations characterized by their own townships. The three towns i.e. Dungun, Cukai and Kerteh will compose a chain-like corridor which will be the area of influence in South Terengganu including the KETENGAH region. Future town hierarchy is shown in Fig. 9.2.

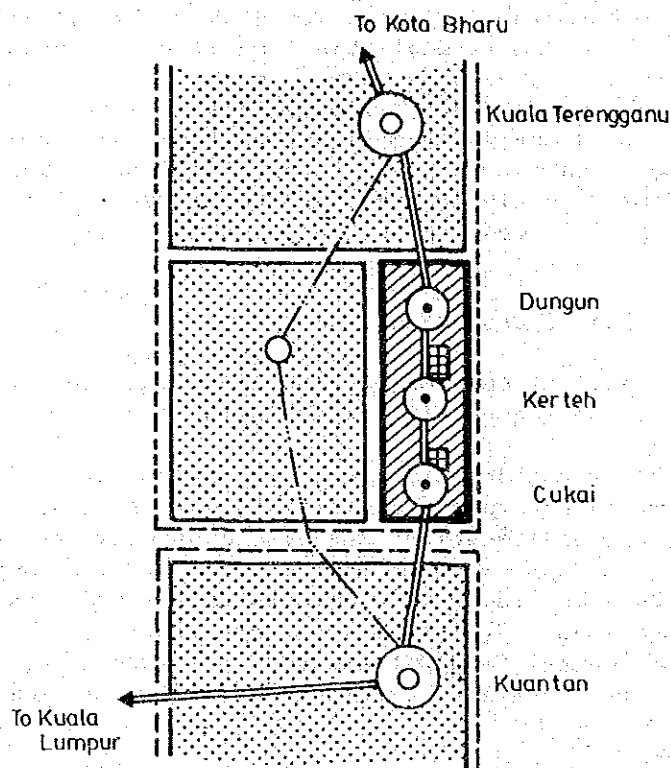


FIG. 9.2 FUTURE TOWN HIERARCHY

2.3 Emphasis of Urban Functions

Urbanization of South Terengganu in coordination with rapid industrialization and socio-economic development is studied in this section. Proposals on the urban development plan should conform with functions required as the centres of community, location of industries and socio-economic activities on the basis of natural conditions. Especially functions required for the locational centre of industrialization are emphasized. A conceptual structure plan of selected centres are illustrated.

(1) High Level Urban Function

A high level urban function means any activities or services appropriate for the town which has inhabitants of more than 200,000 and provides social amenities in the region.

Items of high level urban function are shown below:

- 1 (Public) Administration function;
- 2 Commercial and business function;
- 3 Education function;
- 4 Medical care function;
- 5 Recreation function;
- 6 Circulation function; and
- 7 Production (industry) function.

At present, there is no township of such a magnitude which can support industrialization in the study area. An independent town which can support industrialization usually has a minimum population of 200,000 while a more desirable size is said a population of 500,000. However, the size varies according to its structural elements such as industries, income level, education level, etc. It is irrational to concentrate all urban functions on one of the present urban centres such as Dungun, Cukai or Kerteh. Either one has the population of less than 40,000 in 1983. Therefore, functions should be divided among these townships and integrated in one corridor.

(2) Allocation of Urban Functions

Present features of each major town are summarized in terms of urban functions as spelled out in the following:

- Urban functions of Dungun lies in the accumulation of public administrative and commercial/business functions. Educational institutions also characterizes Dungun.
- Cukai has also public administrative and commercial/business functions. This town registers a rapid industrial development in Jakar industrial estate and in the Telok Kalong industrial estate adjacent to the town area.

- Kerteh has the location of petro-chemical industries. It is constructing a New Township where some kind of urban facilities, high quality housing environment and a modern shopping arcade would be available.

An allocation system of urban functions among those three core towns is proposed for future urban development strategies and shown in the following diagram:

FUNCTION	1	2	3	4	5	6	7
DUNGUN	●	●	●	○	●	△	△
KERTEH	—	○	△	○	○	△	○
CUKAI	○	●	△	○	△	●	●

Notes:

- Sub regional level
- Intermediate
- △ Town level

FIG. 9.3 HIGH LEVEL URBAN FUNCTIONS ASSIGNMENT

Dungun would be characterized by its public administration, commercial/business, and cultural functions. Cukai should strengthen its production function and provide active urban services.

3. Development Framework

3.1 Urban Population and Employment

(1) Urban Population

Future population and employment are estimated in consideration of the following factors:

- Number of employment opportunities which will be created by various development projects.
- Indirect job creation caused by the development projects.
- Growth of existing local industries and social systems.
- Natural population growth.

Table 9.1 shows the population in the town areas and the total of the same within the coastal region in 1983, 1990 and 2000. The urban population and ratio of urban population in the district are also indicated in the same table. The urban population increase in Kemaman district is notable.

Table 9.1 POPULATION IN COASTAL REGION, 1983 - 2000

Year	Dungun	Kemaman	Total
1983	36/53 (67%)	18/48 (38%)	54/101 (53%)
1990	39/57 (68%)	45/86 (52%)	84/143 (59%)
2000	55/81 (68%)	76/131 (58%)	131/212 (62%)

Source: Study Team

Notes: Figures () indicates 36/53 = 67%, where 53 denotes District population in thousand and 36 denotes urban population in thousand.

Distribution of urban population in the three urban areas is estimated as shown in Table 9.2. The following assumptions have been made in the estimate of urban population.

- The urban population in the coastal strip of Dungun District is assumed to be in the Dungun urban area.
- In the coastal strip of Kemaman District, urban population is distributed between Kerteh new town and Cukai urban area.
- Population in Kerteh new town area is assumed to be the same as the low profile population forecast by TERENGGANU COASTAL REGION STUDY, because the industrialization programme proposed by this study and their assumptions to be used for the low profile population forecast are based mostly on the same conditions as this study.

The table indicates that the total urban population in the coastal region is 54,000 in 1983 and it will be 131,000 in 2000, which will correspond to 62% of the total population in the coastal region.

Urban population in Cukai will increase by 40 thousand during the years up to 2000.

Population increase in Dungun will be accelerated after 1990, by the location of research institutes and educational organizations as proposed in this study.

(2) Employment

The employment structure for the coastal region for 1983, 1990 and 2000 are summarized in Table 9.3, which incorporate in the proposed development plans.

Decreases in the primary industry means a partial shift of labour force from smallholding farms and fishery villages to the secondary and service sectors. No estate farming is included in the coastal strip. All other job classifications are expected to increase in the coming years.

Table 9.2 POPULATION IN URBAN AREA, 1983 - 2000

(Unit: thousand)

Year	Dungun	Kerteh New Town ¹⁾	Cukai	Total
1983	36	-	18	54
1990	39	14	31	84
2000	55	18	58	131

Source: Study Team

Note: 1) Low profile population forecast estimated by KERTEH NEW TOWN DEVELOPMENT PLAN

Table 9.3 Employment Structure of Coastal Region, 1983 - 2000

(Unit: thousand)

	Year		
	1983	1990	2000
- Primary Industry	6.1	4.9	3.6
- Mining and Manufacturing	4.5	11.9	22.5
- Construction	3.4	5.1	8.1
- Commerce	5.3	7.2	10.3
- Transportation, Storage & Communication	1.4	3.1	5.5
- Government Service (including Utilities)	8.2	9.3	12.3
- Other Services	2.4	3.6	5.0
Total	31.3	45.1	67.3
(In Percent)	(100)	(144)	(215)

Source: Study Team

3.2 Economic Structure in the Coastal Strip

GDP share by sectors in the coastal strip in 1983 and 2000 is as follows. The share of the secondary sector is 18% and the primary and the tertiary sector are 34% and 48% respectively in 1983. Urban area in the coastal region at present have main activities in the commercial and administrative services with small scale manufacturing units.

On the other hand, the share of secondary industries in 2000 is estimated at 65%, and the value will increase 30 times larger than in 1983. Urban areas in the region in 2000 will be characterized by the location of industries and invited locations of research institutes and educational organizations. The share of tertiary sector and product will increase corresponding to the economic growth of the region, while the primary sector will decrease its share. These are estimated as shown in Table 9.4.

Table 9.4 ESTIMATED GRP: 1983 AND 2000
THE COASTAL STRIP OF THE STUDY AREA
(AT 1970 CONSTANT PRICES)

(Unit: Million Ringgit)

Sector	1983	2000
I Agriculture and Fishery	40.1	63.6
II Quarrying	1.6	8.7
Petrol and Gas Mining	267.0	531.7
Manufacturing	7.2	540.9
Construction	13.0	89.9
Sub-total	288.8	1,171.2
(Without petrol and gas mining)	(21.1)	(639.3)
III Utility	4.5	52.8
Transportation and Communication	6.5	37.9
Commerce	7.4	65.8
Governmental Service	25.6	83.1
Other Services	12.9	88.9
Sub-total	56.9	328.5
Total	385.8	1,563.3
(without petro/gas mining)	(118.1)	(1,031.4)

Source: Study Team

3.3 General Spatial Framework

Spatial distribution plan of economic activities in the coastal area is determined by taking into consideration the characteristics of the existing urban system, the location of industries and their development potentials. Plans are stated as follows:

Dungun: Administration and management facilities of the District are centred in Dungun and most of the high level educational organizations of the study area are also located in the town. In order to develop Dungun as a centre of sub-regional administrative organizations and a centre of research institutes and educational organizations, infra-structural and social amenities should be improved to a higher service level. A higher level urban system is a significant factor to encourage the locations.

Cukai: The manufacturing industries should be gathered at Telok Kalong with inviting new enterprises or rearing local enterprises under a short term strategy of industrial development. Urban development of Cukai should correspond to this industrial growth. Also, the function of goods circulation will be strengthened since the city can be a distribution centre in connection with the port facilities at Kuantan and the industrial port at Tanjung Berhala.

Kerteh New Town: Kerteh new town is designated as a core town for the PETRONAS related plants and offices. High standard housing lots, shopping arcades, social services and facilities will be provided in this town. These high level service and shopping arcades will attract the people living in the south region, if they are opened to the public.

These three townships are main locations of the growth corridor of the study area. In order to sustain the development in this corridor, improvements of social and physical infrastructure are prerequisites. Examples are well maintained road network (less flood prone sections), high speed bus service, better telecommunication service, etc. It is noted that intermediate small towns in the corridor should not be neglected in extending these services.

4. Dungun Urban Development

This section presents a future physical pattern of Dungun and the reasons for the setting. First, the existing conditions are analyzed in terms of desirable physical conditions. Secondly, expected changes in social and economic environment are listed and necessary measures to absorb those changes are shown.

4.1 Existing Physical Structure

(1) Natural Conditions

Urban area of Dungun developed at the mouth of a river is under the influence of hydrology and topography. Existing problems of drainage is attributable to the narrow width of the Dungun River near the

Tanjong Batu bridge. The shape of the river also causes floods in the upper reaches. Therefore, river conservation and/or embankments are indispensable to assure the improvement of town environment. There is the Sura River which runs through the southern part. Sometimes, large parts of the urban area are covered by flooding of the river¹⁾.

In order to promote smooth urban drainage, river conservation and/or construction of a new channel is suggested. These countermeasures should be taken into consideration especially for the future expansion of urbanization.

The ground level of the existing urban area along the mouth of the Dungun River is less than 2 metres above the mean sea level. The remaining urban area developed on the land at ground elevation ranges from 3 to 6 metres.

Land conditions proposed for development of the town area are classified into four categories as shown in Fig. 9.4. On the south of the Dungun River, an area with favourable conditions against flood can be expanded by the construction of drainage channels including the channelization of the Sura River.

On the left bank of the upper reach of the Dungun River, river conservation embankments and ground level raising are necessary.

Accordingly, it is suggested that urban area in the future would be developed within the region of Rank I shown in Fig. 9.4. A favourable natural drainage existing on the south of the Dungun River should be reserved from the viewpoint of natural environment conservation.

(2) Road Network

Town structure serves to facilitate social and economic activities. Roads perform one of the major urban functions. In Dungun, north-south movements are mainly through the corridor consisting of Route III and Jalan Besar.

The town has expanded along that north-south corridor. Consequently some urban functions such as commerce/business and public administration, etc. are most active along this corridor for a length of 4 km.

Town area has expanded outside together with the progress of road construction. However, housing development has gone ahead of road development. The existing road network has developed with little consideration of town size in the future. A road network system is necessary to categorize the roads determining their functions, say, major roads, secondary roads, collector roads and access roads.

Note: 1) Master Plan Drainage System for Dungun was prepared and design work was completed for the central urban area, waiting for gazetting land acquisition.

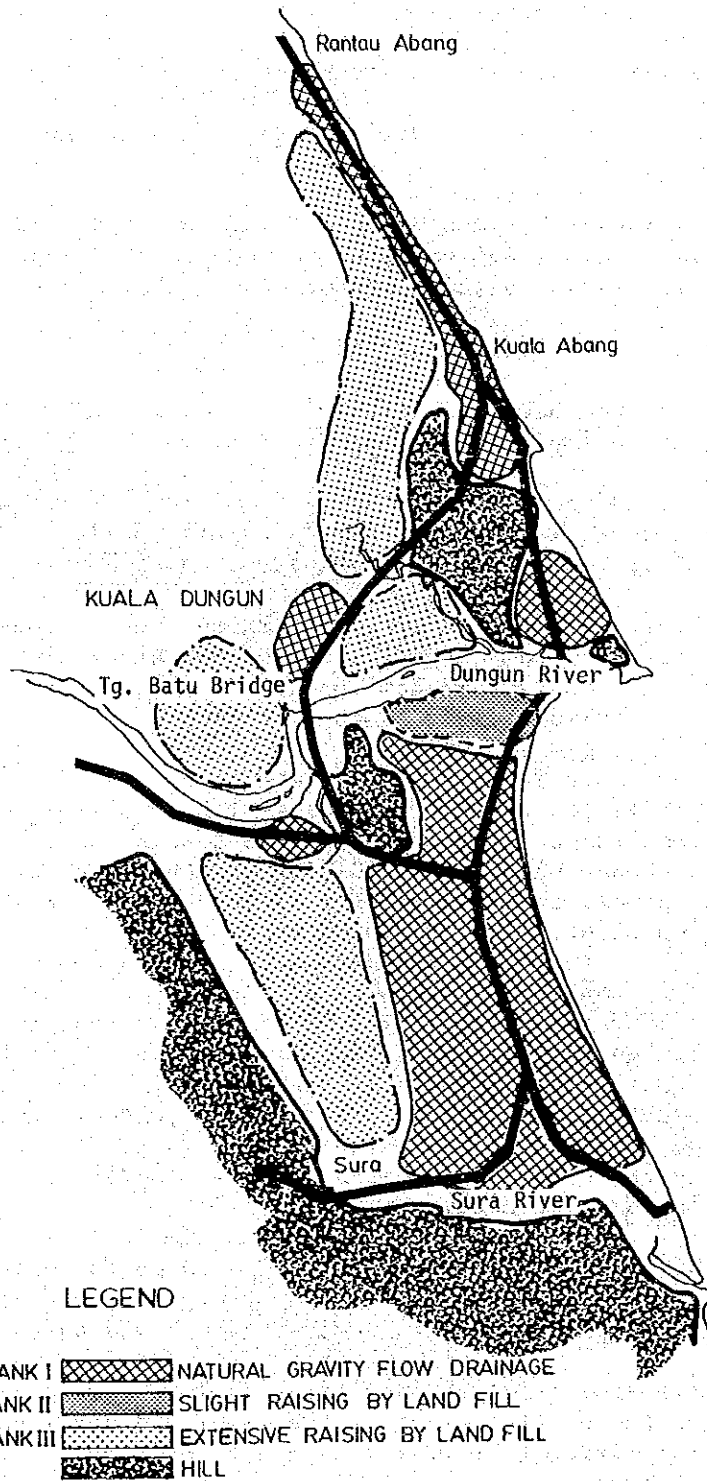


FIG. 9.4 LAND CONDITIONS, DUNGUN

In consideration of a pattern of town organization, the major roads should be identified at the first phase of the planning. It is suggested that east-west roads be provided to serve the major axis for future housing development.

(3) Zonal Identification of Urbanization

Major findings regarding a zoning formation of Dungun are summarized as follows:

- The area in which roads are completed in a systematic way is relatively small, while the area in which the roads are in short supply and less developed status covers the remaining large area.
- Generally, land utilization is less intensive.
- Urban area has been developed into a terrain in which it is difficult to implement a drainage system.
- Private housing developments are found in the area outside the built-up core area. Coordination is necessary between the planning of road networks, zoning and these housing developments.

A perspective of town development characterized by zone is shown in Fig. 9.5. It shows a southward development along Route III. Landuse characteristics and future development directions of these zones are summarized as follows:

Zone A: This zone is at the centre of town, and major urban facilities concentrate here. Public administration facilities are located in this zone. Commercial/business area has been developed close to the mouth of the river and expanded into the area of Jalan Besar and Route III near the junction.

This zone is expected to develop densely as a core of commercial area. Jalan Besar to which people coming from all quarters represents a characteristics of the town. As for the housing area, there are only a few areas which are provided with a well prepared road network down to the level of access road. Therefore, it is suggested to formulate a system of collector roads and to promote the effective landuse for housing.

Zone B: This zone is characterized as an area for housing and expands along Route III. However, they are all small scale developments and thus necessitate coordination and planning.

Zone C: Preparation of housing sites is in progress along Route III at the northern side of the river and small commercial facilities have been located in addition to primary and secondary schools. This zone has a small service centre.

Landuse for industrial purpose can be expanded in the area adjacent to Pulau Serai. Industrial estate is located in this zone.

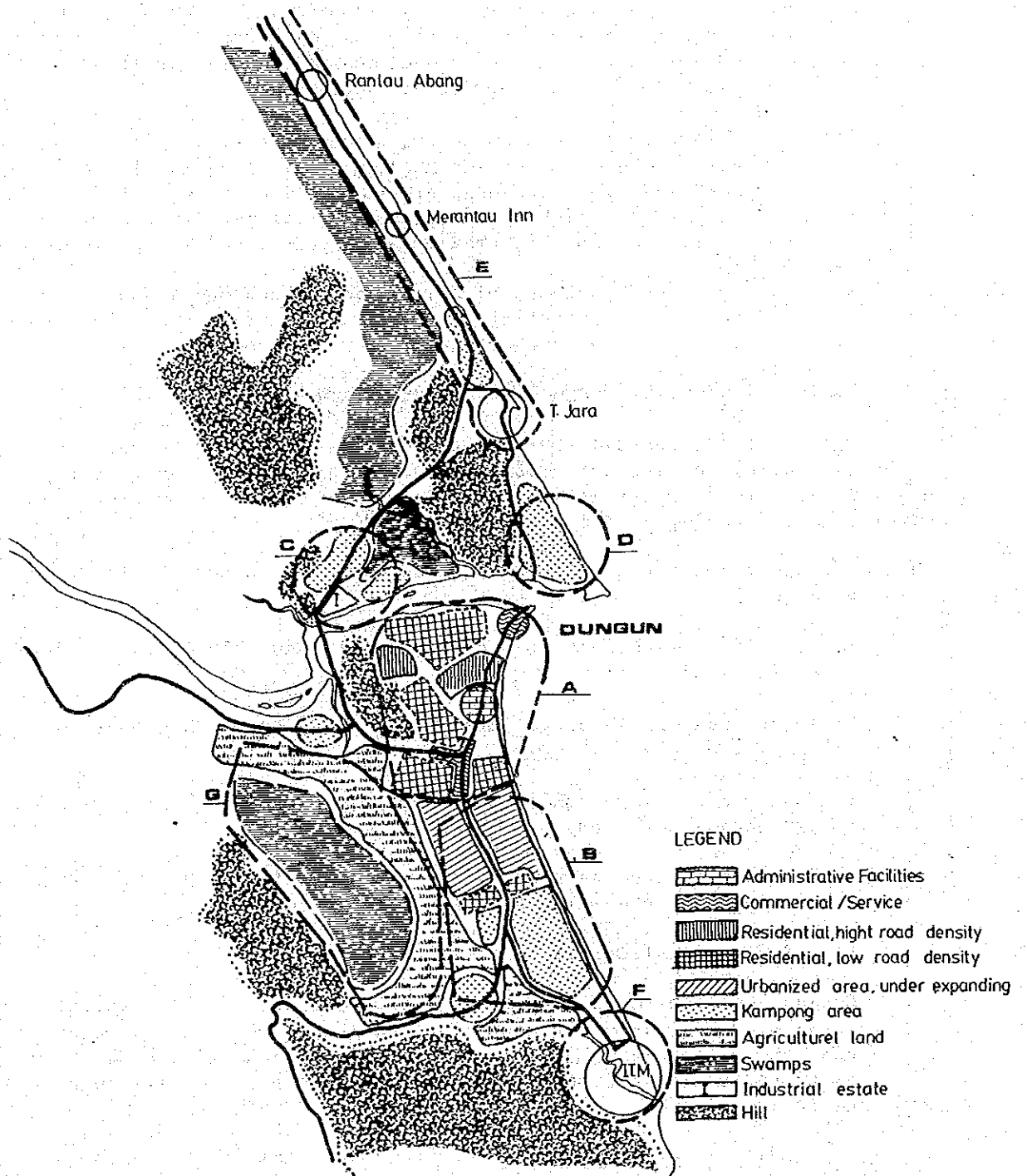


FIG. 9.5 CLASSIFICATION OF EXISTING URBAN AREA, DUNGUN

Zone D: In this zone, there are fishery villages which form a unit of independent community.

Zone E: This zone spreads along the coast from Rantau Abang to Tanjung Jara and covers the area on Route III. This area is endowed with sightseeing resources such as turtle's nesting and breeding area and resort hotels.

Zone F: This zone is located on the southern edge of Dungun town area. The Institute Technology Mara (ITM) is placed in this zone and 2,000 students are expected to be enrolled by the year 1985. Higher educational facilities are recommended to be located in this area in an agglomerated manner in future.

Zone G: This zone consists of agricultural land and swampy land, and has a high potential for urban development since the western and southern edges of the zone are bound by a hill.

4.2 Basic Policies for Dungun Urban Development

Any change in socio-economic environment has a great influence on town planning. Policy setting for urban development is done in consideration of relationship between the existing potentials, the socio-economic changes anticipated in future, as shown in Fig. 9.6.

Urban development of Dungun town area should be carried out in line with the following policies:

- To fulfill functions as a sub-regional centre in C.B.D. (Central Business District).
- To provide enough urban infrastructure to support the future spatial expansion.
- To upgrade living conditions by improving public infrastructure and social services.
- To characterize the town as the educational and cultural centre as envisaged by the structure plan of the study area.

(1) Sub-regional Centre

Dungun functions as a central town of the district and performs the integrated administrative function and management. It is required that the present accumulation should be strengthened further. In order to realize the points above, realistic policies are suggested as follows:

Administration Function: Offices and facilities of public administration and management are located in the middle of town. This encourages additional locations.

Potentiality of Town

1. Centre of administration
2. Favourable land conditions
3. Suitable for educational institutes and researches
4. Resources of sightseeing

Social and Economic Changes

1. Income level
2. Education prevalence
3. Inhabitants' need
4. Population
5. Production

Urban Development

1. Expansion of the area
2. Increased commercial activities
3. Activated commercial activities
4. Industrialization & related service industries
5. Needs for better housing environment & amenities

Policy Setting for Urban Development

1. To strengthen the administrative function as centre of the South Terengganu
2. To implement infrastructure projects to cope with the future urban expansion
3. To form an attractive commercial area
4. Invite locations of high level education organizations and research institutes
5. To enrich the image of the region in terms of recreation

FIG. 9.6 BACKGROUND AND DEVELOPMENT POLICY: DUNGUN

Amplification of Commercial/Business Area: The market at the northern end of Jalan Besar will be moved to a new location 500 m west along the river bank. The new centre is being constructed but not used yet. The focal area of commercial activities is shifting into the south. Therefore, the area at the junction with Route III where new commercial accumulation is now underway should be developed and equipped with a new commercial/business functions.

The area on the south of the river is endowed with favourable land condition. A large area of land is available for future urban development. Measures to expand urban scale in terms of landuse control are shown below:

Shift of Traffic Flow from Route III: Traffic volume on Route III is expected to grow more than that in the past. Dense traffic passing through the urban area has unfavourable effect on safety, urban transportation as well as road environment. Intra-town trips by vehicles on Route III will increase the share as the urban area expands. Thus, through-traffic flow should be shifted to the west side of the urban area by constructing a bypass of Route III in order to assure a favourable urban environment.

Large Scale Housing Development on Vacant Land: At present most of all land along Route III and other suitable lots for housing development are privately owned and enough land is not available for a large scale housing development. Progress of mini housing developments makes it difficult to systematize the urban development. Thus, a large scale housing development should be carried out which is characterized by high quality environment. Systematic urban planning should be applied with developing the required infrastructure.

Development Control: The area to be urbanized should be decided based upon an expected urban scale in the future. Within its boundary, various development plans should be implemented in ways as to upgrade the amenity of the region. The outskirts should be kept safe from uncontrolled sprawling. Any development causing natural environment destruction should be administratively ruled out by means of control and/or establishment of reservation area.

Sightseeing Spot: It is suggested that any development in the coastal area on the north side of Tanjung Jara is to be restricted because of conservation of natural tourism resources such as turtle nesting.

(3) Protection of Residential Environment

Residential environment in urban area should be protected in terms of amenity, safety, convenience and health. The following measures can contribute to maintain a good residential environment in Dungun.

Flood Free Urban Area: It is mandatory to take some action against flood of the Dungun River.

Establishment of Drainage System: This includes the river improvement of the Sura River and implementation of urban drainage system.

Establishment of Road Network System: Implementation of collector road construction contributes to an improved road system so that traffic flow can be accommodated effectively by this road network.

Amplification of Social Service Facilities: Sufficient scale and numbers of facilities should be provided in parallel to the population increase. Location of these facilities should be decided based on due consideration of population density and convenience of visits.

(4) Improvement of Town Image as an Educational and Cultural Town

Location of high educational institutes in the town can develop an image of "University Town" or "Educational Town".

The coastal area necessitates sufficient numbers of highly educated personnel as the industrialization progresses. Location of research institutes is also necessary to support the technological progress.

Research and/or educational organizations should be located in the southern part of the town.

4.3 Dungun Urban Structure

(1) Road Network System

Framework of the town is determined by locations of transportation facilities as well as geographical conditions. Transportation facilities include a railway, roads, airport, circulation centre etc. of which the road i.e. Route III, is a dominant factor to form the framework of the town.

As explained in the previous section, construction of bypass can contribute to an increase in traffic capacity and improvement of safety for pedestrians. In addition to this, the following merits in connection with urban structure are expected:

- To make it easy to secure urban space
- To improve the commercial/business function of town

The bypass will change in stages the pattern of road network system, and will be systemized with collector road in the town. Bypass is recommended to be partial access controlled expressway type. Plans of primary, secondary and collector roads should be prepared in coordination with a plan of the drainage system, and some newly developing urban areas.

(2) Urbanization Area

In the target year of 2000, a projected population of urban area is 55,000 and the scale of town should be large enough to absorb that population.

On the north of the Dungun River is located the industrial estate and some surrounding area of Kg. P. Serai have already turned into housing lots. However, this area is categorized in this study mainly into a reserved area. Urbanization is mainly promoted in the south area.

The required urbanization area amounts to about 3,300 hectares in the year 2000 of which 2,900 hectares will be in the south of the Dungun River and 400 hectares in the north area as shown in Table 9.5.

Table 9.5 LAND USE FRAMEWORK IN DUNGUN TOWN AREA IN 2000

(Unit: ha, %)

	Total	Share
Commercial/Business/Services	100	(3.0)
Residential	1,800	(54.5)
Industrial	180	(5.5)
Recreation	250	(7.6)
Open Space/Preservation/Village	590	(17.9)
High Educational	100	(3.0)
River	40	(1.2)
Others (Roads, Railways, etc.)	240	(7.3)
Total	3,300	(100.0)

(3) Spatial Composition

The swampy area spreads over the west of the proposed bypass. However, it can be turned into agricultural land and housing lots through raising ground elevation or drainage improvements.

The following is a guideline of land use:

Commercial/Business Area: It is recommended to strengthen the present accumulation of urban functions along the urban axis. For instance, hotels or business complex buildings are recommended along Jalan Besar.

New Housing Areas: The private housing development is in progress at several sites. Technical and planning coordinations are necessary in order to incorporate them into a planned urban area. Plans for a large scale housing development is recommended and should be implemented in accordance with the demand for housing for the purpose of forming urban areas efficiently.

Education/Culture Areas: This area spreads around ITM and is reserved for locations of other educational and research institutes.

Industrial Area: Locations of large scale industries is not recommended in the Dungun Town Area, taking into consideration the Dungun urban characteristics as commercial/business and educational centre. However, an industrial zone should be provided especially for relocations of the local factories and warehouses existing in the town area, and for agro-based processing factories with small/medium scale.

The area alongside the proposed by-pass is suitable for the location of the industrial zone because of transport convenience.

Open Spaces: Bt. Chatok and its hilly area on the north-west of the urban area is planned to be installed with various recreation facilities surrounded by tree zones.

Tourism Promotion Zone: The beach of Rantau Abang famous for turtle egg-laying should be preserved except the use for the tourism promotion.

5. Cukai Urban Development

5.1 Existing Physical Structure

(1) Natural Conditions

Town area of Cukai is located near the lower reaches of the Kemaman and the Cukai rivers. This area is topographically almost flat and the town development was concentrated in the area with the most favourable land conditions and has gradually expanded into less suitable land.

The land lies from 3 to 6 metres above the sea, however, the ground level of the whole area except a hilly area along the coast is relatively low and is affected by flood, especially because the lower reach of the Kemaman River flows in a meandering alignment. The ground level of the upper part of the urban area along the river is not high enough to be free from flooding. The urban area should be kept high for a certain distance from the mouth of the river since the gradient of water surface is 1 : 3,500 (1/3,500).

In case of the flood experienced in December 1983, the flood covered the whole part of the lower area (except the central urban area, coastal dune and hill) and interrupted urban activities.

Flood control is an indispensable prerequisite for the urban structure plan of Cukai. Landuse should be planned together with flood control.

Fig. 9.7 shows the ground conditions. The zone in which drainage flows by gravity is limited, while there are large areas where river improvement and/or raising ground level are required.

The urban area spreads along the road stretching to the west. This phenomenon is attributable to the upgraded road surface and improvement in topographical conditions there.

(2) Road Network

The central urban area of Cukai is developed in the area along the north-south axis and the area along the Jalan Ayer Puteh. The urban area has expanded in parallel to those major roads.

The problems lie in systematizing primary collector roads in this urban area and in shifting out the through-traffic from the town area by constructing a bypass.

Industrialization in Telok Kalong will generate much more heavy vehicular traffic.

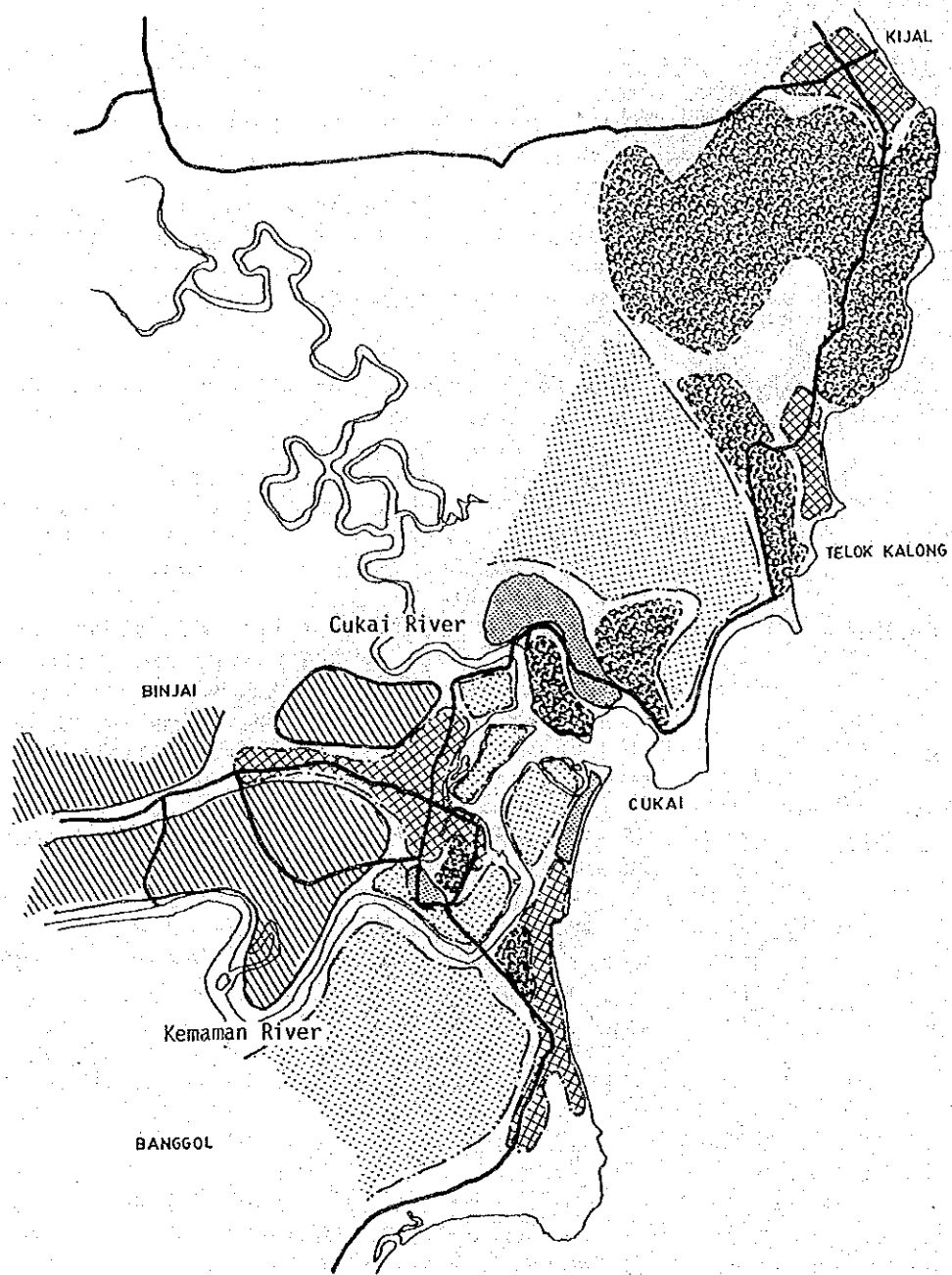
(3) Zonal Identification of Urbanization

Urban area lies in Mukim Cukai. Population increase is remarkable in both areas as shown in Table 9.6.

Table 9.6 POPULATION INCREASE, 1970 - 1980

	(Unit; persons)		
	1970	1980	Annual Growth Rate
Mukim Cukai	18,351	25,384	3.2%
Urban Area	12,514	16,059	2.5%

Expansion of urban area is most remarkable both in the north-west part of the urban area and around Kampung Bukit Kuang of the north of the Cukai River, where SEDC has promoted a housing development. Urban area forms a dispersive pattern. High application rate for public housing (about 10 times) proves clearly that housing demand exceeds the supply. Small private developments increase rapidly. The built-up area of Cukai has already stretched into the surrounding urban area.



LEGEND






RANK I		NATURAL GRAVITY FLOW DRAINAGE
RANK II		SLIGHT RAISING BY LAND FILL
RANK III		EXTENSIVE RAISING BY LAND FILL
		RIVER IMPROVEMENT AND RAISING
		HILL

FIG. 9.7 LAND CONDITIONS, CUKAI

Delineated zones with spatial characteristics are shown in Fig. 9.8 and as follows.

Zone A: This zone is the centre of town, where administrative and commercial areas have been developed. Many social service facilities are established within this zone and the land utilization rate is also high.

For existing Route III, its role should be shifted from service for industrial traffic to the urban traffic. It should be emphasized that safety of pedestrians is ensured so that the attractiveness of commercial/business area can be improved.

Zone B: This zone is a coastal dune, and fishery villages are located at the northern edge. On the southern part, housing development is progressing near the Route III. This zone has good topographical conditions, however, its location is far from the centre of town. Therefore, it forms a suburban area with Zone C for which social service and public facilities should be increasingly supplied.

Zone C: In this zone, housing development has made steady progress along the Route III. Even in the swampy area with low ground level, a large scale housing development was initiated. However, housing development is going ahead without flood control. Thus, it is necessary to formulate a definite plan for urban drainage system.

Zone D: Housing project conducted by SEDC at nearby Kampung Bukit Kuang is underway and a planned urban area will be constructed. This should be planned in coordination with existing villages. Especially, a staged development pattern of road network should be prepared in conformity with the completion of housing and other facilities.

A natural gravity drainage system on the ground with a height of approximately 3.5 m is probably possible since water level of the Cukai River is lower than that of the Kemaman River at the time of the flood.

As this zone is located close to Telok Kalong Estate, a planned urbanization pattern should be delineated in connection with the industrial estate.

Zone E: This is a large housing zone. Almost all roads are under construction. Favourable living environment can be developed in this zone.

Zone F: This is a swampy area, where landuse is limited only to agricultural purpose. It is easily influenced by flood of the Kemaman River and ground raising is, thus, a prerequisite for further housing development. Because of its location close to the centre of the town, housing development is suitable in this area.

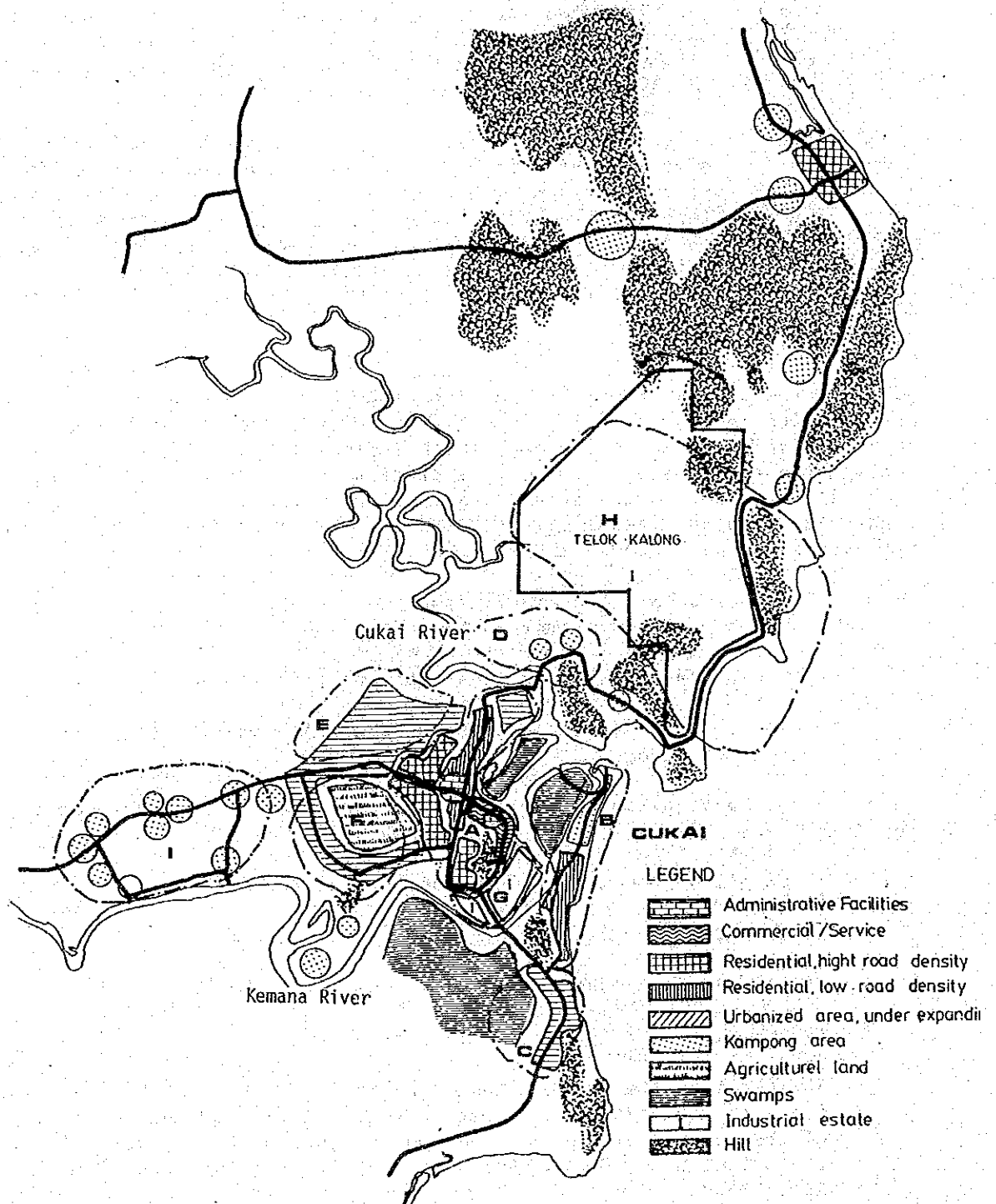


FIG. 9.8 CLASSIFICATION OF EXISTING URBAN AREA, CUKAI

Zone G: This is the Jakar Industrial Estate (about 80 ha). Timber mills are located there and the zone is a flood prone area.

Zone H: This zone consists of Telok Kalong Industrial Estate and the port in Tanjong Berhala. An increase of traffic flow between the town centre of Cukai and this zone will consist mostly of commuters and people on business.

Zone I: This zone is on a relatively low level but is located at distances of 4 to 7 km. Housing development along the roads is a so-called ribbon-development and land utilization rate for housing is low. The land is used mainly for agricultural purposes. Small housing development is in progress at several places. However, urban infrastructure is far below the required level.

5.2 Basic Policies for Cukai Urban Development

Cukai is the centre of the Kemaman District, and its business centre is concentrated in near the river mouth. The urban area is expanding on easy-to-develop areas as its population increase. The town, as the Telok Kalong Industrial Estate grows, will attract more workers, and the urban area will incorporate the related service industries. Taking these tendencies into consideration, the subjects for urban development of Cukai are identified as follows:

- To build up the commercial/business centre corresponding to the needs of rapidly increasing population;
- To form a sound urban area with an effective land use; and
- To supply a decent residential area with sufficient protection against flood.

Based on the above planning subjects, the basic policies of development of the Cukai urban area are set up as follows:

- To aim at the formation of an active industrial city;
- To build an effective agglomerated city; and
- To prepare a sound living environment.

(1) Formation of an Active Industrial City

Influence of the Telok Kalong Industrial Estate on Cukai town will increase steadily in the near future. It will stimulate the growth of the service industries and the increase of the commercial needs by the new comers. The measures to meet these future requirements are as follows:

- To develop the commercial/business district. The present commercial/business district along Jalan Sulaiman should be developed densely to meet the increasing demand of the urban population.

- To ease the mobility between the city and the industrial complex. The trips between the city and the industrial complex will increase rapidly. To ease travel between these areas, the road network should be improved. Also more people will commute to the industrial complex after the housing estate around Kampung Bukit Kuang on the northern bank of the Cukai River is completed. Roads should be constructed to meet this demand.

(2) To Build an Effective Agglomerated City

At present, the town is spread sparsely along the radial roads stretching toward the north, south and west. For the effective use of the limited town area, agglomerated development of the town is recommended to meet the increasing population. The measures in line with this policy are as follows:

Definite Landuse/Zoning System: Intensive development area should be defined based on the planned town size. Within the area investment on infrastructure should be planned effectively. The development should be strictly controlled to avoid encroachment into the preservation area.

Promotion of the Large Scale Development: In order to supply a high quality residential area, a large scale housing development should be promoted on the area adjacent to the existing town area. When the land is developed piece by piece, the comprehensive planning of the road network, water supply, drainage and other services will not be functioned effectively. Besides, by a large scale development with an effective land use, provision of the social facilities and adequate open space will be subject to a systematic urbanization.

(3) Enhancement of the Living Environment

Sound living environment is generally based on the conditions of amenity, safety, convenience and health. In order to improve these conditions, investment on infrastructure and social facilities is necessary. Measures for improving the conditions of Cukai city are summarized as follows:

Provide Flood Free Urban Land: The living environment of the Cukai urban area is not satisfactory because the land is low and suffers from frequent flooding. The most urgent necessity is, thus, to protect the urban area from flooding of the Kemaman River by the planning of appropriate land use together with a long term flood control plans.

Establishment of the Urban Drainage System: Jalan Ayer Puteh forms a watershed dividing the catchment area in the centre of the town. The rain water flows into the Cukai River in the north and into the Kemaman River in the south. The drainage systems should be established based on the future town area in relation with a flood control system.

Bypass of Route III: Federal Highway Route III passes through the urban area in the north/south direction. This route may separate the urban area into 2 areas as its traffic volume increases. In order to protect the living environment of the community, construction of a bypass is recommended. This bypass diverts the traffic from the northern part of the study area including the Telok Kalong Industrial Estate.

Acquisition of Open Spaces: The open spaces left in Cukai town is decreasing due to disorderly rapid expansion of the urban area. Recreational facilities are a prerequisite for a healthy town life, and better social amenities can be an attraction of the city.

Improvement of the Social Service Facilities: The appropriate number and size of social service facilities should be provided in response to increases in population. The location should take these facilities into account for development in the future.

5.3 Cukai Urban Structure

(1) Proposed Urban Pattern

The Cukai town area is divided into three areas by two rivers of the Cukai River and the Kemaman River, i.e., the north, the central and the south areas. The north areas centering on the Telok Kalong Industrial Estate is characterized as an industrial promotion area. The central area is to accommodate mainly urban service activities such as commercial, business and other various functions. The south area is for new urban development. Urbanization will be promoted mainly in the central area toward the western direction up to the line of the planned railway.

The project of flood control, say, the change of alignment of the Kemaman River and the development of diversion canal, will give a great impact to the urban structure of Cukai, a new potential area for urbanization will be created in the eastern part of the town by this project.

The bypass of Route III is proposed in the Cukai town as well. This will function as a new backbone of the urban activities and contribute to expansion of the required urbanization area.

The railway station, if it is completed, will be another large impact on the urban structure. Generally this kind of facility is endowed with somewhat capability of formation of new commercial sub-centre. The eastern side of the planned station is recommended to be designated as a specific development area with about 200 ha, and disorderly private developments in this area should be restricted until a definite development master plan in this area is completed.

(2) Urbanization Area

The urban boundary should be decided by considering the future development and population. Then the infrastructure within the boundary should be improved intensively in order to form a decent living environment. Of the infrastructure programme, priority is given to flood control by improving the river and drainage system.

The urbanized area will be totally 4,740 hectares in Cukai including the Telok Kalong Industrial Estate with 1,200 hectares. The landuse framework by area and use is projected as shown in Table 9.7 and several attentions for landuse control should be paid as follows:

Table 9.7 LAND USE FRAMEWORK IN CUKAI TOWN AREA IN 2000

(Unit: ha, %)

	North Area	Central Area	South Area	Total (Share)
Commercial/Business/Services	-	120	-	120 (2.5)
Residential	250	1,270	280	1,800 (38.0)
Industrial	1,200	70	-	1,270 (26.9)
Recreation	80	130	10	220 (4.6)
Open Space/Preservation/ Village	600	310	40	950 (20.0)
Industrial Port	80	-	-	80 (1.7)
Others (Road, Railway)	90	200	10	300 (6.3)
Total	2,300	2,100	340	4,740 (100.0)

- Expansion of the town area to the west should be limited up to the planned railway corridor by the year 2000;
- Development of the south should be limited to the swamp area; and
- The northern area should be developed comprehensively with the SEDC housing estate and the adjacent areas. Expansion should be limited to the bypass in the west and in the northeast a part of the industrial complex is included.

The area with about 200 hectares adjacent to the railway station planned is recommended to be reserved for building the new sub-centre. The railway station will give an impact to grade up the urbanization potential in the front area. In order to orderly form a sub-centre to accommodate commercial and business functions, any spontaneous development in a planless manner should be controlled.

6. Projects and Programmes

6.1 General

In accordance with development plans described in previous sections, the following projects and programmes are proposed as shown in Table 9.8.

Table 9.8 PROPOSED PROJECTS AND PROGRAMME

PROJECT	DUNGUN	CUKAI
Promotion of Industrial Development	<ul style="list-style-type: none">. introduction of higher level educational facility.. Research & development institutes.	<ul style="list-style-type: none">. inducement of concentrated manufacturing industries.
Urban Land Supply and Land Use	<ul style="list-style-type: none">. land use intensification in Kampong area.. large scale land supply and development.. maintenance of commercial & businesses district, open space and recreational land.	
Road.	<ul style="list-style-type: none">. construction of bypass for trunk road.. intra urban road network system.	
Drainage	<ul style="list-style-type: none">. river improvement. construction of training dyke (river mouth improvement & beach erosion protection).. drainage system in urban area.	<ul style="list-style-type: none">. construction of flood channel. river improvement. drainage system in urban area.
Others	<ul style="list-style-type: none">. control & inducement of newly developed urban area.. conservation of natural resources.	

Among the projects listed in Table 9.8, some are identified as priority projects. The implementation is considered in phased manner divided into three bases as follows:

Phase I:	1986 - 1990
Phase II:	1991 - 1995
Phase III:	1996 - 2000

6.2 Dungun Urban Development Projects and Programmes

(1) Educational Facilities

Educational facilities are proposed referring to the following four types:

- . Technical Training College: Phases I & II
- . Vocational Training Schools: Phases II & III
- . Polytechnical Institutes: After Phase III
- . University: After Phase III

(2) Urban Land Supply

Increase in population and diffusion of small family raise a demand for housing and it reaches up to 5,500 units. It is suggested that the following measures should be taken:

- Land use intensification: Commence at Phase III (500 ha)
- Large scale land supply: Commence at Phase II and Phase III (400 ha)
- Improvement of the Sura River, construction of bypass

(3) Maintenance Commercial and Business District

Urban functions of the area along the central axis with length of 4 km and of the public administration facilities should be strengthened.

Subjects of improvement refers to improvement of streets (establishment of sidewalk, tree planting and improvement in pavement etc.), establishment of parking, construction of commercial buildings and acquisition of open spaces.

Implementation plan should be prepared at the beginning of Phase I and be implemented by the end of Phase III.

(4) Bypass for Route III

5.5 km of bypass is proposed. This bypass should be constructed in coordination with the large scale land supply programme. Implementation starts from Phase I and is completed at Phase II.

The bypass should be of the partial access controlled type. An intensive commercial development along the bypass should be limited.

(5) Intra Urban Road Network System

Intra urban road network is constructed and improved in coordination with a land supply programme.

(6) Drainage

Due to the long period of implementation which is closely related with the urban development programme, alternatives and priority should be studied further. Construction should be started from Phase I, including the following projects:

- Improvement of Dungun River and Sura River
- Training dyke construction
- Urban area drainage system

6.3 Cukai Urban Development Projects and Programmes

(1) Urban Land Supply and Development

On-going housing projects in the north-western part of urban area should be expanded further. It is suggested that in the north-west part of urban area, 250 ha be provided for housing lots and 220 ha be provided in the western part. Development should be completed by the end of Phase II.

The area on the south side of Jalan Ayer Puteh should be improved in terms of efficiency of land utilization. Construction or improvement of road and drainage networks are strongly recommended.

(2) Maintenance of Commercial and Business District

East-west axis of urban area (1.5 km) should be strengthened in terms of its urban functions. Subjects are the same as Dungun. Implementation should commence at Phase I.

(3) Bypass for Route III

A proposed bypass is divided into four segments as shown in Fig. 9.9.

- Segment A to B : 4.5 km, located in the urban area. Construction of sidewall is necessary. Commencement at Phase I is recommended.
- Segment B to C : 3.7 km, which connects industrial region and urban area. Commencement in Phase I is preferable.
- Segment C to D : 3.5 km, which locates in the Telok Kalong Industrial Estate. It is under construction.
- Segment D to E : 9.5 km, which JKR has a plan to construct. Priority is lower than that of segment C to D.
- Segment F to A : 5 km, which is constructed after Phase III because the southern part of urban area is restricted in urbanization.

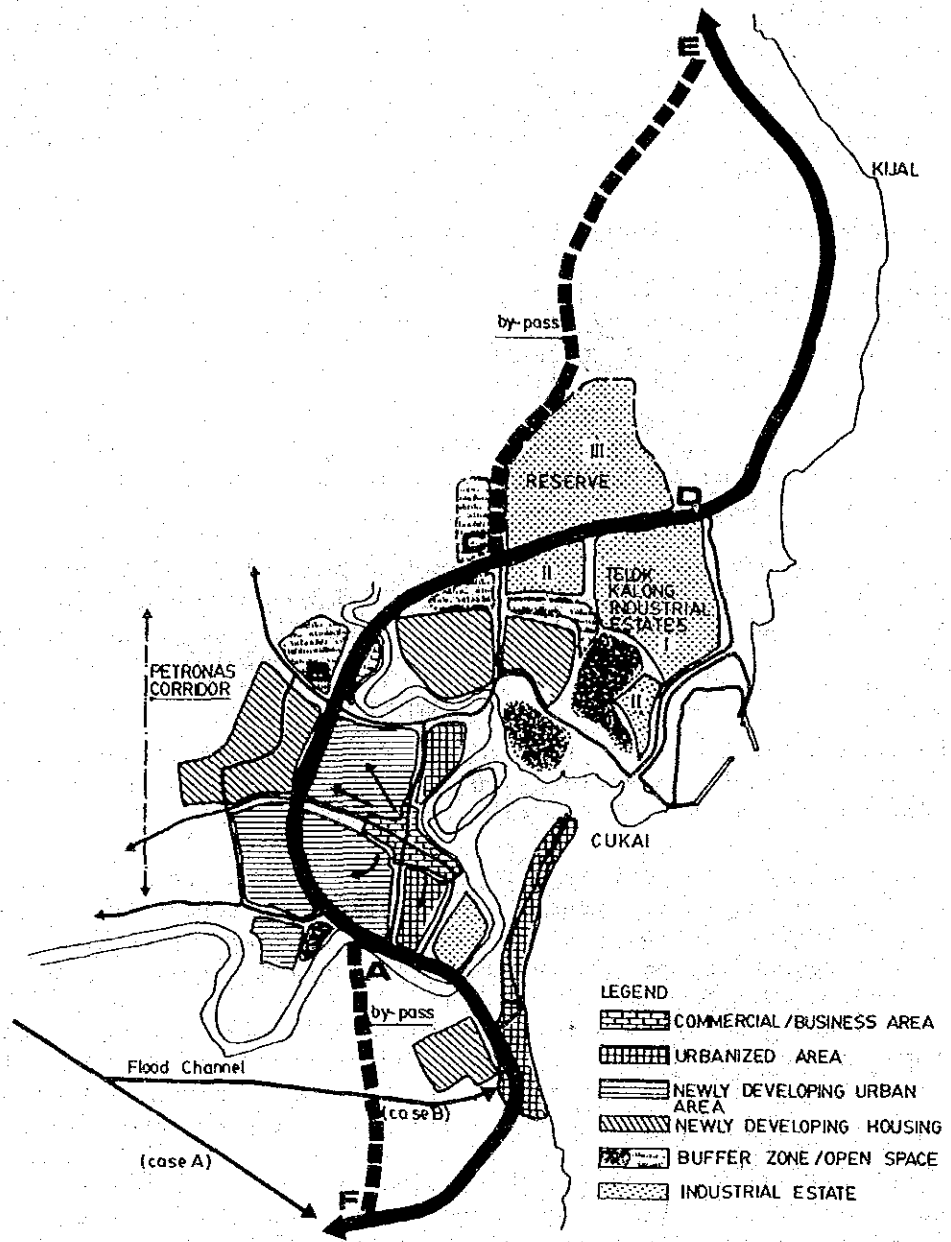


FIG. 9.9 BYPASS SEGMENT

(4) Intra Urban Road Network

Intra urban road network is constructed and improved in coordination with land supply programme and land adjustment system.

(5) Drainage

It takes a long period to construct a flood channel. Urban drainage is closely related with the choice of alternatives for the river improvement. Drainage which includes flood control of the Kemaman River has a high priority and is suggested to commence at Phase I. A system to be developed is suggested in detail in Chapter 11 of Technical Paper.

6.4 Proposal of Land Readjustment System

In Dungun and Cukai, demand for housing land is great. Small scale housing development is in progress by the private sector in the existing urban area and also in the surrounding kampungs.

Utilization of land is, however, not so efficient. For the purpose of providing a good quality housing environment, private owned land should be converted into housing lots. Large scale housing development should also be encouraged in the future.

In order to overcome the problem in securing suitable land to develop the necessary land property, a new system is recommended to allow the easier acquisition of land from both the private and public sectors. So-called land readjustment can be made to consolidate the necessary land for urban development.

The land readjustment method practiced in Japan is described below. Detailed method and organizational matters are to be studied to suit the conditions in Peninsular Malaysia.

The purpose of land readjustment project is to attain the comprehensive improvement of urban environment and utilization of land through coordinated planning and arrangement of public facilities such as roads, parks and water supply, sewerage and orderly arrangement of housing sites.

To briefly illustrate the project, the forms of roads, housing sites, etc., are changed as shown in Fig. 9.10 in the arrangement of plot forms to allow the improvement of such public facilities and the higher utilization of land, say, the change of agricultural use to housing and other urban use.

The largest feature in executing the project is that landowners, etc., are required to offer land within the range of benefits they receive, according to the respective rates (called "reduction of land lot"), to allot the offered land for such public facilities newly required for creating better environment. The land lots of respective rightful persons and the land lots for public facilities are exchanged and adjusted in their location and forms, to form an urban area as planned.

Since the project involves the restriction of rights and compulsion in this way through joint submission of small parcels of land and individual housing sites, the act stipulates in detail the executors, execution procedure, expense sharing, etc., in order to attain the smooth operation of the project and the protection of private rights for landownership.

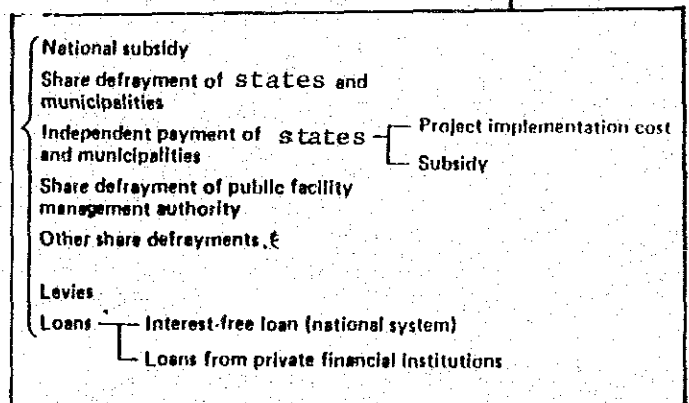
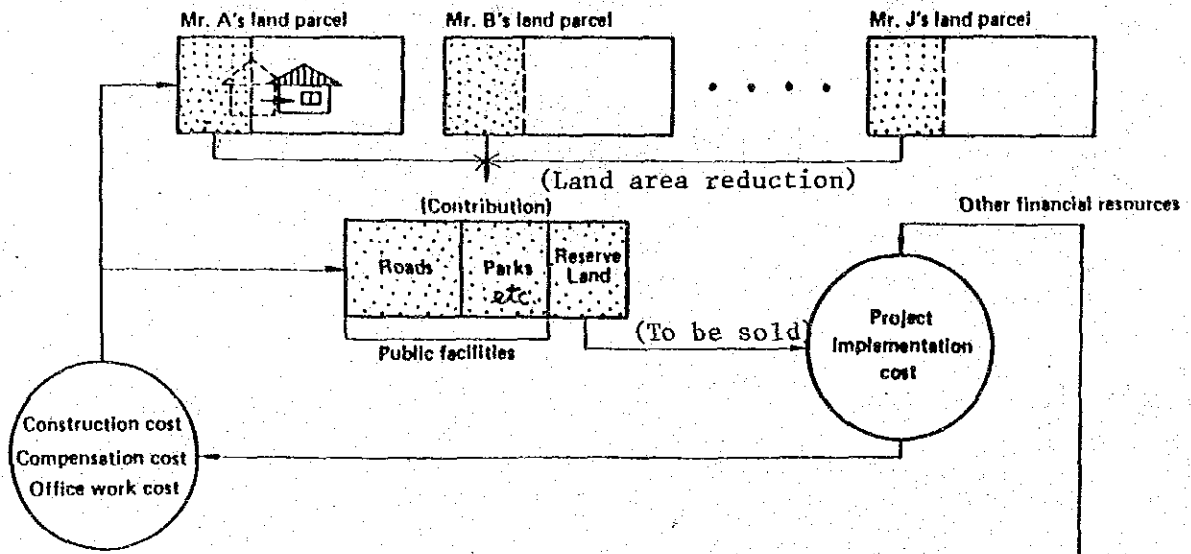
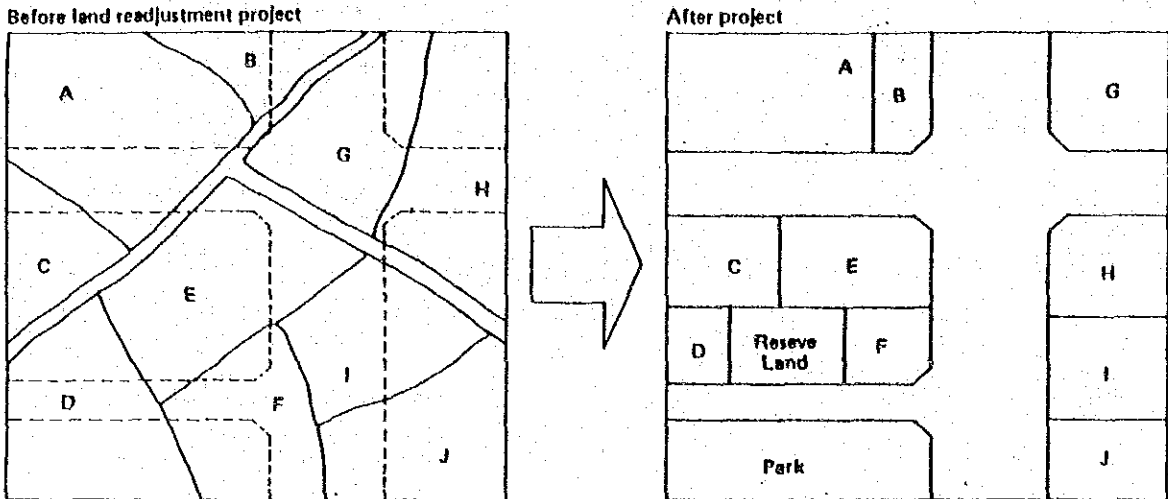


FIG. 9.10 EXAMPLE FOR SYSTEM OF LAND READJUSTMENT

Since this land readjustment project is accompanied with coercion such as restrictions on private landownership etc., replotting of land and moving of buildings, only the following seven bodies can become executors of the project in Japan and strict legal procedures are reequired in executing the project.

- | | |
|--------------------------|---|
| Private Executors: | - Land consolidation associations |
| | - Local authorities |
| Administrative Agencies: | - The Minister of Construction |
| | - Head of cities and towns |
| National Government | |
| Enterprises: | - Housing and Urban Development Corporation |
| | - Regional Development Corporation |

CHAPTER 10

TRANSPORTATION

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