

Table 2.13 FUTURE EMPLOYMENT BY SECTOR, TERENGGANU

Sector	Total Number					Net Addition				
	1980	1985	1990	1995	2000	1981	1986	1991	1996	2000
Agriculture										
Forestry & Fishing	87600	93300	99400	105000	111400	5700	6100	5600	6400	6400
Mining & Quarrying	2000	2050	2100	2150	2200	50	50	50	50	50
Manufacturing	17500	24800	35100	54000	83100	7300	10300	18900	29100	29100
Construction	8200	11600	16400	23200	32900	3400	4800	6800	9700	9700
Utilities	1100	1300	1550	1900	2300	200	250	350	400	400
Transport, Storage & Communication	3800	4550	5450	6550	8000	750	900	1100	1450	1450
Wholesale & Retail Trade, Hotels & Restaurants	22400	26750	32100	38800	47050	4380	5350	6900	8250	8250
Finance, Insurance, Real Estate & Business Services	1800	2150	2550	3100	3800	350	400	550	700	700
Government Services	19300	23050	27600	33500	40550	3750	4550	5900	7050	7050
Other Services	6200	7400	8850	10750	13000	1200	1450	1900	2250	2250
Total	169900	196950	231100	278950	344300	29050	34150	49850	65350	65350

3.2.2 Qualitative Requirement in Employment Opportunities

Occupational composition differs among the sectors of the regional economy. Terengganu Manpower Study has shown the percentage composition of occupation in each sector. It is shown in Table 2.14, where the sectors of primary and secondary industries have large percentage shares of manual and production related workers while financial service and Government service sectors have large shares in desk/office workers including clerical workers.

Each occupation requires those who have appropriate skill and/or educational background. The percentage distribution of educational qualification differs among the occupations. The Manpower Survey has conducted surveys on differences in the occupation. By using the percentage distribution of occupations in each sector, shown in Table 2.14, and the percentage distribution of educational qualification in each occupation of the Manpower Survey, a matrix of the educational qualifications and the economic sectors in terms of percentage is produced. It is shown in Table 2.15.

By using this distribution of Table 2.15 and the forecast labour demand by Table 2.13, the net addition of manpower demand classified with educational qualifications is estimated as in Table 2.16. It is based on the assumption that there will be no drastic change in occupational composition of the sectors nor in the requirement of educational background composition.

However, there is a general tendency of technology development which will result in two major changes in the manpower demand of the industrializing economy.

The first is the increasing demand for those who are able to handle new technology. It will require those who complete higher school levels and are specialized in technical training. The other is the improving productivity which can be achieved by the introduction of improved technology, together with the training of employed persons either in any institute or by 'on-the-job training' methods. The improved productivity will result in changes in the distribution of job opportunities in all sectors: reductions in some sectors and increases in others.

Table 2.14 OCCUPATIONAL STRUCTURE (%), TERENGGANU, 1981

Sector	Occupational Category	Professional Technical & Related Workers	Administrative & Managerial Workers	Clerical & Related Workers	Sales Workers	Service Workers	Agriculture & Forestry Workers, Fishermen	Production & Related Workers, Transport Equipment Operators & Labourers	Total
Agriculture, Forestry & fishing		0.2	0.1	0.6	0.02	0.2	95.6	3.2	100
Mining & Quarrying		9.1	4.5	6.4	-	5.5	-	74.5	100
Manufacturing		0.6	1.1	5.0	0.6	1.4	0.6	90.7	100
Construction		5.0	3.9	4.4	-	1.7	0.3	84.7	100
Utilities		11.7	-	16.7	-	0.8	-	70.8	100
Transport, Storage & Communication		1.0	1.5	12.5	0.5	1.0	0.3	83.3	100
Wholesale & Retail Trade, Hotels and Restaurants		0.2	0.8	5.8	76.1	11.4	0.2	5.4	100
Finance, Insurance, Real Estate & Business Services		23.3	4.2	45.8	5.8	4.2	4.2	12.5	100
Government Services		47.5	0.5	16.0	0.1	20.2	2.5	13.2	100
Other Services		1.5	0.4	2.0	0.8	51.3	3.3	40.7	100
Total		6.3	0.7	4.5	10.6	6.3	49.2	22.4	100

Source: Terengganu Manpower Study - Phase II

Table 2.15 EDUCATIONAL QUALIFICATIONS AND ECONOMIC SECTORS:
TERENGGANU, 1981

Educational Qualifications	Professional Institution Qualification	University Degree	College Diploma	Technical or Agricultural Institute Qualification	Vocational or Trade School Qualification	Secondary School Certificate (HSC, MCE, LCE)	Primary School Education (up to Std. 6)	Commercial School Qualification
Agriculture Forestry & Fishing	-	0.06	0.34	0.01	0.45	15.34	83.77	0.03
Mining & Quarrying	0.13	2.14	6.31	0.45	1.41	24.90	64.06	0.67
Manufacturing	0.03	0.46	0.77	0.30	1.65	21.82	74.23	0.78
Construction	0.10	1.55	3.73	3.77	1.56	21.18	67.39	0.72
Utilities	0.05	1.56	6.94	0.42	1.43	30.77	58.06	0.76
Transport, Storage & Communication	0.04	0.80	1.21	0.29	1.57	26.99	68.43	0.81
Wholesale & Retail Trade, Hotels & Restaurants	0.06	0.46	1.15	0.32	0.21	31.41	66.28	0.11
Finance, Insurance, Real Estate & Business Services	0.20	4.48	14.94	0.52	0.66	53.45	25.09	0.66
Government Services	0.21	6.17	27.65	0.87	0.59	35.46	28.75	0.30
Other Services	0.02	0.30	3.09	0.17	0.76	24.00	71.32	0.35

Table 2.16 ADDITIONAL MANPOWER DEMAND WITH EDUCATIONAL QUALIFICATIONS,
TERENGGANU, 1981 - 2000

Educational Qualifications	1981	1986	1991	1996
	1983	1990	1995	2000
1. Professional Institution Qualification	20	20	30	40
2. University Degree	370	470	640	820
3. College Diploma	1,400	1,730	2,310	2,870
4. Technical or Agricultural Institute Qualification	200	280	400	550
5. Vocational or Trade School Qualification	260	340	530	770
6. Secondary School Certificate (HSC, MCE, LCE)	6,630	8,390	11,780	15,920
7. Primary School Education (up to Std. 6)	18,060	22,770	31,910	44,020
8. Commercial School Qualification	110	150	250	360
9. Total	27,050	34,150	47,850	65,350

Source : Study Team

3.3 Demand and Supply of Manpower in the Whole State

As shown in Table 2.17, there will be shortages in the available supply of tertiary school level graduates if the economy grows as projected up to 2000 in the State, although their number is relatively small. However, it is a constraint for development. In order to cope with the expected shortages, the following policies are recommended.

- Encourage the graduates to return to Terengganu by proposing fringe benefit and/or incentive allowance for graduates
- Providing private enterprises with information on the recruitment status of Terengganu originated intellectuals.
- Construct tertiary level schools within the State. At the moment there are two teachers training colleges, a training branch of Fishery Department University of Agriculture Malaysia and the Dingum campus of Institute Technology MARA. It is understood that new locations of tertiary level schools in the State are quite reasonable in order to have a balanced locational distribution since most of them are concentrated in the west coast. In addition, the location will have demonstrative impact that the State is reorganizing itself in providing better technological infrastructure which is prerequisite for the industrial development.

In the case of secondary and primary school leavers, it is forecast that the manpower is likely to be surplus up to 1995, however it indicates shortages after 1996.

Those shortages can be covered by 1) increasing the range of labour participation rate and 2) accepting those from other states.

On the other hand, the unemployment forecast for the years up to 1995 is relatively small in volume. This supply surplus problem would be less serious than the problem of shortages in the tertiary school graduates.

Table 2.17 MANPOWER SUPPLY AND DEMAND: NET ADDITION

Educational Qualification	Available Supply ⁴⁾					Demand					Accumulated Difference									
	1981	1986	1991	1996	2000	1981	1986	1991	1996	2000	1981	1986	1991	1996	2000	1981	1986	1991	1996	2000
Professional Institute Qualification & University Degree 1)	130	180	190	260	260	390	490	670	860	860	- 260	- 570	-1050	-1650						
College Diploma 1)	1360	1480	1800	2210	2210	1400	1730	2310	2870	2870										
Technical or Agricultural Institute Qualification	510	520	570	570	570	200	280	400	550	550	+ 270	+ 260	- 80	- 720						
Vocational or Trade School Qualification	1790	5830	5900	5900	5900	260	340	530	770	770										
Secondary & Primary School Certificate	27410 ²⁾	28510	34220	37140	37140	24800	31310	43940	60300	60300	4140	6830	2480	-15550						
Total	31200	36520	42680	46080	46080	27050	34150	47850	65350	65350	4150	6520	1350	-17920						

1) Returning ratio is assumed as 10 %

2) Including 2240 unemployed Labour Forces in 1980.

3) There are some who finish the school but not intending to work. They are non labour force and are estimated by using the result of the regional economic frame. These non labour force participants are deducted from Table 3.

4) Those more than 65 years are not included.

4. Future Prospect in the Study Area

Employment opportunities generated by the growth of economy in the study area are forecast in this section. The comparison of the demand and the supply of manpower will explore the shortage and/or supply constraints in the study area. Recommendations to solve those constraints will be presented in Section 5.

4.1 Employment

4.1.1 Quantitative Requirement

The study area is divided into the coastal strip area and the inland area of KETENGAH. Urbanization and industries will develop in the former area. Employment patterns are different between those two areas.

Employment opportunities forecast are shown in Table 2.18, where the figures for four sectors are taken from the socio-economic frame.

In the coastal strip area, the percentage shares of the main sectors in descending order are: Government service (25.8%), agriculture (19.4%), commerce (16.9%), and manufacturing 13.0% in 1983. However, it is estimated that a large increase will be seen in manufacturing rising to 25.0% in 1990 and 32.6% in 2000. Agriculture will decrease from 6,100 persons (19.4%) in 1983 to 3,600 (5.3%) in 2000. In total, the projected employment of 31,300 in 1983 will increase to 45,100 in 1990 and 67,300 in 2000 in the coastal area.

In the KETENGAH area, there are 15,300 persons engaged in the agriculture of estate farming and production in villages in 1983. Its share in the total is 90%. Agro-based manufacturing accounts for 1,112 persons (6.6%). It is forecast that workers in agriculture will be 21,600 (81.6%) for the total of estates and villages in 2000.

For the total of the study area, the primary sector occupied 44.2% in terms of persons in employment in 1983. It decreases the share to 26.8% in 2000, although the workers increase by 3,800 in number. Manufacturing will have 26.2% and commerce and service 30% of the total of 93,800 employed in 2000.

Table 2.18 PROJECT EMPLOYMENT IN THE STUDY AREA

SECTOR		1983	1985	1990	1995	2000
Coastal Area	Agriculture, Forestry & Fishing	6079	5634	4898	4205	3551
	Mining & Quarrying	383	552	674	597	580
	Manufacturing	4074	6675	11253	14980	21915
	Construction	3366	3873	5065	6332	8080
	Utilities	314	620	810	1092	1196
	Transport, Storage & Communication	1421	2023	3103	3965	5535
	Wholesale & Retail Trade, Hotels & Restaurants	5282	5763	7165	8483	10340
	Finance, Insurance, Real Estate & Business Services	257	306	380	442	534
	Government Services	8063	8276	9057	9894	11941
	Other Services	2027	2164	2668	2951	3632
TOTAL		31266	35886	45073	52941	67304
KETENGAH Area	Agriculture, Forestry & Fishing	15262	16135	18825	20387	21593
	Mining & Quarrying	35	35	35	35	35
	Manufacturing	1112	1322	1903	2164	2665
	Construction	0	356	386	418	543
	Utilities	20	45	49	53	57
	Transport, Storage & Communication	-	-	-	-	-
	Wholesale & Retail Trade, Hotels & Restaurants	144	183	298	363	429
	Finance, Insurance, Real Estate & Business Services	-	-	-	-	-
	Government Services	351	802	866	935	1010
	Other Services	40	50	82	101	118
TOTAL		16964	18928	22444	24456	26450
Study Area Total	Agriculture, Forestry & Fishing	21341	21769	23723	24592	25144
	Mining & Quarrying	418	587	709	632	615
	Manufacturing	5186	7997	13156	17144	24580
	Construction	3366	4229	5451	6750	8623
	Utilities	334	665	859	1145	1253
	Transport, Storage & Communication	1421	2023	3103	3965	5535
	Wholesale & Retail Trade, Hotels & Restaurants	5426	5946	7463	8846	10769
	Finance, Insurance, Real Estate & Business Services	257	306	380	442	534
	Government Services	8414	9078	9923	10829	12951
	Other Services	2067	2214	2750	3052	3750
TOTAL		48230	54814	67517	77397	93754

4.1.2 Qualitative Requirement

As discussed earlier, the percentage distribution of qualitative (educational background) levels were already estimated for each sector of the State in 1981. It is shown in Table 2.15. The percentage composition of the State is used to find the manpower requirement in the study area. The resultant estimate of requirements for educational background are shown in Table 2.19.

In Table 2.19 additional demand is accumulated by every five years, showing that the work opportunity will be almost doubled from 48,200 of 1983 to 93,800 in 2000: an addition of 45,000 during the 17 years. Of these additional requirements, those with diploma and degree comprise 5.4%. However, the estimate is rather conservative considering the detail of modern features of industries which are technology and capital intensive. Unfortunately, the detailed data are beyond the scope of this study.

The same table shows the demand for those from primary and secondary schools is 92% in 2000. Technology advancement and diversification are to be seen in these years, they will be required to be trained in vocational and technology training systems within the firm and/or in other organization.

The figures in the table indicate approximately 600 persons with university degrees or higher education are required for the period up to 2000 under the projected development pattern of Terengganu. The demand will be more larger if development in technology and location of new industries in the study area can be considered.

Table 2.19 MANPOWER DEMAND WITH EDUCATIONAL QUALIFICATION, STUDY AREA

Minimum Educational Qualifications Required	TOTAL MANPOWER DEMAND					ADDITIONAL DEMAND BY FIVE YEARS				
	1983	1985	1990	1995	2000	1984	1986	1991	1996	2000
						1985	1990	1995	2000	2000
1. Professional Institution Qualification	30	30	40	40	60	-	10	-	20	30
2. University Degree	680	760	880	1000	1220	80	120	120	220	540
3. College Diploma	2800	3090	3500	3890	4690	290	410	390	800	1890
4. Technical or Agricultural Institute Qualification	250	300	380	460	580	50	80	80	120	330
5. Vocational or Trade School Qualification	350	430	580	700	900	80	150	120	200	550
6. Secondary School Certificate (HSC, MCE, LCE)	11030	12660	15670	18110	22240	1630	3010	2440	4130	11210
7. Primary School Education (up to standard 6)	32960	37370	46230	52910	63670	4410	8860	6680	10760	30710
8. Commercial School Qualification	130	170	240	290	390	40	70	50	100	260
TOTAL	48230	54810	67520	77400	93750	6580	12710	9880	16350	45520

4.2 Labour Force

4.2.1 Labour Force Supply

On the assumption that manpower resource is expanded in accordance with the natural growth of population within the study area, the labour force supply is forecast to increase at 3.2% to 3.5% per annum. The forecast under this assumption is shown in (b) of Table 2.20.

If the forecast is compared with the demands from the sectors of the study area, there will be an increasing tendency of shortages in these years. These shortages should be filled in by immigration. The demands are also shown in Table 2.20. If these balances are studied by sector or by job occupation, the shortages will be remarkable in every aspects, particularly in the jobs of technical and educational background. This can be one of the constraints in the regional development.

Table 2.20 TOTAL DEMAND AND LABOUR FORCE IN
THE STUDY AREA, 1983 - 2000

	1983	1985	1990	1995	2000
a. Employment Demand	48,230	54,820	67,510	77,400	93,750
b. Labour Force Supply (except immigrants)	46,560	54,960	65,600	78,020	91,645
c. Shortages (b - a)	-1,670	+140	-1,910	+620	-2,105

Source: Study Team

4.2.2 Constraints of Manpower Development

(1) Total Demand and Supply

As discussed in relation to Table 2.20, if there will be no immigrants from other areas, the total manpower demand cannot be filled by the people in the study area. Immigrants are necessary to support the development.

(2) Shortages in Qualified Personnel

There will be shortages of those with high level educational background and technological qualification even if there are immigrants into the area.

New subsectors of manufacturing industries are expected to be invited into the study area. They will demand persons with specific skills and occupational background. Vocational schools should be developed to produce qualified persons to fill these demands.

(3) Difficulty in Changing Occupation and Jobs

There will be difficulty in changing occupations and jobs. Examples are found in agriculture and fishery, not to mention occupations in manufacturing industries. However, changes should be encouraged by training and adjustment.

5. Recommendations

5.1 Vocational Training

Under the progress of industrialization and changes in economic composition of the area, some people need to change their jobs and/or adjust their skills and technology to new industrial requirement. For this purpose the functions of vocational training organizations should be reviewed and strengthened.

Particularly, long time inhabitants of the study area should be given the opportunity of training so that they can have job opportunities in expanding subsectors. Immigrants into the area can be also the subject for training. Otherwise, there arises an unfavourable social problem of unemployment, while there are shortages in some job classifications.

5.2 Educational System

All over the country an educational system will be improved qualitatively and quantitatively. The study area should go along with this improvement. Particularly, some organizations of the tertiary category should be invited to be located in the study area. Those characterized in the education of technology and science will be able to meet the requirements of the developing industry of the area.

From this point of view, new schools in the tertiary level are recommended to be located in the study area, particularly in Dungun. It is discussed also in Chapter 3: Human Resource Development.

5.3 Terengganu Scholarship

Scholarships given to the students of Terengganu origin encouraged those who were dilligent in studying academic courses in high level schools. The scholarships are awarded with an obligation to work in the State for five years. Majority of them left the State after this period because of unattractive remuneration and lack of opportunity for advancement.

In order to retain these scholars in the State after their five year service, the State should consider payment of some incentive allowances. Additional training to catch up with technology progress is an other method to retain those staff in Terengganu.

CHAPTER 3

HUMAN RESOURCE DEVELOPMENT

CHAPTER 3 HUMAN RESOURCE DEVELOPMENT

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CHAPTER 3 HUMAN RESOURCE DEVELOPMENT

1. General

Industrial development of the coastal area is composed of interactions of the following four elements;

- . Manufacturing industries
- . Urban system
- . Social System (Human Resource Development)
- . Infrastructure

Growth of manufacturing industries requires the development of technology and scientific information, which are generated and evolved by those who are qualified in education and research works.

Here, the social system is defined as the human resource development being an integration of organizations in which education, research and vocational training schools are incorporated. Without this, selfpropelled industrial development cannot be achieved.

2. The Current Facilities and Plans of the Country

Since the human resource development, defined as an integration of vocational training, education and research institutes of technology, is indispensable for the development of society and industries, the locations of these facilities have also been concentrated in the west coast, particularly in the Kelang Valley area where population, industries and urban facilities are clustered.

2.1 Tertiary Educational Institutes

The locations of tertiary education institutes including universities are shown in Figure 3.1 and their enrollments in Table 3.1. There are seven universities including International Islamic University. Except the two, the medical faculty of University of Science Malaysia in Kota Bharu and the training centre of Fishery Department of University of Agriculture Malaysia in Kuala Terengganu, all others are located in the west coast. Currently, there is no announcement of construction of any new university in the country.

There are two polytechnic institutes already established. During the FMP period, additional five institutes will be established. Of these seven institutes, none is planned to be located in Terengganu.

There are nine campuses of ITM; of which one is located in Dungun of the study area. In addition, two campuses will be opened in 1985; one in Kota Bharu and the other in Selangor. There are 26 teacher training colleges (not shown in Figure 3.1) in the country, of which two are in Kuala Terengganu. Ministry of Education has a plan to establish new colleges and expand the existing ones. The total number of teacher training colleges will be 31 in 1990.

2.2 Research Institutes

The Standards and Industrial Research Institute of Malaysia is under the administration of Ministry of Science, Technology and Environment. It has established two research centres of metal industries in Shah Alam, and has programmes of the construction of a plastic research centre in Shah Alam and a foundry research centre in Perak.

The nuclear research centre has its test plant in Bangi under the administration of the Prime Minister's Department.

2.3 Locations in Terengganu

As described above the locations of schools at tertiary level are minimal in Terengganu, not to mention the Governmental research centres.

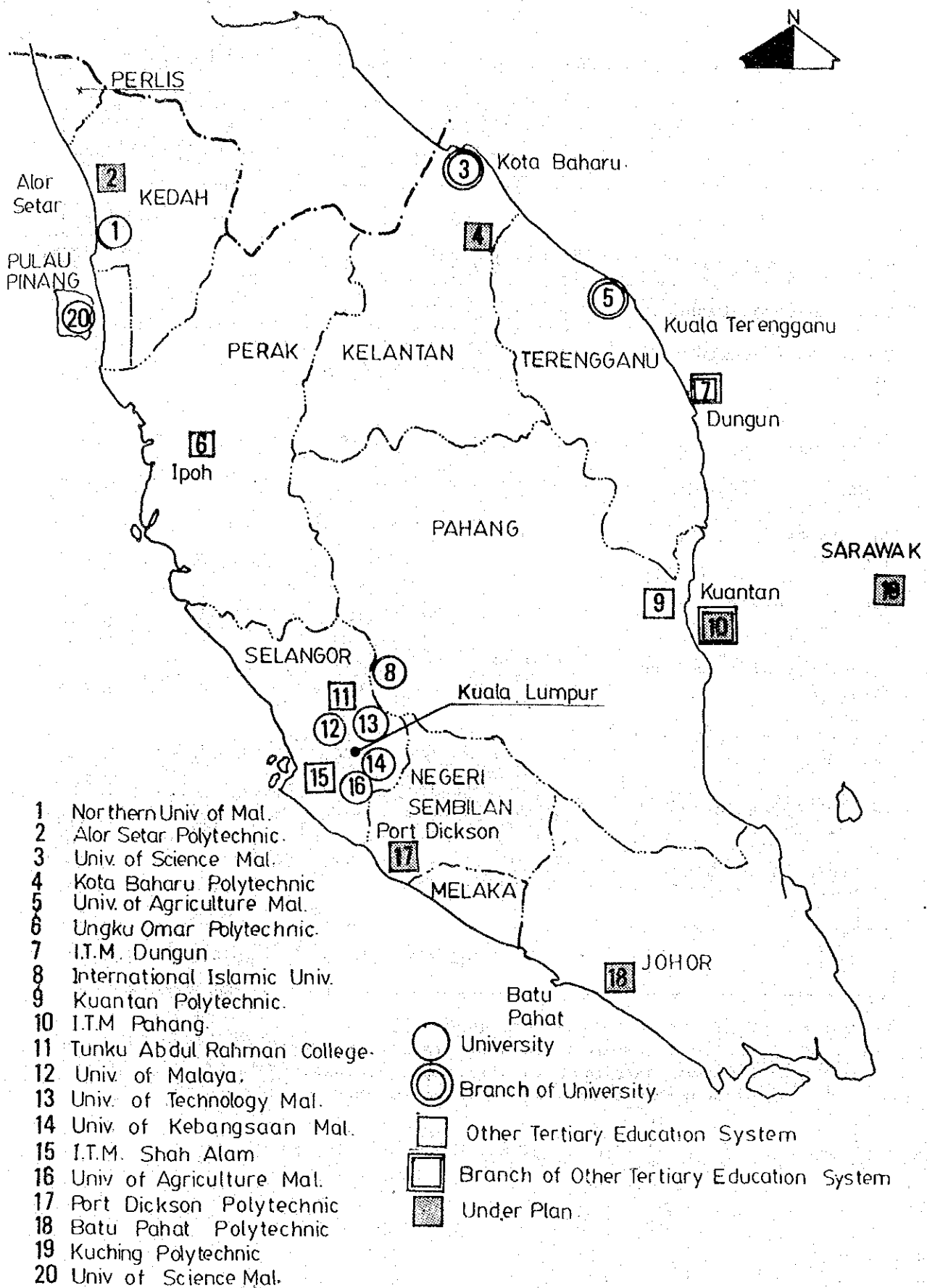


FIG. 3.1 LOCATION OF TERTIARY EDUCATION INSTITUTES

Table 3.1 ENROLLMENT IN TERTIARY EDUCATION, MALAYSIA, 1985

	Certificate	Diploma	Degree ¹⁾	Total
Kulantan Polytechnic	1,980	-	-	1,980
Ungku Omar Polytechnic	2,039	226	0	2,265
Batu Pahat Polytechnic	234	-	-	234
Tunku Abdul Rahman College	1,128	2,779	120	4,027
MARA Institute Technology	203	14,952	2,423	17,578
University of Malaya	-	-	9,890	9,890
University of Science ²⁾ Malaysia	-	-	8,862	8,862
National University of Malaysia	-	-	10,220	10,220
University of Agriculture Malaysia	-	3,569	4,843	8,412
University of Technology Malaysia	-	4,630	2,942	7,472
International Islamic ³⁾ University	-	-	524	524
Northern University of Malaysia	-	-	604	604
Total	5,584	26,156	40,428	72,068

Source : Ministry of Education through MTR, 1984.

Notes : 1) Includes enrolment in post-graduate courses.

2) Includes enrolment in off-campus courses.

3) Excludes enrolment of foreign students.

3. Necessity of Development of the Human Resource

The development of the human resource is a prerequisite condition for the growth of industries and urbanization. Specifically the system should meet the following requirements.

3.1 Manpower Requirement

As discussed in other chapters, the requirement for manpower with high level educational background, skills and technology will increase much more when plants are located in the area. Institutes for high level education and for vocational training should be established in the study area. Contiguous locations of industries and institutes will raise the efficiency in the coordinated performance between these systems.

3.2 Technology Innovation of the Industries

Research institutes should be established either by Government or by private sector. They should support and be supported by the industries in the development of the following activities;

- . Technology innovation
- . Quality control methods
- . Assistance in finance, manpower and facilities
- . Training of specialized personnel
- . Information service of technology, market and resources
- . Consultation and guidance

3.3 Pioneering New Industries

While locations of institutes described in 3.1 and 3.2 above are encouraged in association with the problems of strengthening the basic conditions of industrial development and urbanization, there should be other kinds of research institutes. They are related not to the industries expected to be developed in the short run, but to industrial subsectors which are desired to develop in the long run.

Examples of these research fields are shown below;

- . Biochemistry
- . Fermentation
- . Hygienic Science
- . New Materials
- . Energy

4. Locations of Human Resource Development System

As the industrial development is planned to be concentrated in Kerteh and Cukai, the human resource development system should not be located away from this agglomeration corridor. Exchange of information between the development system and the industry can be sustained if they are located closely.

The plan to develop the growth corridor recommends the industrial location in Kerteh and Cukai for the initial phase. The spatial setting of the study area considers better that Dungun be given another feature of development. In this context the study proposes Dungun should be characterized to be developed into a town of institutes for human resource development.

The Dungun town has been the centre of the district in economy and administration. It is a built-up urban community although the scale is with population of 30,000. In addition there is already a branch campus of MARA Institute of Technology (MIT) on a site of 400 acres. There are 1,300 students enrolled in June 1984. They study business administration, banking, accounting, administration, etc.

5. Recommendations

5.1 Locations

It is recommended that institutes categorized within the human resource development system be invited to be located at Dungun. Dungun can develop the area suitable for the location of these institutes. It should be characterized as the town of education and research institutes.

5.2 Educational Institutes

Institutes recommended in the tertiary level of the education system are shown in Table 3.2. A teacher training college, a polytechnic, and a university with faculties in technology and science should be encouraged to advance in Dungun. The table shows the conclusion on the recommended locations for school, being arrived at after the discussions with the agencies concerned.

Table 3.2 RECOMMENDED LOCATIONS FOR SCHOOLS IN THE TERTIARY LEVEL
IN THE STUDY AREA

Schools	Students	Teaching Staff	Supporting Staff
1. A teacher training college (At present, the teacher training college at Pasir Panjang is too small. Ministry of Education considers a new place to relocate it.)	500	50	75
2. The above college should be expanded to a regular scale	1,000	100	150
3. A vocational training school (similar scale as MIT)	600	35	60
4. A polytechnic institute specialized in high level job training	2,000	170	400
5. A university specialized in technology and science.	1,200	200	400

5.3 Vocational Training Schools

Besides the above educational system, vocational training schools covering the local needs of readjustment and practice of new skills should be invited for location. The subjects of these training schools should be closely related to the sectors in the study area, including agriculture and fishery.

There are some factories which have their own training courses within their organizations. Examples are Petronas and Perwaja. They should strengthen their activities.

5.4 Research Institutes

Research and experiment institutes should be invited for location. Their subjects should be closely related to the industrial sectors and urbanization in the study area. They should be organized in a way that production sectors and urban community can utilize advantageously the results of their research.

In addition, there should be a few research institutes which are independent of the conventional sectors, looking for new era of technology and development. Examples are those in the study of biochemistry, new materials, energy, etc. Location of these institutes conducting researches for the future generation will strengthen the regional image of South Terengganu as the new complex of industries and researches.

5.5 Community Development Centre

Industrial agglomeration, urbanization, research and education, and the primary industries will develop in the study area in the coming years. The scale of development is quite modest, each sub-area with a population of 40,000 - 60,000. In a sense, the scale is within practicable and policy-implementable magnitude. There will be a good opportunity to explore means to realize an idealistic community in which the above activities are well organized and integrated. A research centre in policies, communities and economy should be established for this exploration of integrated development.

CHAPTER 4

INDUSTRIAL DEVELOPMENT

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CHAPTER 4 INDUSTRIAL DEVELOPMENT

1. Manufacturing Industries and Problems of the Study Area

The section gives analysis on industrial development from the four aspects. They are 1) comparison of industrial development between the Terengganu State and the other part of the country, 2) status of utilization of industrial estates in Terengganu, and 3) relative advantages/disadvantages of industries in the east coast. Discussions in these aspects result in 4) problems and recommendations of industrial development in Terengganu particularly in the southern part of the State.

1.1 Manufacturing Industry's Potential for Development in the State of Terengganu

The extent of industrial agglomeration as given by several indicators is low compared with those of national average. The share of the number of large manufacturing establishments counts 7.1% for the state of Terengganu as against 13.1% for the national average in the year 1981. This is shown in Table 4.1.

Out of 38 MIDA registered companies in the Terengganu State, as many as 8 companies have their headquarters in Kuala Lumpur. This amounts to 22% of total number of MIDA registered companies in the Terengganu State as against 7% for the national average. The fact indicates the lack of serviceability from tertiary industries and of industrial agglomeration.

Assuming that the extent of industry agglomeration proceeds in parallel with the population size distribution, the number of MIDA registered companies in the Terengganu State should be tripled to count as many as 106 and the total number of establishments should be increased by 50% over the current number. They are shown in Table 4.2.

Although the absolute level of industry agglomeration is low as compared with the national average, the indicators on the manufacturing industry's growth over the years 1973-1981 show higher figures compared with the average figures for the Peninsular Malaysia except the indicator on the number of establishments. The figures have reference to the industrial surveys 1981 and the census of the manufacturing industries, Peninsular Malaysia 1973, Department of Statistics. The indicators are shown below.

Annual Growth Rate Over the years 1973-1981

<u>Indicators</u>	<u>Terengganu</u>	<u>Peninsular</u>
Number of manufacturing establishments	6%	6%
Revenue	28	22
Number of employees	12	8
Value of fixed assets	26	20

Table 4.1 INDICATORS ON MANUFACTURING INDUSTRIES BY STATE

STATE	PERCENTAGE SHARE OF LARGE MANUF. 1)		AVERAGE PER ESTABLISHMENTS					AVERAGE PER EMPLOYEE			CAPITAL TURN-OVER RATE
	ESTABLISHMENTS	REVENUE (M\$1,000)	GROSS SURPLUS (M\$1,000)	NO. OF EMPLOYEES (persons)	VALUE OF FIXED ASSETS (M\$1,000)	REVENUE (M\$1,000)	GROSS SURPLUS (M\$1,000)	SALARIES AND WAGES (M\$1,000)	VALUE OF FIXED ASSETS (M\$1,000)		
Johor	14.6	1865.5	60.8	27.1	502.5	68.8	2.24	5.05	18.53	3.71	
Kedah	8.5	1032.4	26.0	21.0	447.0	49.2	1.24	3.43	21.32	2.31	
Kelantan	6.1	650.9	27.9	25.2	213.6	25.9	1.11	2.86	8.68	2.98	
Melaka	7.9	1240.6	61.2	27.0	301.7	45.9	2.27	3.96	11.17	4.11	
Negri Sembilan	7.3	6058.8	267.6	26.4	700.4	229.7	10.14	5.33	26.55	8.65	
Pahang	10.2	1549.7	34.1	31.8	563.9	48.8	1.07	4.95	17.75	2.75	
Pulau Pinang	16.3	2609.9	155.9	44.0	641.2	59.4	3.55	4.85	14.58	4.07	
Perak	11.1	1086.8	56.9	21.0	338.0	51.9	2.72	4.00	16.13	3.22	
Perlis	4.2	1532.7	88.1	17.3	800.1	88.5	5.09	5.01	46.22	1.92	
Selangor	26.0	4732.5	274.4	51.6	1234.1	84.8	5.32	6.19	23.93	3.54	
Terengganu	7.1	822.2	15.6	23.5	308.8	35.0	0.66	4.23	13.13	2.66	
Sabah	7.5	664.9	- 5.3	18.3	344.9	36.4	- 0.29	6.03	18.88	1.93	
Sarawak	12.9	826.9	32.3	15.8	210.6	52.5	2.05	3.99	13.36	3.93	
Wilayah Persekutuan	10.9	1141.6	82.0	21.2	314.1	53.9	3.86	5.68	14.81	3.63	
Total	13.1	1894.1	95.8	28.3	510.9	66.9	3.38	5.06	18.04	3.71	

Note : 1) MIDA registered

Source : Industrial Surveys 1981, Department of Statistics.

Table 4.2 GEOGRAPHICAL DISTRIBUTION OF MANUFACTURING ESTABLISHMENT AS COMPARED WITH POPULATION DISTRIBUTION

STATE	A	B	C	A / B	A / C	LARGE COMPANIES ONLY	ALL SCALE OF MANUF. ESTABLISHMENTS
	POPULATION AS of 1981 (100 persons)	NO. OF MIDA APPROVED COMPANIES	NO. OF MANUF. ESTABLISHMENTS OF ALL SIZE FROM THE SOURCE 2)	POPULATION SUPPORTED BY LARGE COMPANIES (100 PERSONS)	POPULATION SUPPORTED BY MANUF. ESTABLISHMENTS (100 PERSONS)		
JOHOR	15804	408	2793	36.74	5.66	320.2	2445.3
KEDAH	10778	84	988	128.31	10.91	216.4	1667.7
KELANTAN	8593	34	556	252.74	15.46	174.1	1329.6
MELAKA	4468	65	823	68.74	5.43	90.5	691.3
NEGRI SEMBILAN	5514	54	741	102.11	7.44	111.7	853.2
PAHANG	7688	82	807	93.76	9.53	155.8	1189.5
PULAU PINANG	9008	333	2041	27.05	4.41	182.5	1393.8
PERAK	17437	323	2908	53.98	6.00	353.3	2698.0
PERLIS	1448	5	119	289.60	12.17	29.3	224.0
SELANGOR	14263	642	2469	22.17	5.77	288.4	2202.7
TERENGGANU	5253	38	536	138.24	9.80	106.4	812.8
SABAH	10229	84	1116	121.77	9.17	207.2	1582.7
SARAWAK	12355	197	1533	62.72	8.06	250.3	1911.7
MILYAH PERSEKUTUAN	9196	326	2999	28.21	3.07	186.3	1422.9
TOTAL	132032	2675	20429	49.36	6.46	-	-

Source: 1) Directory of Approved Companies 1982, MIDA
 2) Industrial Surveys 1981, Dept. of Statistics.

1.2 The Position of Industrial Estate in the Terengganu State

The supply of the industrial estate in the Terengganu State is enough to meet the demand for the coming years as long as the current pace of occupancy rate is expected to continue. (Refer to Table 4.3) This section discusses the current supply prospect only. The long-term perspective is shown in the section five. Out of 188 hectares of industrial land developed and saleable in the coastal industrial estates of Gong Badak, Kuala Ibai, Jakar I and II and Dungun, 78.8 ha is still available. Even the above acreage only can accommodate for no less than 4 years for the new locators to the State if they are guided into the industrial estates following the past trend for the years 1974-1982.

The serviceability of supporting infrastructure is relatively poor as viewed from the national average. The indicative examples as of December, 1982 from MIDA are shown below.

<u>Infrastructure</u>	<u>Indicators</u>	<u>Serviceability</u>	
		<u>Terengganu</u>	<u>National Average</u>
Power	Power supply capacity (MVA)/acreage still available (ha)	0.053	0.534
Telecommunication	No. of telephone lines still available/acreage (ha)	1.61	5.68

Table 4.3 POSITION OF INDUSTRIAL ESTATE

STATE	EXISTING INDUSTRIAL ESTATE										PROPOSED INDUSTRIAL ESTATE		
	NO. OF INDUSTRIAL ESTATE	TOTAL PLANNED AREA (ha)	DEVELOPED (ha)	SALEABLE (ha)	STILL Available (ha)	PREVAILING PRICE RANGE FOR CURRENTLY AVAILABLE ESTATE LAND (RM/HE)	LEASE PERIOD (years)	NO. OF FREE TRADE ZONE	NUMBER	PLANNED AREA (ha)	NO. OF INDUSTRIAL ESTATE		
											NUMBER	PLANNED AREA (ha)	
JOHOR	12	1637.52	1195.22	1099.96	175.46	21.53-32.29	60	1	3	128.70			
KEDAH	5	495.60	489.20	401.18	95.48	19.30-21.53	60	-	1	80.93			
KELANTAN	5	621.31	277.32	253.65	127.88	26.91	66	-	3	281.71			
MELAKA	7	344.84	266.66	241.02	26.52	12.92-26.91	99	2	2	121.41			
NEGRI SEMBILAN	6	401.51	401.51	299.65	7.46	12.92-20.45	60	-	5	102.79			
PAHANG	8	1304.50	739.07	569.31	260.48	9.26-96.88	99	-	1	103.60			
PULAU PINANG	8	1356.00	708.08	1166.32	540.02	30.14-37.67	60	3	0	-			
PERAK	10	746.85	715.30	588.65	55.05	3.23-37.67	60	-	8	1076.68			
PERLIS	1	13.35	13.35	11.45	4.47	26.91-30.14	60	-	0	-			
SELANGOR	16	2421.02	1742.93	1408.86	223.10	43.05-107.64	99	3	8	363.37			
TERENGGANU	9	609.73	364.71	536.53	323.80	20.00-38.00	60	-	3	2003.19			
SABAH	7	403.34	402.43	301.56	30.60	-	66	-	3	72.72			
SARAWAK	6	910.71	753.18	581.42	69.45	45.90-69.50	60	-	4	1479.05			
WILAYAH PERSEKUTUAN	-	-	-	-	-	-	-	-	-	-			
Total	100	11266.28	8068.96	7429.56	1939.77	-	-	9	41	5814.15			

SOURCE: Position of Industrial Estate, as at 31st Dec. 1983, MIDA.

1.3 Assessment of Industrial Development Prospects of the East Coast as viewed from the West Coast Locators

(1) Interviews

Interviews with the plant managers were conducted to identify the factors which determined their current location and those which may determine the location of new establishments in other places, particularly concerning the study area.

(2) Sectors Selected for the Interview

Plants surveyed are as follows:-

<u>Locations</u>	<u>Products</u>
Bayan Lepas FTZ	- electronic devices, plastic moldings
Prai FTZ	- Synthetic fibre
Kuala Kangsar IE	- Textile mill
Mak Mandin IE, Butterworth	- Wood products
Butterworth	- Steel fabrication
Telok Panglima Garang FTZ, Kuala Langat	- Electronic devices
Ulu Kelang FTZ	- Electronic materials
Batu Pahat	- Ceramic ware

(3) Major Findings from the Interview Results

Key factors in industrial location are classified as follows:

a. Access

Access to the market either through national trunk road network or through trading ports/international airport.

b. Price competitiveness

Price competitiveness will be maintained as long as the transport cost component does not exceed 5% of ex-factory price. It is felt through the interviews that a plant may select a suitable location in the range where the transport cost component varies by less than 5% if other conditions are same. The indicative figures are as follows:

<u>Product Type</u>	<u>Variation in the Transport Cost Component</u>
Plastic product	1 - 2%
Textile	Less than 2%
Wooden door	1%
Ceramic ware	3 - 5%
Steel pipe	Less than 5%
Transistor IC wafers	1 - 2%

c. Malaysian Manufacturing Industry Structure:

Some managements comment that the vertical (upstream and downstream) industrial specialization is not well-established in Malaysia. As a result one company tends to manufacture necessary components and parts internally with its in-house production units rather than purchasing from outside suppliers.

Such functions as plant maintenance service, repair and steel fabricating shops are internalized, indicating a smaller demand for independent ancillary industries. Managements expect development of these with an efficient service, because these in-house systems are not cost efficient.

d. The Terengganu Case

Major disadvantages in locating in Terengganu as viewed from the west coast are as follows:

- Loss of business activity and plant operation due to suspended traffic during floods.
- Not frequent calls by international vessels although the nearby port of Kuantan was completed in 1983. There is no international airport in the study area.
- Longer distance to the major markets resulting in less competitiveness in terms of transport cost.

e. Necessary Conditions to be Provided in The Study Area:

Throughout the discussion with the plant managers it was found the following points should be provided if the study area is to be an attractive site for new enterprises.

Necessary infrastructure:

- Stable power supply without power break and voltage fluctuation.

- Furnishing of reliable telecommunication means with direct international links.
- Provision of international port available throughout the year.
- Provision of trunk roads with access to the plants even during the flood season.

1.4 Problem of Industrial Development in The South Terengganu Area

The low level of industrial agglomeration in the South Terengganu area can be observed both from quantitative and qualitative aspects. Quantitatively the size and number of manufacturing establishments are small in absolute terms. Qualitatively that region's manufacturing industry structure is yet to evolve into solid interdependence among the establishments through intra-sectoral transactions.

Small market size, unavailability of qualified manpower and lack of fixed capital formation have been the cause and of not being able to embark on the regional economy's expansion cycle.

The measures to overcome the above obstacles are summarized below.

- (1) To accelerate industrial agglomeration, strong promotion and inducement of existing medium and small scale industries into the region from outside are needed. This should be tied up with the industrial strategy of concentrated location of industries.
- (2) Establishment and provision of the State's own industrial incentives to compensate for the private enterprises' cost increments incurred by geographical remoteness, small market size, access to inputs and so on are required. Some institutional arrangements are necessary to administer and implement effectively the matters on corporate incentives.
- (3) The provision of industrial estates should be limited to the existing and currently ongoing ones. Rather the serviceability of the existing and ongoing industrial estates should be kept high to attract more enterprises.

2. Basic Characteristics of Manufacturing Industry

Basic characteristics of manufacturing industry should be identified prior to preparing a plan of development. They are stated in the following subsections. If a development plan does not take into account these basic characteristics, the resultant development cannot achieve the goal.

2.1 Importance of Agglomeration

A manufacturing plant operates in pursuing an objective of maximizing the profit. In order to achieve this objective, the management makes every effort to maximize the revenue while minimizing the expenditure simultaneously. Apart from the resource oriented location, agglomeration generally influences advantageously efficiency in operation.

The manufacturing industry has stronger linkage effects with other economic sectors. Accordingly, the industry is sensitive to the scale of agglomeration. In general, location of manufacturing industry clusters in selected areas producing linkage effects if free economic activities are allowed and no political constraints are imposed. This kind of development has been found in Malaysia and other countries.

If the plant is located in isolation, there will be little opportunity to develop linkage effects. Supportive and related service industries usually follow to locate their activities in the place where they find market potential and agglomeration. Manufacturing plants which operate and expand their outputs continuously can increase the extent of agglomeration.

When the agglomeration proceeds further and the conditions which support the profit maximizing activities become disadvantageous, there begins a spill over. Examples of disadvantageous factors are difficulty in finding additional labour, traffic congestion causing delays in schedules and higher cost in the transport of raw material and product, unfavourable effect on environment due to excessive concentration of locators.

Any industrial development policy should be formulated in response to this phasing, although there may be variation and diversions to a certain extent. Importance of agglomeration should be taken into account when an industrial development programme is prepared.

2.2 Location Criteria of Manufacturing Plant

When a manufacturing plant looks for a location, it determines the place which is expected to result in the largest return from the long term viewpoint. The criteria of the location factors are classified as follows:

- (1) Natural conditions - climate, oceanic and riverine conditions and geographical location.
- (2) Industrial infrastructure - they include physical infrastructure such as land, water, power, telecommunication, road and other transport system, drainage, sewerage, disposal system and social infrastructure such as housing, social amenities for daily life, education system for children, etc.

- (3) Market and agglomeration - urbanization, population and extent of agglomeration.
- (4) Labour force - quality and quantity.
- (5) Input resources - mineral, agricultural, forest, fishery, etc.

In southern Japan there is a proverb, "manufacturing plant is not interested in the location which stands in the midst of the typhoon course". Good natural condition (1) is a prerequisite for the manufacturing and industries in general. If there are established infrastructures (2), the plants will be interested in the location since the cost to construct the infrastructure by themselves can be saved. Selection of input resources (5) differs among the plants, because their products require different inputs. These three factors are given a negative listing in the sense that if any one of them provides poor performance, it can be shown by negative points indicating additional cost when compared with the most favourable case. They can be classified as the negative list.

On the other hand, market (3) and labour (4) can be given with positive grading points in the sense that industry will be more attracted to the location which is surrounded by larger market (3) and labour force (4). These can be named as the positive list.

When a study on the plant location is conducted, the following aspects are analysed. These are mostly concerned with the above positive list covering (3) and (4).

- Accessibility to large market (access to the west coast and international ports).
- Availability of parts, material and resources (easy access to the related manufacturers).
- Existence and availability of supporting maintenance and service enterprises.
- Amenities for management executives, engineers and other employees. (urban service, education system, etc.)
- Qualitative aspect of labour force (skill, educational background, experience, etc.)
- Incentives and special provisions to overcome the locational disadvantages of the region.

Terengganu State is at a lower level than the national average in the above aspects except "Incentives". These lower levels are considered not attractive for the entrepreneurs who look for a new plant site. In order to be attractive in location, the State has to develop industrial agglomeration, urban service, and others at the earliest time.

3. Development Strategy of Manufacturing Industry

Identifying location characteristics of the manufacturing industry as in the previous sub-section, a development strategy is proposed in the following process. Major points in the planning process are stated as:

- Dispersed location versus concentrated location.
- Inviting new enterprises and rearing local enterprises.
- Types and scales of leading industries which can form the growth core.

3.1 Alternative Courses of Industrial Development

Terengganu State is classified as one of less industrialized states in the country. Within the State, the number of manufacturing establishments registered with MIDA are shown in Table 4.4. The geographical distribution of the number of manufacturing establishments seems to correspond to that of urban agglomeration. The central area occupies 50% and the study area (the south) 37% of the total number of manufacturing establishments in the State.

Two alternative development strategies are presented as follows and a concept is shown in Fig. 4.1.

The first path: an equitable regional growth type.

It proposes a dispersed location of plants in the State, just like the dispersal policy of the federal Government. It may not change the inter-regional share of manufacturing industry at any time over the growth path. However, it is questionable that this approach is more appropriate than the others in the case of industrialization in Terengganu, where current industrial agglomeration is quite modest in every area. When invited plants are dispersed over the State, their accumulation impact is less sizeable.

Existing situations in urbanization, qualitative levels of labour supply, etc. are considered not attractive for private enterprises in accelerating new locations of plants in Terengganu.

The second path: growth pole type.

This approach proposes the guided formation of concentrated location of manufacturing establishments in one area at the initial stage of the development in order to reach a sizeable extent of agglomeration. It will naturally spill over to the peripheral areas forming solid inter-industry linkages. Satellite cores of growth will be formed at the final stage of development.

This strategy intends to make maximum use of inherent characteristics of industry's growth, particularly the agglomeration effect. The cost of infrastructure construction is less but with higher efficiency, because of the concentrated investment.

Table 4.4 DISTRIBUTION OF MIDA APPROVED COMPANIES IN TERENGGANU

INDUSTRY CLASSIFICATION NO.	TYPE OF MANUFACTURING	KUALA TERENGGANU	GONG BADAQ	KEMAMAN	OTHER AREA TOTAL	STATE MALAYSIA				
						NORTH CENTRAL	SOUTH WEST	TOTAL		
31140	Canning preserving processing of fish, custacea and similar foods.	1* ^{LUR}	-	-	-	-	-	1	43	
31152	Palm Oil	-	-	1* ^P	-	-	-	-	1	50
31190	Manufacture of Cocos, Chocolate and Sugar Confectionery	1* ^{LI}	-	-	-	-	-	-	1	22
31221	Icees Factories	2	-	1	-	-	-	-	3	26
31219	Other Food Products, n.e.c.	-	1* ^{LI}	-	-	-	-	-	1	19
31220	Prepared Animal Feeds	-	-	-	1	(1)	-	-	1	48
	Food Manufacturing Sub-total	4	1	2	1	(1)	-	-	8	443
32114	Batek Making	1	-	-	-	-	-	-	1	9
33111	Sawmills	6	1	6	8 ^P	(2)	(3)	(3)	21	213
33112	Plywood, Hard Board and Particle Board Mills	1* ^P	-	-	-	-	-	-	1	61
33113	Planing Mills, Window and door Mills and Joinery Works	-	-	-	1	-	(1)	-	1	57
33114	Prefabricated Wooden Houses	-	1* ^{LI}	-	-	-	-	-	1	6
33119	Other Wood Products	1	-	-	-	-	-	-	1	14
	Wood and Wood Products Sub-total	8	2	6	9	(2)	(4)	(3)	25	387
36999	Other Non Metallic Mineral Products n.e.c.	-	-	1	-	-	-	-	1	9
38320	Manufacture of Radio, Television and Communication Equipment and Apparatus	-	1* ^{LUR}	-	-	-	-	-	1	85
39099	Other Manufacturing Industries, n.e.c.	1* ^P	-	-	-	-	-	-	1	25
36200	Hotel and Tourist Complex	1* ^P	-	-	-	-	-	-	1	56
	Grand Total	15	4	9	10	(3)	(4)	(3)	38	2940
	Number of Companies with head office in K/L	3	2	2	1	-	-	(1)	8	

Notes : 1)* Designates incentives granted, P: Pioneer Status, LUR: Labour Utilization relief, LI: Locational Incentive

2) Numbers without * mark on the shoulder indicate those companies without incentives.

3) Total and Subtotal figures in the right most column include those types of industries not cited here explicitly

Source: Directory of Approved Companies, 1982, MIDA

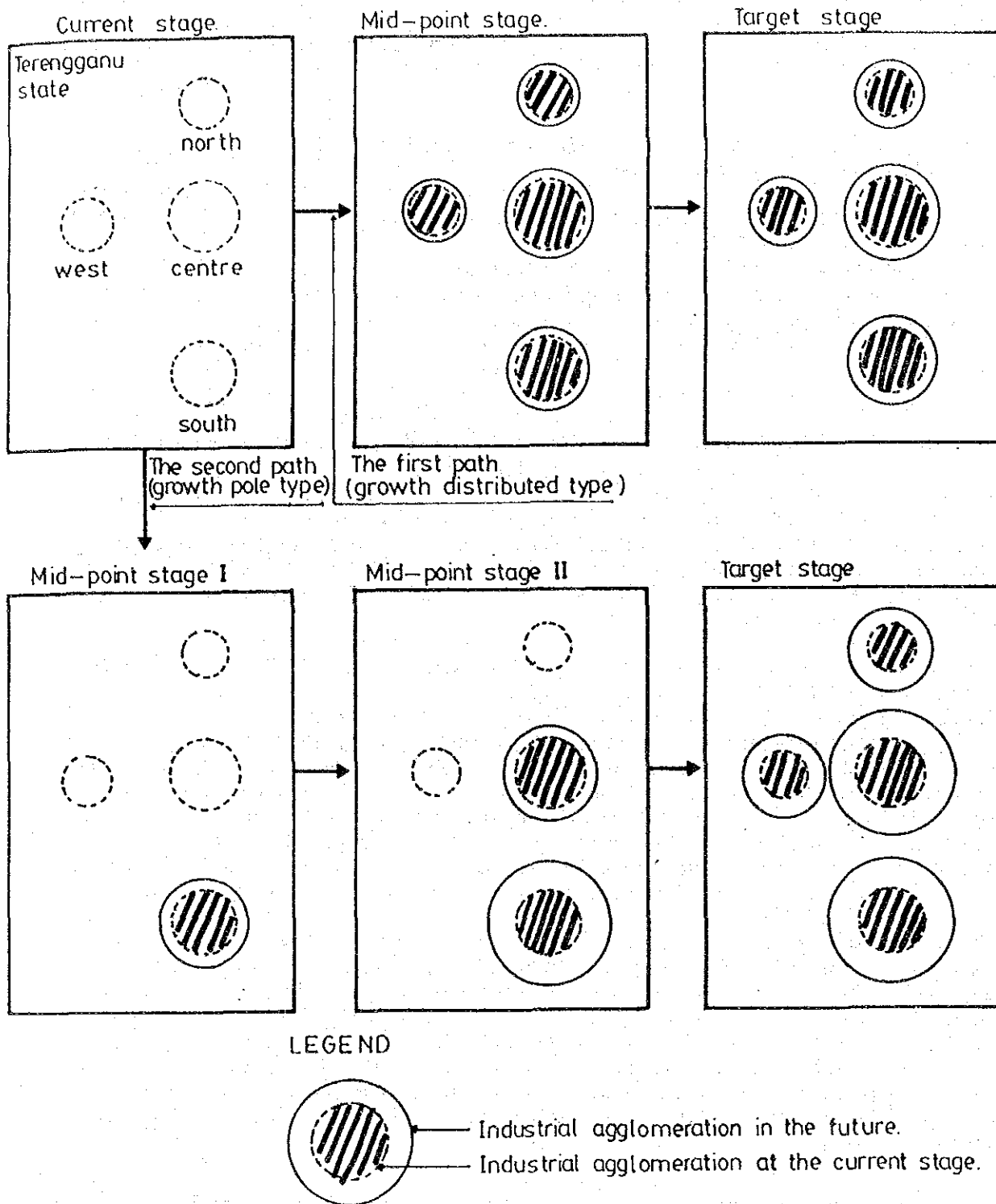


Fig. 4.1 ALTERNATIVE COURSES OF INDUSTRIAL DEVELOPMENT

It is noted that this approach will enlarge the differences of development among the areas for sometime at the initial stage. However, the unbalanced growth among the regions does not mean the negligence of growth in other regions, but they merely show slower growth compared with that of the growth pole.

3.2 Development Strategies Applicable According to the Stages of Industrial Agglomeration

3.2.1 Basic Concept of Stages for Industrial Agglomeration

Each development stage of industrial agglomeration needs to have its own strategy because the stages are different in various aspects. Firstly, the stages are categorized comprehensively as in Fig. 4.2. Secondly, major points in coordinating the development policy and the decision of private entrepreneurship are discussed. And finally, a plan of development strategies in the study area is proposed.

An example is found in Japan, where industrial development was initiated by the Government to concentrate in four areas in the period after World War II. In that time the agglomeration was virtually zero because of complete destruction of major urban areas throughout Japan. In that case heavy industries such as steel, shipbuilding, fertilizers, etc. were the leading industries of the growth poles in these areas. No encouragement by government was given to other subsectors, such as light industries. They were left to grow by themselves.

Growth poles were developed at the coastal zone of Tokyo, Nagoya, Hanshin and Kita-Kyushu. During one or two decades, the development was accelerated and the agglomeration went far beyond expectation. Problems in transportation, urban amenities, environment, etc. reached at such a critical level that a new phase of spreading started. It was in the latter part of the 1960s. After that a number of development strategies were proposed to relocate and disperse the manufacturing industries. They are named as method of regional core development, large-scale project method, etc., always accompanied by investment in infrastructure sectors. Incentives and subsidies to the plants to move out for relocation were also given often.

The staged evolution in agglomeration was a result of the mixture of policy instruments and pragmatic reasoning rather than that of a theoretical approach. The growth pole theory in the field of regional planning is a result of study and research which materialized rather recently. Its leading theorists/economists are F. Perroux, N.M. Hansen, J. Glasson, etc.¹⁾ Most articles and books were published in the 1960s and afterwards. Finding in the experiences of Japan as well as research studies are used whenever necessary in order to support the presentation of strategies in this study area.

Note 1): . Myrdal, G., *Economic Theory and Under developed Regions*, Duckworth (1957)
. Perroux, F., *La notion de pole de croissance*, *Leconomie de xxeme siecle*, Paris (1964)
. Hansen, N.M., *Development Pole Theory in a Regional Context*, *Kyklos*, XX (1967)
. Glasson, J. *An introduction to Regional Planning*, Hutchinson of London (2nd Edition 1978 and reprinted in 1983)

3.2.2 Categorized Development Stages

Stages of development are categorized as the periods of Government initiative in order to formulate the growth pole, an agglomeration development, matured level in which some spreadings are identifiable and a period of encouraged spatial spreading. The stages are shown in Fig. 4.2.

In Fig. 4.2, the development phase (p curve) are shown as a logistic curve, which reach a saturation level in the last part. The constraint on the private sectors is apparent when the agglomeration is quite small. Maintenance service, parts and other suppliers, other service, etc. are not easy to find at this stage. If the plants are located and agglomerated, these linked activities develop spontaneously.

Constraint from the public sector is shown by a curve in Fig. 4.2. It moves up rapidly, when the development reaches a matured level and further ahead indicating an accelerated increase in the social cost, due to traffic congestion, environmental deterioration, etc. The two constraints are aggregated and shown as c-curve, a downward convex.

In Fig. 4.2, the stages are categorized into four stages. During the first stage (0 - A), constraint factors remain in a way not attractive for the new locations of private enterprises. Agglomeration is negligibly small at this stage. Initiatives by the public sector to concentrate the location in selected areas and incentives for inviting plant locations are necessary.

When the development comes into the second stage (A - B), expanding activities and new locations by private sector will generate a substantial growth in agglomeration. The public sector will be able to function in determining the location of selected subsectors from the view-point that they are advantageous for further development of the area and in guiding the overall sub-sectoral composition to a targetted structure.

During the period (B - C) the development potential still exceeds the constraint factor although the latter increases its influence. A few steps will be taken to give incentives rather "not to be located in the area".

The industries in the region reach a matured status in the long run (C - D). Constraint factors are prominent which will necessitate the plants to relocate in other areas. Urban problems and environment deterioration are so severe that a movement to disperse the plants from the area is encouraged and implemented by using various policies.

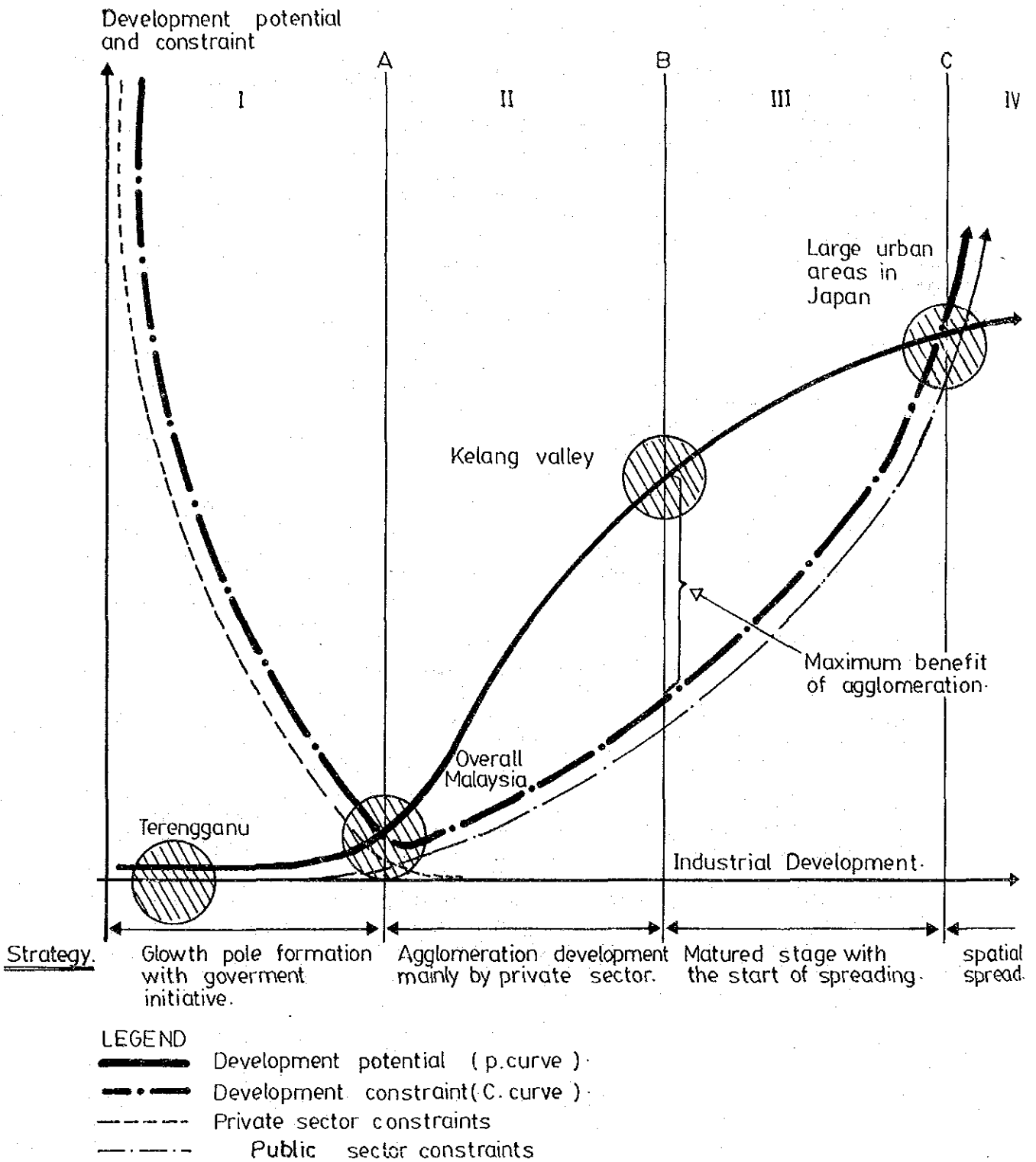


Fig. 4.2 STAGES OF INDUSTRIAL AGGLOMERATION AND DEVELOPMENT STRATEGY

3.2.3 Development Strategies Applicable to the State of Terengganu

The foregoing section dealt with an alternative development path in a view to sustain a high regional economic growth. The three possible strategies regarding the spatial allocation of manufacturing industries over the state are to be given here.

The strategies should also promote the formation of core towns for industrial development. The opportunities of newly locating manufacturing establishments, whether they may be coming from outside the state or new ventures emerging from within the state, should be employed to achieve intended spatial allocation of industries.

- (1) Alternative 1: Guide formation of strategic growth poles with concentrated location of manufacturers.

Predesignated strategic growth core is to be sited with intentionally guided introduction of new firms centering on strategic industries such as petro-chemical or steel mill down stream complexes. Intensive development programme of one core after another in an order of priority should be prepared. Intensive development effort on one core is continued so as to produce economy of agglomeration until it reaches a stage capable of sustaining autonomous growth.

Growing industries can become a growth pole. Finally several of such poles will be developed within the State. The concentration will be cost efficient including the investment of infrastructure, while it may cause the congestion and environmental deterioration if not controlled.

- (2) Alternative 2: Equitable industrial development of sub-regions within the State through dispersed location of manufacturing establishments.

The strategy does not designate specific sub-regions or core areas of development with any assigned priority, rather it intends to achieve equitable growth among the sub-regions within the State. This strategy requires a longer period to reach the targetted growth goals and the economy of agglomeration is unlikely to be expected due to dispersion. Particularly, dispersion under the existing situation will not attract additions of private firms.

- (3) Alternative 3: Spatial allocation of industries in accordance with their types.

The strategy is particularly concerned with the types of industries in their spatial allocation.

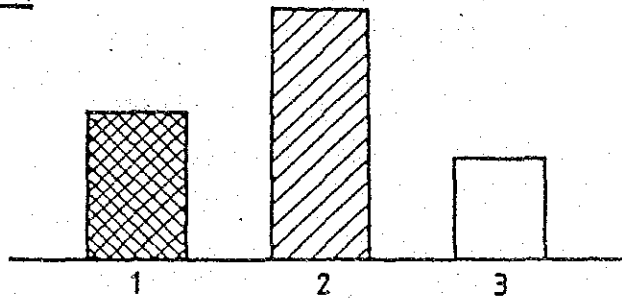
The types of industries largely fall into two categories; those of resource-based whose manufacturing plants are to be located at the nearest site where resources are available and those of nonresource based whose manufacturing plants are not always located in accordance with resource availability.

Non resource-based industries include manufactures of textiles, apparels, paper products, plastic products, fabricated metal products, non-electrical machinery, electrical machinery, consumer electric appliances, transport equipment and so on. The location of those industries should be guided into strategic locations in a priority order until they reach a certain degree of agglomeration. An emphasis should be placed on integration of these two types of industries as well as two industrial area of the inland and the coastal into a combined manner.

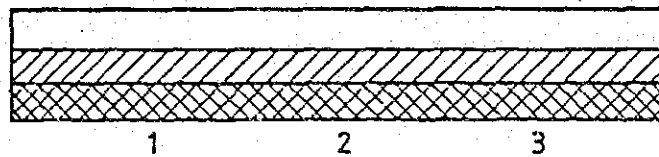
The outcome of implementing the industrial allocation strategy in accordance with the selected locations together with the resource availability, say, Alternative 3 may be the result of the mixture of the Alternative 1 and 2. This might result a lower growth in the industrialization than the Alternative 1, and higher than the Alternative 2. However, it will generate development of resources related industries and will diversity the industrial activities in other subregions simultaneously. The industrial development strategy of Alternative 3 is applicable in the study area, based on this understanding.

Figure 4.3 shows the concept diagramatically. It is advisable the third strategy be adopted for the industrial development.

STRATEGY 1



STRATEGY 2



STRATEGY 3

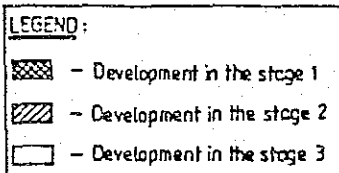
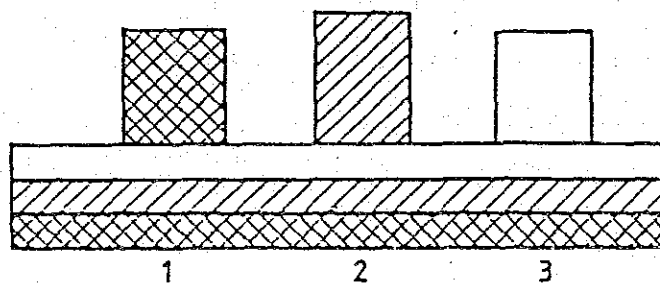


Fig. 4.3 INDUSTRIAL DEVELOPMENTS STRATEGIES/SPATIAL ALLOCATION OF INDUSTRIES

3.2.4 Elaboration of Manufacturing Industrial Development Strategies in the South Terengganu Sub-region - The Study Area

The industrial development strategies are elaborated here in the context of the south Terengganu sub-region based on the following two premises.

- (1) The three industrial development strategies applicable for the whole state are discussed earlier in the Section 3.2. Among them, the third strategy is advised to be adopted state-wide.

Consequently elaboration of strategies in the sub-regional context is subject to the state's third strategy.

- (2) Under the third strategy, the spatial allocation of industries in the study area will envisage two distinct areas - the one is the industrial growth corridor or the coastal strip for the industrial agglomerating by non-resource based as well as oil and gas based industries and the other is the inland KETENGAH area for the distributed location by resource-based industries.

Application of the above strategies does not imply the relocation of plants already established and operating in the State.

The planned industrial allocation in the sub-region can most effectively be implemented through administrative guidances in encouraging enterprises out-of-the state to induce their locations and in setting-up new ventures together with the local enterprises and funds.

In the inland KETENGAH area, agro-based industries - palm oil mill, latex processing plant and wood products plant - will continued to be located or to be expanded on the same site with the planned increase in agricultural and forest production.

In the coastal strip - a planned growth corridor designated for industrial agglomeration - the suitable types of industries are to be induced. They include:

- petrol and gas processing and relevant downstream industries,
- steel and steel products industries
- manufacture of fabricated metal products, structural metal products agricultural machinery, electrical industrial machinery and apparatus.

3.3 Inducing Manufacturing Establishments and Rearing Local Establishments

TMPS emphasizes the growth of small scale hand craft and agro-based industries during the initial stages. They are already located in the area and closely linked to the local market. Production unit is mostly by family unit or by a similar small number of employees. Technology, marketing, invested funds are well below the level of agglomeration required for modern industries.

To raise them as the leading industries of the growth pole formation will require quite a long time. It is hard to find a wide variety in the types of these small scale local industries since the local market is small. There are little linkages to the developing industries. Accordingly, they cannot be placed as the leading industries necessary for agglomeration. However, it does not mean they should be neglected. It is emphasized that their activities should be sustained and encouraged to hold a certain percent of share in the regional economy. They will generate substantial purchasing power as well as job opportunities.

Plants leading the core formation can be found in other aspects, either in a joint-venture form such as PETRONAS related plants and SEDC joint-ventures or in private enterprises such as Siong Industries (M) Sdn. Bhd. (a TV assembly plant in Gong Badak, Kuala Terengganu).

Strategies for the initial stage of the planning period are already suggested in the previous sub-section of 3.2. To repeat, national projects under construction should be placed as leading industries. Related downstream plants in new sub-sectors should also be invited from outside the State and foreign countries. Selective raising of the local manufacturers to form linkages with the leading core plants should be undertaken.

During the mid-term period, development into the downstream sectors from the leading plants should be emphasized. In the case of new plants coming in the area, selective guidances should be given to those who produce high value added outputs in steel, metal and machines, who use advanced modern technology and who have large industrial linkage with other sectors. Efforts to raise local enterprises to have strong linkage with those newly induced industries should be emphasized.

In the final planning period, a rapid agglomeration will take off. Strategies should emphasize the direction to intensify the linkages within the area through which the study area can attain a high productivity and competitiveness with other regions. Part of the linkages will spill over to other areas. The spillover effect of the growth pole to other areas of the study area can be realized in this period.

These staged strategies for new plants and local enterprises are summarized in the Table 4.5.

Table 4.5 INDUCING ESTABLISHMENTS FROM OUTSIDE AND REARING LOCALS

	Initial period - 1990	Mid-term period - 1995	Last period - 2000
Leading Industries petro, gas, steel	⊙	⊙	⊙
Inducement of plants from outside	⊙	○	○
Raising Local Enterprises	○	⊙	⊙

Notes : ⊙ ○ ○ indicate the relative magnitude of emphasis.

3.4 Medium Sized Plants

Plants in Terengganu are classified into two groups. One is for those organized with funds from SECD, HICOM, PETRONAS, etc. Most of them are established as joint-venture companies and are large in terms of the sizes of employemnt, product, etc. Usually they have direct linkages with plants and markets in the west coast rather than with those in local areas.

The other group covers the smaller groups mostly composed of family size units. Currently, they produce dry fishes, furniture, bricks, steel frameworks, materials for construction work, etc. Most of them are not within the system of production closely linked to a core manufacturing plant.

The relationship between these two groups should be intensified. For this purpose raising and inviting the plants of medium scale should be proclaimed in the development strategies. They will be placed in-between of these dual groups and wll incorporate the small sized group into a system, thus increases the agglomeration effect. Current activities of the small sized group should be reorganized into those using modern technology in the course of incorporation.

4. Suitable Types of Industries to be Located in the State of Terengganu

The selection of industry types having possibilities in locating the plant in the area is conducted by using the Malaysian industrial classification. The four digit industrial classification in the total of 79 types was subjected to review, giving 35 types as having potential for location.

They are subsequently screened by other viewpoints which deleted 7 types not likely to settle down. Finally 28 types are considered to have possibility in locating their plants in the study area.

4.1 Selection Criteria Employed

Selection criteria include the following view-points and are aggregated into three groups in their application to the industry types.

- having higher opportunity for capital investment into plants and equipment, particularly with the potential of rapid growth.
- contribute to the restructure of Terengganu economy
- capable of locating plants away from a large market
- shortages in skilled staff should be filled in partly by intensive and specific development of education and job-training systems and others by immigrants.

4.1.1 Investment with New Location

The industry type should be selected if it is a type having a larger opportunity in investment for a new site. The opportunity is assessed by the following viewpoints.

(1) Growth Potential

High investment opportunity is closely associated with the industry type's growth potential. Corporate motivation to capital investment leading to new plant sites will be attributable to the industry type's high growth.

Recent production trend by industry types over the years 1981 - 1983 is employed to evaluate the industry type's growth potential.

(2) Gross Surplus

Gross surplus used here is the balance of revenue less expenditure given by the Industrial Survey, issued from the Statistics Department. The magnitude of the gross surplus can serve as a good measure for the industry type's capability to make capital investment.

Average gross surplus per manufacturing establishment by industry type is withdrawn from the Industrial Census 1981.

(3) Wave Rate

The national average wage per employee for each of the industry type in the Industrial Census is compared with all industrial average wage in Terengganu State. The national average is M\$5,050 per worker, while the Terengganu average is M\$4,230 per worker.

The above three indicators are evaluated for each of 79 industry types with the positive or negative scores shown below.

The first category's score is simply the sum of the components scores.

<u>Indicators</u>	<u>Component Scores</u>	
	<u>Negative Score</u>	<u>Positive Score</u>
growth potential	negative growth rate - 2	growth rate more than 20% +2
gross surplus per establishment	less than Terengganu average - 1	larger than Terengganu average +1
average wage per employee	less than Terengganu average - 1	larger than Terengganu average +1

Evaluation of the Category

<u>Score</u>	<u>Evaluation</u>
less than - 2	no potential
equal to - 1	some potential
greater than 0	good potential

4.1.2 Sizes of the Plant

In order to find the sizes of the plants which are easier to be located in the State, the following three criteria are employed for screening. In summary, the medium sized plants are easier to be located than the smaller or larger sizes.

The criteria to define the above medium size are shown below (referring to Industry Census 1981):

Medium Sized Establishment

- Range -

Revenue per plant	M\$822,000 (Terengganu's average)	-	M\$8,000,000 (Four times of the national average)
Employees per plant	10 (Half of the Terengganu's average)	-	250 (Twelve times of the Terengganu's average)
Fixed capital assets per plant	M\$150,000 (Half of the Terengganu's average)	-	M\$3,100,000 (Ten times of the Terengganu's average)

4.1.3 Location Away from a Large Market

There are some types of the industry whose plants are located disregarding proximity to a large market. The input-output table of Peninsular Malaysia in 1975 produced by the Institute of Development Economy, Japan is used to study the parameters, where input figures by the producers' prices are used in finding the following ratio.

(1) Transportation Cost Ratio

If the transportation cost constitutes a significant percentage of the input cost, this type can locate the plant away from the large market. Terengganu is away from Kuala Lumpur. If that type of industry indicates a small transport cost ratio, it will not locate the plant in Terengganu.

(2) Energy Cost Ratio

It shows the input cost of electricity, gas, water, etc. Energy resources of gas and petroleum are located in Kerteh. If the cost ratio is high, it has possibility in getting much advantage in using the energy of Kerteh. Types with large ratio in energy cost are selected.

(3) Personnel Cost Ratio

Terengganu has a lower wage rate than the national average as discussed in 4.1.1 (iii) above. Labour intensive types will not be attracted to the study area since the labour force and population are rather small to support the labour intensive industries. Those having a large ratio is not selected.

(4) Value Added Ratio

The sector with a high ratio of value added has relatively less amount of input in the process of production. That means the sector can contribute effectively to increase the output. In addition, it is relatively free in determining the location because of less linkages with others. Those with high ratios are selected.

4.2 Result of the Selection

Industry types of 79 classifications, shown in the industrial census are reviewed and compared by using the above criteria. These criteria have scoring points and the summation for each type is assessed. Out of 79 types, 35 types are selected to have possibilities in location.

Selected 35 types may be considered too many to make use of in the implementing policy. However, it is considered better to have a wider range of selection possibility. Textiles, leather, timber and those already in Terengganu are not included.

Of these 35 types, another screening is conducted as in the following sub-section, resulting in 28 types as the conclusion of this selection and screening.

4.3 Screening

Additional screening on the selected 35 types was conducted from the view points of plant location by applying policies and incentives. It is found 7 types are deleted in this screening, resulting in 28 types of industries under this approach.

With regard to these 28 types, inter-sectoral linkages and optimum timing of location are studied.

4.3.1 Location by Inviting

If the manufacturing plants are distributed in the same ratio with the population, a hypothetical number of plants can be calculated by using the national and Terengganu population for each of 35 types. When the total number of plants in one type is small, the hypothetical number for Terengganu becomes much small. In that case possibility of inviting is considered negligibly small.

Seven types, such as malt liquors, rubber downstream, computers, sport goods, etc. are deleted. The resultant 28 types as shown in Table 4.6.

They are classified into two groups. The first group comprises 15 types supposed to respond easily to invitation to locate in the study area.

The second group comprises the remaining 13 types considered not to respond easily to locate in the study area. The successful inducement of the latter group is closely associated with effectiveness of the incentives. The second group is earmarked in the column 7 in Table 4.6.

4.3.2 Linkages with Other Sectors

If a plant of the selected type is located, its input sources and output distribution should be studied. If the plant is assessed to have larger input linkages with others, it will be better to locate them after the agglomeration develops to a certain level.

If the plant can utilize the resource already developed in the area, earlier location should be encouraged. The input-output table of Peninsular Malaysia in 1975 is used for the analysis.

(1) Input Dependence on Specific Sectors

Major products in other sectors such as palm oil, timber, rubber, fish, etc. and those of the petroleum refinery and the DR mill are assessed with priority. Plants using them as input source are given priority in location invitation.

Those using the outputs of the steel mill and petrochemical complex are better to be located in the mid-term phase, since these downstream development are dependent of larger market and other sectors. Petrochemical downstreams, metal processing, and machinery are categorized in this group.

(2) Output Relationship to Other Sectors.

The output distribution into other sectors is studied. If the output from selected subsector has a range of input to other sectors, the linkage effect is substantially large. The sector is named as "the trunk and roots industry", in a sense that it develops production relationships with a number of other sectors. If a plant in this kind of sector is located, it will promote the diversification of the manufacturing industry.

The production relationship such as above often extends to the most of the industry. Accordingly the location should be seen at a stage where agglomeration effect is identifiable. The inviting at an earlier phase will require supports from public sectors and incentives as well.

4.3.3 Summary Table

The final outcome from screening is shown in Table 4.6.

Table 4.6 TYPES OF INDUSTRIES FOR LOCATION

Item	Ind. Categ. No.	IO No.	Description	1. High corporated investment opportunity	2. Supporting the restructure of the regional economy	3. Away from large market	4. Preliminary selection results	5. Potential in terms of the number of establishments	6. No. of MIDA registered companies in Terengganu	7. Secondary screening results	8. Dependence on specific industry	9. Multitude of industries supplying input to the industry	10. Multitude of industries dependent on that industry's output	11. Phasing
1	3112	18	Dairy Products	○	B△	○	○	△	—	△	—	○	△	2) A
2	3115	21	Palm Oil	○	B△	○	△	⊙	1	○	Oil Palm	△	△	A
3	3116	24	Rice Milling	○	○	△	○	△	—	△	Paddy	△	△	A
4	3119	31	Canning and Preserving of Fruits and vegetables	○	○	○	○	△	1	○	—	○	△	A
5	3122	33	Prepared Animal Feeds	○	○	○	○	△	1	○	—	○	△	A
6	3311	43	Lumber	○	○	△	○	⊙	25	○	wood	△	△	A
7	3412	49	Paper Products	○	○	○	○	△	—	△	Paper	△	○	B
8	3420	50	Printing and Publishing	○	○	○	○	△	—	△	paper	△	○	B
9	3521	54	Paints, Vernishes and Lacquers	○	○	○	○	⊙	—	△	BIC	○	○	B
10	3522	55	Drugs and Medicines	○	○	△	○	△	—	△	—	⊙	△	C
11	3529	57	Other Chemical Products	○	○	△	○	○	—	○	BIC	○	△	B
12	3551	60	Tyre and Tubes	○	○	△	○	○	—	○	BIC	○	△	B
13	3559	59	Natural Rubber, other than Latex	△	○	○	○	○	—	○	Rubber	△	△	A
14	3560	62	Plastic Products	△	○	○	○	⊙	—	○	Rubber	⊙	○	B
15	3620	64	Glass and Glass Products	○	○	○	○	△	—	△	Plastic	△	△	C
16	3691	67	Other Non-Metallic Mineral Products	○	○	⊙	○	⊙	—	○	P.R.	△	△	A
17	3692	65	Cement, Lime and Plaster	○	B△	○	△	△	—	△	P.R.	△	△	A
18	3699	66	Cement Products	○	○	○	○	○	1	○	—	○	△	A
19	3710	68	Iron and Steel (Including Secondary Iron and Steel)	○	○	△	○	○	—	○	Iron/Steel	△	○	A
20	3819	72	Structural Metal Products and other Fabricated Metal Products	○	○	△	○	⊙	—	○	Steel	△	○	A
21	3822	74	Agricultural Machinery and Equipment	○	○	○	○	△	—	△	—	○	△	B
22	3824	76	Other Non-Electric Machinery	○	○	⊙	○	△	—	△	—	⊙	△	B
23	3831	77	Electrical Industrial Machinery and Apparatus	○	○	△	○	△	—	△	EIM	⊙	△	B
24	3832	79	Other Electrical Appliances	○	B△	○	△	○	1	○	—	⊙	△	C
25	3839	79	Other Electrical Appliances	○	○	○	○	△	—	△	—	⊙	△	C
26	3841	80	Ship Building	○	○	⊙	○	△	—	△	—	⊙	△	C
27	3843	82	Motor Vehicles	○	○	○	△	○	—	○	Steel	⊙	○	C
28	3844	83	Motorcycles and bicycles	○	○	○	△	△	—	△	M.V.	⊙	△	C

Notes: 1) B.I.C. : Basic Industrial Chemicals
P.R. : Petroleum Refinery
E.I.M. : Electrical Industrial Machinery and Apparatus
M.V. : Motor Vehicles

2) Item 1, 3, 4, 5, 7, 9, and 10
⊙..... highest possibility, ○..... higher possibility,
△..... possibility
Item 2
○..... Actively contribute, BA Establishment size excessively large or small
Item 11
A Initial, B Mid-term, C Final

4.4 The Spatial and Temporal Allocation of Manufacturing Industries in the Sub-region

The study area is deemed to be comprised of coastal strip and the inland KETENGAH area.

The potential leading industries which can trigger further industrialization are already formed along the coast. Plants engaged in primary processing of agro-forestry resources are observed in the KETENGAH area.

Based on the current distribution of the manufacturing plants over the study area, possible spatial allocation of selected industries in the section 4.3, which are expected to come to locate in the study area upto the year 2000 is to be shown.

Types of industries most favourably located at specific areas are determined using industries' inherent characteristics - dependence on resource availability, dependence on the availability of intermediate inputs and on the agglomeration of supporting industries.

Over the planning horizon, the downstream industries of steel products, gas-products and agro-based products are to be located in the initial to middle-term. Their spatial allocation is largely determined by resource availability.

Assembly type of industries and such industries as manufacture of supply parts and equipment have high degree of linkages among them and are expected to locate only after the formation of solid industrial base. Such industries are to be allocated peripheral to the core industries such as the steel industry in the large industrial base.

The spatial allocation of industries by types over the planning horizon is shown in the Table 4.7.

Table 4.7 SPATIAL AND TEMPORAL ALLOCATION OF MANUFACTURING INDUSTRIES IN THE SUB-REGION

Spatial development Timings	Coastal strip (growth corridor)	KELINGGAH-area
Initial 1985-1990	<u>Steel and Metal related industries</u>	<u>Resource-based industries</u>
	Iron and Steel Basic Industries Structural Metal Products Fabricated Metal Products	Canning and preserving of fruits (3119) Prepared Animal Feeds (3122) Wood Mills (3311) Manufacture of rubber products (3559) Manufacture of structural clay products (3691)
Mid-term 1991-1995	<u>Chemical Industries</u>	
	Paints, Varnishes and Lacquers (3521) Chemical Products (3529) Tyre and tube industries (3551) Plastic Products (3560)	Palm oil mill (3115) Cement, Lime and Plaster (3692) Cement Products (3699)
	<u>Industries based on some degree of agglomeration</u>	
	Agricultural machinery and equipment (3822) Special industrial machinery and equipment (3824) Electrical industrial machinery (3831)	
Final 1996-2000	<u>Industries based on higher degree of agglomeration</u>	
	Electronic components (3832) Cable, wires, electrical appliances (3839) Boat building and repairing motor vehicles' parts and accessories (3844)	

Note: Numbers in the bracket indicate the industrial classification number

5. Prospects for Industrial Estates

The State of Terengganu has five industrial estates in the coastal strip of the study area and five industrial sites in the KETENGAH area. The total planned area of the five industrial estates in the coastal strip amounts to 1,400 ha. However their stages of development vary greatly in terms of the percentage of land area saleable as against the total planned area, occupancy by plants, and the provision of infrastructure.

In fact, industrial estates of Kerteh, Dungun and Telok Kalong are still in the development stage - land grading work, provision of drainage and service roads in the estates are only partially completed as of middle of the year 1984. The five industrial sites in the KETENGAH area have a total proposed area of 300 ha., whose occupancy rate varies from 0% to 46%.

In this section, a review in the past trend of plant location in the State is conducted. After confirming this trend, forecasts of future demand for the location sites are shown. In the forecasts, demand for lots in the industrial estates of the study area is also projected. In estimating the demand, the areas for petro-chemical projects and the steel industry are conducted separately in individual sub-sectoral studies.

The demand for lots in the study area is the outcome of the proposed industrial development policy of the study area, which emphasizes the growth of industrial agglomeration initiated by the development of leading industries. In order to achieve this goal, a selective and concentrated location policy in specific industrial estate(s) is proposed for the beginning years of the planning period. Together with this, a long range location policy for the whole period is presented.

5.1 Industrial Estates in the Terengganu State and the Study area

5.1.1 Locational Trend of Manufacturing Establishments (Plants) in the Well Established Industrial Estates

A review on the past trend of locating plants in the well-established industrial estates - Gong Badak, Kuala Ibai, Jakar I and II, and Pulau Serai - is conducted. It is aimed to grasp quantitatively the plant location trend - in terms of annual increments in the number of new locators and associated incremental acreage requirements.

As shown in Table 4.8, there came 50 plants on the above mentioned five industrial estates in the period from 1978 upto the end of 1982, occupying an area of 84 ha and employing 2815 persons. Out of this, the three estates in the study area had a total of 12 plants, 43.2 ha and 1139 persons. The study area's share to the State total is 51%, 40% and 24% in terms of land area, employment and the number of plants respectively.

The two estates outside the study area are located in Kuala Terengganu. Particularly, Gong Badka estate is close to the airport and offers a lower price for the lots compared to others. There are two vocational schools and Sultan Zainal Abidin Religious College in the adjacent area. The amenity is good, compared to others.

The six year performance in these five estates is averaged at 8.3 plants, 14 ha and 470 employees per year. The total 50 plants in the above table are divided into two groups: one as the medium-large scale, the other as the small scale.

Distribution of the plant size by the Number of Employees

	Less than 24	More than 25	Total
Number of plants	18	32	50
Total number of employees	262	2,552	2,815
Total area (ha)	12.2	71.8	84

Source : from Table 4.8

5.1.2 Location Both In and Outside the Estates

There is a list of plants located not only in the estates but also outside with employees of more than 25 persons from 1974 to 1982 by SEDC. They are shown in Table 4.9. The total of 44 plants are covered in the table. Coverage in terms of plant size is different from Table 4.8. The findings in the previous subsection 5.1.1. apply to those located in the estates only.

For the overall Terengganu area, during this period, 55% of the plants in this category were located in industrial estates. However, it is found that the percentage share increased to 70% in the latter years (1981 - 1982) from 40% in the beginning years (1974 - 1980) in the table.

In the case of percent share of the study area, it is found approximately 40% of the state total is located in the study area. The remaining 60% is in the other part of the state.

Table 4.8 PLANT LOCATION IN THE COMPLETED INDUSTRIAL ESTATES

1)		1978	1979	1980	1981	1982	1983	Total
Gong Badak	1. Plant		1	11	6	5	6	29
	2. Area	-	1.2	9.8	4.8	8.8	7.6	32.2
	3. Employees		20	440	228	351	176	1,215
Kuala Ibai	1.			3	3 ³⁾		3	9
	2.	-	-	3.2	4.1	-	1.3	8.6
	3.			143	90		228	461
Jakar I	1.	1 ²⁾	3	2	3		3	9
	2.	14.2	20.8	1.6	0.4	-	-	36.9
	3.	84	665	63	56			868
Jakar II	1.					1	1	2
	2.	-	-	-	-	0.2	0.7	0.9
	3.					13	100	11
Pulai Serai	1.					1		1
	2.					5.4	-	5.4
	3.					158		158
Total	1.	1	4	16	12	7	10	50
	2.	14.2	22.0	14.6	9.3	14.4	9.6	84.0
	3.	84	685	646	374	522	504	2,815
The Study Area	1.	1	3	2	3	2	1	12
	2.	14.2	20.8	1.6	0.4	5.6	0.7	43.2
	3.	84	665	63	56	171	100	1,139
Outside The Study Area	1.		1	14	9	5	9	38
	2.	-	1.2	13.0	8.9	8.8	8.9	40.8
	3.		20	583	318	351	404	1,676

Notes : 1) 1. Number of plants 2. Area in ha
 3. Registered employees

2) It is completed in 1975

3) A plant did not registered the number of employees.

Source: A list of Authorized Enterprises in Industrial Etates, SEDC, January 1984.

Table 4.9 PLANT LOCATIONS IN AND OUTSIDE THE INDUSTRIAL ESTATES

In Number and Percent

	1974 - 1980	1981 - 1982	Total	Remark
Number of Plant	24(100.0)	20(100.0)	44(100.0)	
Terengganu				
1) Estates	10 (41.6)	14 (70.0)	24 (54.5)	
-1 Group 1	10 (41.6)	9 (45.0)	19 (43.2)	Gong Badak, Jakar I & II, Kuala Ibai, Dungun
-2 Group 2	0 (0.0)	5 (25.0)	5 (11.4)	Telok Kalong KETENGAH Sites
2) Outside	14 (58.4)	6 (30.0)	20 (45.5)	
Within the study area				
	10 (41.6)	7 (35.0)	17 (38.6)	
Dungun	3	1	4	
Kemaman	7	6	13	
Outside the study area				
	14 (58.4)	13 (65.0)	27 (61.4)	

Source : From the file of the medium-large scale enterprises registered at the end of 1982, SEDC.

5.1.3 Overall Plant Location in Terengganu

Plant location in Terengganu can be determined by using the findings in Tables 4.8 and 4.9. The overall plant locations in Terengganu State covering small, medium and large scales are figured out in the following manner.

As shown in Fig. 4.4, the data in Tables 4.8 and 4.9 cannot cover plants of all scales. These uncovered parts of Fig. 4.4 are calculated by using the percentage compositions of these in the two table data. By these calculation, it is estimated that the total number of plants coming to Terengganu State and the area occupied over the year 1978 - 1983 are as follows:

Number of Plants $50 + 42.1 + 23.7 = 116$

Area in ha $84 + 94.5 + 16.1 = 195$ ha

Taking and average increment per year, the following figures are determined.

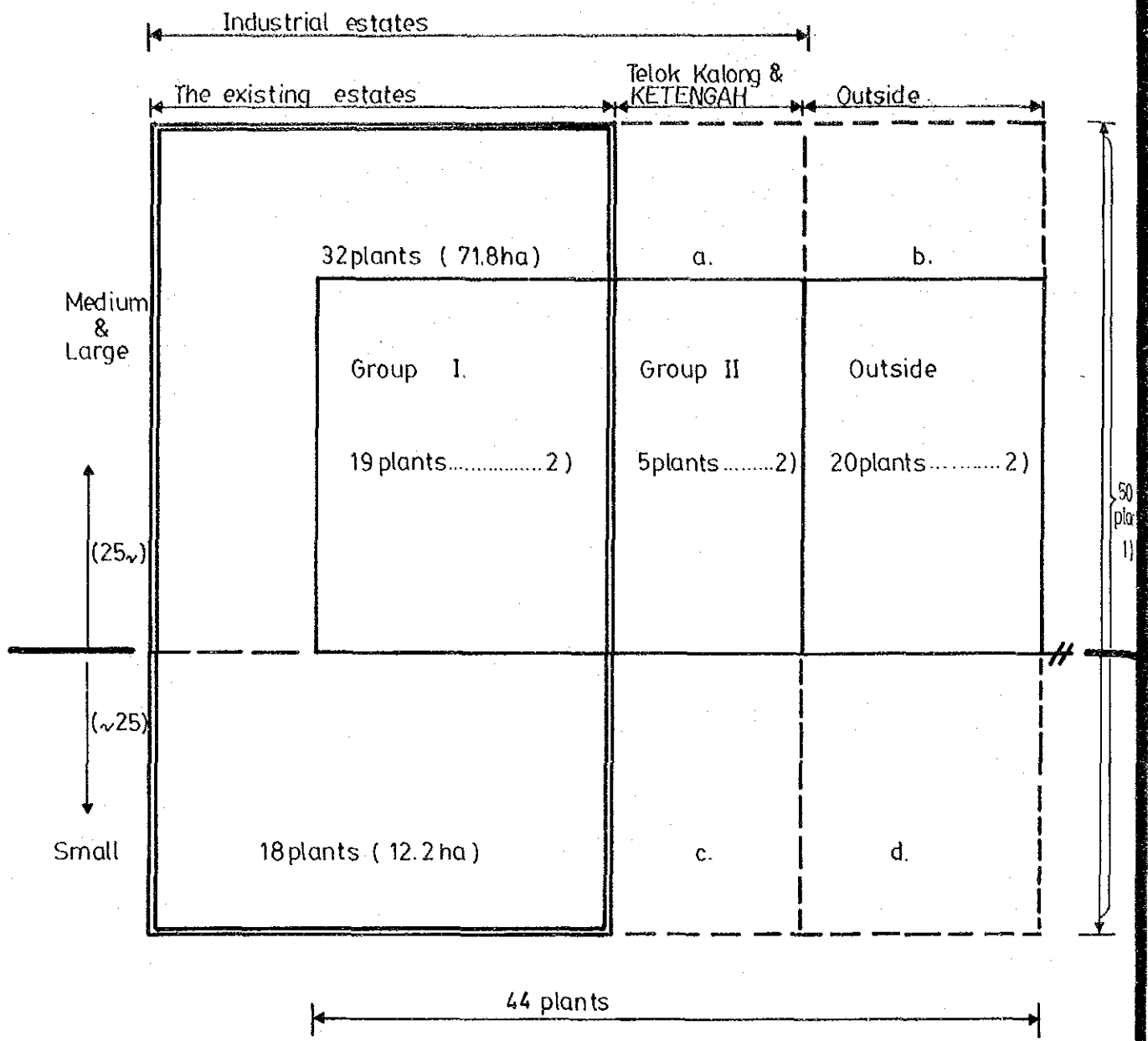
$116 - 6 = 19.3$ plants per year

$195 - 6 = 32.5$ ha in area per year

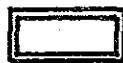


As for the study area, the locational share of 40% to the state total is applicable. The average annual increment of the study area is shown as follows:

	The study areas (40%)	Others (60%)	Terengganu (100%)
Number of plants	7.7	11.6	19.3
Area in ha	13.0	19.5	32.3

The above results were not inconsistent with the Industrial Census of 1973 and 1981. There were 326 plants in Terengganu in 1973 and 536 plants in 1981, hence annual increment is 26.3 plants. Accordingly, the foregoing inference, which covers plants above small scale, is within a satisfactory range.



LEGEND.

-  From Table 4-8
-  From Table 4-9.
-  Calculation to fill in.

Calculation for estimate is shown as follows.

$$a + b = 32 \times \frac{5+20}{19} = 42.1 \dots \text{number of plant.}$$

$$a+b=71.8 \times \frac{42.1}{32} = 94.5 \dots \text{area in ha}$$

$$c+d = 18 \times \frac{5+20}{19} = 23.7 \dots \text{number of plants}$$

$$c+d=12.2 \times \frac{23.7}{18} = 16.1 \dots \text{area in ha}$$

Fig 4.4 OVERALL PLANT LOCATIONS IN TERENGGANU

5.1.4 The Industrial Land Requirements in the Study Area

The target industrialization picture of the Terengganu state in the year 2000 is set to be the national average industry structure in the year 1983 according to TMPS. The target indicators of industrialization are shown below:

	The year 1983	The year 2000
Population in a ratio by one manufacturing establishment	980 persons	650 persons
Total number of manufacturing establishments	596	1,431 (596+835 = 1,431)
Scale Distribution in terms of the number of employees		
more than 25	15%	20%
between 6 - 24	16%	37%
less than 5	69%	43%

The projected number of manufacturing establishment in the year 2000 is shown in Fig. 4.5 and Table 4.10.

Two scenarios are to be presented with varying extent of the target achievement. They are,

Scenario 1 : linear annual increase in the number of newly induced manufacturing establishment under the current promotion effort level

Scenario 2 : Increased industrialization promotion efforts with the provision of the state's own incentive measures.

Scenario 1 can only achieve 52% of the target figure in terms of the number of newly induced firms.

Scenario 2 will give higher performance, but the achievement of target figure largely depends on the state's intensified efforts.

Locational share of the study area - the south Terengganu area - to the State's total number of new establishments expected to locate upto the year 2000 is assumed to be varied between 25% - 50%.