

No. 108

THE KINGDOM OF THAILAND

**FINAL REPORT  
FOR  
THE STUDY ON THE LAEM CHABANG EPZ/GIE  
INDUSTRIAL PROMOTION  
IN  
THE KINGDOM OF THAILAND**



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INDUSTRIAL PROMOTION IN THE KINGDOM OF THAILAND

DECEMBER 1988 JAPAN INTERNATIONAL COOPERATION AGENCY



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## PREFACE

In response to a request from the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a survey on the Laem Chabang EPZ/GIE Industrial Promotion Project and entrusted the survey to the Japan International Cooperation Agency (JICA).

JICA sent to Thailand a survey team headed by Dr. Sadakazu Iijima from March 14 to November 22, 1988.

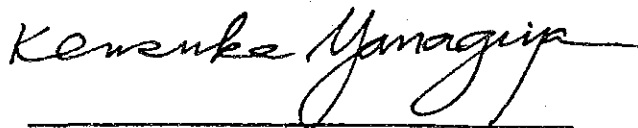
The team exchanged views with the officials concerned of the Government of Thailand and conducted field surveys in the study-related areas.

After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the development of the Project and to the promotion of friendly relations between our two countries.

I wish to express my sincerest appreciation to the officials concerned of the Government of the Kingdom of Thailand for their close cooperation extended to the team.

December, 1988

A handwritten signature in black ink, reading "Kensuke Yanagiya", written in a cursive style. Below the signature is a horizontal line.

Kensuke Yanagiya  
President  
Japan International Cooperation Agency



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## ABBREVIATIONS

BOI	= Board of Investment
CAT	= Communication Authority of Thailand
CISD	= Chonbri Institute for Skill Development
DIP	= Department of Industrial Promotion
DIW	= Department of Industrial Works
DOVE	= Department of Vocational Education
ETO	= Express Transportation Organization of Thailand
IEAT	= Industrial Estate Authority of Thailand
ISI	= Industrial Service Institutes
ITVE	= Institute of Technology and Vocational Education
KMIT	= King Mangkut's Institute of Technology
MOI	= Ministry of Industry
MOE	= Ministry of Education
NESDB	= National Economic and Social Development Board
NHA	= National Housing Authority of Thailand
NISD	= National Institute for Skill Development
OESB	= Office of Eastern Seaboard Development Committee
OPEC	= Office of Private Education Committee
PAT	= Port Authority of Thailand
TOT	= Telephone Organization of Thailand



## INTRODUCTION

In response to the request of the Royal Thai Government (hereinafter referred to as "RTG"), the government of Japan has decided to conduct the Study on the Laem Chabang EPZ/GIE Industrial Promotion (hereinafter referred to as "the Study") in accordance with the Agreement on Technical Cooperation of the two governments.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation program by the government of Japan, dispatched a preliminary survey team to Thailand for a discussion with RTG on the Study from December 16 to December 23, 1987.

The scope of work for the Study (hereinafter referred to as "S/W") was agreed upon and signed by the director of the Office of the Eastern Seaboard Development Committee, and the leader of the preliminary survey team on December 23, 1987.

The study was started in March, 1988, with the arrival of the JICA study team in Thailand, at which time they explained the inception report to RTG. Actual study work was started in May. Since then, the Study was carried out both in Thailand and in Japan, including a six-month field survey in Thailand.

In the course of the study, the Inception Report, Progress I, II, III and the draft of the Final Report were submitted to RTG. The invitation pamphlets of the Laem Chabang I.E., which included the details of the project, the advantages, the incentives, etc., were produced in Thai, English, and Japanese. The list of potential investors was derived from the results of the questionnaire surveys conducted both in Thailand and in Japan.

During the study period, numerous formal and informal meetings were held in order to prepare the structure of the Final Report and the pamphlets. This final report was finalized by incorporating the results of all the surveys and discussions.

First, the background of the Laem Chabang development was clarified through the review of the national industrial development policy, and the current status of industrialization and the industrial location. Based on this background, the roles of the Laem Chabang I.E. in the industrial development in the Kingdom of Thailand were discussed.

Second, the selection of the target industries was examined based on the previous studies and on the Japanese experience. In addition to the above, questionnaire surveys were conducted to find the potential investors from manufacturing, commerce, warehousing, and shipping industries both in Thailand and Japan. From the results of the above studies, a list of the target industries to be actually established was prepared. The criteria for the selection of the appropriate industries was also presented.

Although the completion of the Laem Chabang I.E. is scheduled within two years, an industrial estate is finalized only when factories are actually established and start their operations. The study addresses several promotional activities and presents the appropriate strategies and institutional arrangement proposals for IEAT.

Finally, the industrial promotion supporting services and facilities are studied based on the experience of several countries. Furthermore, the operation and management of the Laem Chabang EPZ/GIE are discussed.

To facilitate the implementation of the Study smoothly, a steering committee was established and discussions were held.

The list of the members of the steering committee and the members of the Study Team are shown below.

STEERING COMMITTEE

Mr. Prateeb Chuntaketta (Chairman)	IEAT
Mr. Manas Sanguandikul	OESB
Mr. Banjab Piriyaarakob	MOI
Mr. Chavalit Chockratanachai	IEAT
Ms. Wantana Tanapongpipat	IEAT

STUDY TEAM

Dr. Sadakazu Iijima	Leader,	JILC
	Industrial Location Policy	
Mr. Mutsuhiro Fujita	Industrial Management & Operation	JILC
Mr. Hayao Taki	Industrial Estate Planning	JILC
Mr. Takeshi Isogai	Industrial Utility & Facilities	NKK
Mr. Yorihiro Mano	Industrial Promotion	JILC
Mr. Seiichi Aoki	Market Research for Industrial Estates	JILC
Mr. Hiroshi Nishimaki	Promotion of Direct Investment	ECFA

Ref.: IEAT = Industrial Estate Authority of Thailand

OESB = Office of the Eastern Seaboard Development  
Committee

MOI = Ministry of Industry

JILC = Japan Industrial Location Center

NKK = NKK Corporation

ECFA = Engineering Consulting Firms Association, Japan



## 1. REVIEW OF THE BACKGROUND OF THE STUDY

### 1-1 NATIONAL POLICY ON THE INDUSTRIAL DEVELOPMENT IN THE KINGDOM OF THAILAND

#### (1) THAI ECONOMY AND NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN

The economy of Thailand has made remarkable progress since the 1960's. During the 1950's, the GDP growth indicated an annual average growth rate of only 4.7%. The following two decades' per annual GDP growth rate jumped to 7.9% and 6.9% in the 1960's and the 1970's, respectively. Early in the 1980's, the growth rate declined to around 5% per annum, but still surpassed that of most of the other developing countries.

This rapid economic growth was accomplished by a considerable increase in agricultural production and in industrial development. This age of economic growth was divided into two periods i.e. one from 1960 to the middle of the 1970's, the other from the middle of the 1970's to 1985. During the former, agriculture was the backbone of the economic growth, during the latter, the manufacturing sector brought about the rapid economic growth (Table 1-1).

##### 1) The First Plan (1961-66)

In 1961, when the remarkable progress of the Thai economy started, the First National Economic and Social Development Plan (hereinafter the First Plan) was submitted. The main target of the First Plan was the preparation of infrastructures. The Thai government continued to use the import substitution policy as an industrialization policy which was expected to promote industrialization steadily, and cause a decrease in consumer goods imports. In this period, a remarkable policy change for foreign capital was executed. The government changed to a positive policy of the

inducement of foreign capital. As a result, the Industrial Investment Promotion Act, which was advantageous to the foreign investors, was enacted in 1962.

During this period, the economic growth achieved an 8.1% per annum increase on account of good conditions both in the country and in the world market as follows.

- Durable inflow of the foreign capital because of low inflation, rich labor force, and political stability
- Progress of import-substitution industries
- Increase in exports of primary products
- Special procurement demand from South Vietnam

## 2) The Second Plan (1967-71)

During the period of the Second Plan from 1967 to 71, the GDP growth was still high, registering an annual growth rate of 7.2%. However, the situation of the Thai economy was very severe, caused by such factors as trade deficit etc. The reasons for the trade deficit were as follows;

- Decline of primary production for export
- Decrease in special procurement demands from South Vietnam
- Sharp increase in imports of raw materials and capital goods caused by the growth of import substitution industries

The manufacturing sector, which was protected from the foreign competitors by government policy, did not contribute to the improvement in the above trade deficit.

## 3) The Third Plan (1972-76)

In 1972, the world politics and economy changed drastically because of the so-called Nixon Doctrine, containing the tendency to an end to the Vietnam war and the establishment of diplomatic relations with the People's



Republic of China. This enormous change influenced the policy of the economic development in Thailand. The Thai government was required to reconstruct the economy. The Third Plan, approved under the above mentioned conditions, placed emphasis on domestic policy. It demanded a review of the agricultural production and a decrease in income differences by means of rural development. At the same time, the industrial policy was converted from import substitution to export promotion by reason of the trade deficit. The economic growth rate was less than the previous decade by reason of the recession of the world economy deriving from the first oil crisis in 1973, a change of the regime, etc.

#### 4) The Fourth Plan (1977-81)

During the period of the Fourth Plan, the circumstances of Thailand were unfavorable because of the continuing inflation and of the influence of the second oil crisis. But the policy of export promotion brought about some favorable results. For example, the dependence on imports by light industries decreased. On the other hand, the intermediate goods and the capital goods still depended on imports. The economy of Thailand kept the structure in which the increase of the exports in the light industries caused the increase of imports of intermediate goods and capital goods.

The targets of the Fourth Plan consisted of the following.

- Bringing up the export oriented industries
- Progress of the agro-industries
- Decentralization of industries

Since this period, "Bringing up the export oriented industries" and "Decentralization of industries" have been the most important policy issues in the Thai government.

Table 1-1 Trend of Primary Economic Indices 1961-91

	Actual					Target Sixth Plan 1987-91
	First Plan 1961-66	Second Plan 1967-71	Third Plan 1972-76	Fourth Plan 1977-81	Fifth Plan 1982-86	
<u>Economic growth</u>						
Agriculture	4.6	4.1	3.9	3.5	2.1	2.9
Industries	10.2	9.7	8.6	8.7	5.1	6.6
Total production	8.1	7.2	6.2	7.3	4.4	5.0
Exports:goods						
Annual value increase	8.7	4.1	14.0	20.0	8.4	10.7
Inflation	2.3	1.5	12.5	11.6	2.9	2.3
Current account deficit/GDP	-	2.5*	1.7	6.3	3.8	0.9
Budgetary cash deficit/GDP	0.7	2.9	2.7	3.3	3.4	2.6

Source: NESDB

Ref: \* Actual fig. for the last year of the planning period

Under the hard situations mentioned above, the GDP growth was more than 7% per annum during this period.

#### 5) The Fifth Plan (1982-86)

During the period of the Fifth Plan the economic growth rate declined compared with the previous two plan periods. The main reasons were the worldwide recession caused by the serious stagnation of the U.S. economy and a slump in primary product exports. In order to overcome these difficulties, the Thai government prepared the Fifth Plan. The major objectives of the Fifth Plan include;

- Improvement of economic and financial position
- Restructuring of the key productive sectors to raise economic efficiency
- Provision of social services, especially to backward rural areas
- Poverty alleviation in backward areas
- Coordination of economic development activities with national security
- Adjustment of administrative system and distribution of ownership pattern

The above objectives of the Plan were then embodied in the following concrete measures.

- Development of export oriented industries
- Promotion of investment by small and medium-sized companies
- Job creations
- Dispersion of industries to rural areas
- Increase in energy self-sufficiency
- Development of basic industries
- Development of science and technology

The first four measures are inherited from the previous plans. The latter three are newly proposed measures, arising

from the fact that natural gas discovered in the Siam Bay showed a prospect of commercialization. The Eastern Seaboard Development Program, which aims at diverting industrial concentration in Bangkok, promoting export industries, and increasing energy self-sufficiency, started during this period.

The early part of the 1980's saw only deteriorating economic activities, as mentioned earlier, all over the world, thus reducing the achievement of the stated goals substantially. Similar situations prevailed in other neighboring countries. Both Malaysia and Singapore suffered from negative economic growth in 1985 for the first time in decades. Thailand's economy performed satisfactorily under adverse external situations. The Eastern Seaboard Development Program faced serious setbacks, resulting in postponement of the implementation.

Overall economic indexes during the period of the Fifth Plan are shown in Table 1-2.

Table 1-2 Overall Economic Targets of the Sixth Plan  
1987-1991

	Actual Fifth Plan (1982-1986)	Targets Sixth Plan (1987-1991)
Trade defucite(current prices)		
Average per year(million baht)	57,300	35.900
As percentage of GDP	5.9	2.7
Current account deficit (current prices)		
Average per year(million baht)	36,800	11,800
As percentage of GDP	3.8	0.9
Export:goods and servicies		
Annual value increase(%)	9.0	9.9
Annual quantity increase	8.0	7.4
Average annual value(million baht)	176,100	290,700
Eamings from tourism (current prices)		
Annual value increase(%)	12.2	7.4
Imports:goods and service		
Annual value increase(%)	3.3	9.3
Annual quantity increase(%)	3.3	4.5
Imports:goods		
Annual value increase(%)	2.9	9.5
Annual quantity increase(%)	3.3	4.6
Average annual value (million baht)	233,300	324,900
Economic growth (% annually,constsnt prices)		
Agriculture	2.9	2.9
Industry	5.6	6.6
Mining	6.5	6.4
Natural gas(million cu ft/day)	320 <sup>1</sup>	720 <sup>2</sup>
Total production	4.9	5.0
Expenditure growth (% annually,constsnt prices)		
Praivate		
- Consumption	4.6	3.7
- Investment	0.6	8.1
Government		
- Consumption	3.6	5.3
- Investment	2.4	1.0
Tax revenue and other income as percentage of GDP	14.6	15.3
Population growth(%)	2.1	1.7
- Minicipal areas	3.1	2.9
- Sanitary administration areas	2.5	2.8
- Villages	1.8	1.1
Inflation	2.7	2.3

<sup>1</sup>=1982, <sup>2</sup>=1991 Source:The National Economic and Social Development Board

## 6) The Sixth Plan ( 1987-1991 )

The Sixth Plan started in 1987, which also marked the recovery of the Thai economy. The appreciation of Yen and, later, other currencies of the NIES after G-5 agreement in 1985 strengthened the export competitive power of the Thai manufacturing sector. The appreciation of these traditionally exporting countries has also urged Japan, Korea, and Taiwan to search for an alternative overseas production site. Thailand, which has become the first target of these countries, has been experiencing an unprecedented investment boom ever since 1986. The Sixth Plan, which started under these favorable economic conditions, basically inherits the unaccomplished goals of the Fifth Plan. One of the characteristics of the Sixth Plan is the shift from project oriented planning to program oriented planning. Another new feature is that it includes policies related to marketing.

The Sixth Plan, which sets forth the general direction of Thailand's development policies for the period of 1987-1991, provides a basic framework for the Eastern Seaboard Development as well. In the economic aspect, the Plan states its objectives as follows.

- Stabilized economic growth at a minimum rate of 5% per annum.
- Generation of at least 3.9 million jobs during the plan period.

The overall structure of the Sixth Five Year Plan is illustrated in Fig 1-1. The above objectives of the Plan are then translated into so-called strategies, i.e.

- 1) To increase the efficiency in development
- 2) To improve production and marketing systems and raise the quality level of basic economic factors

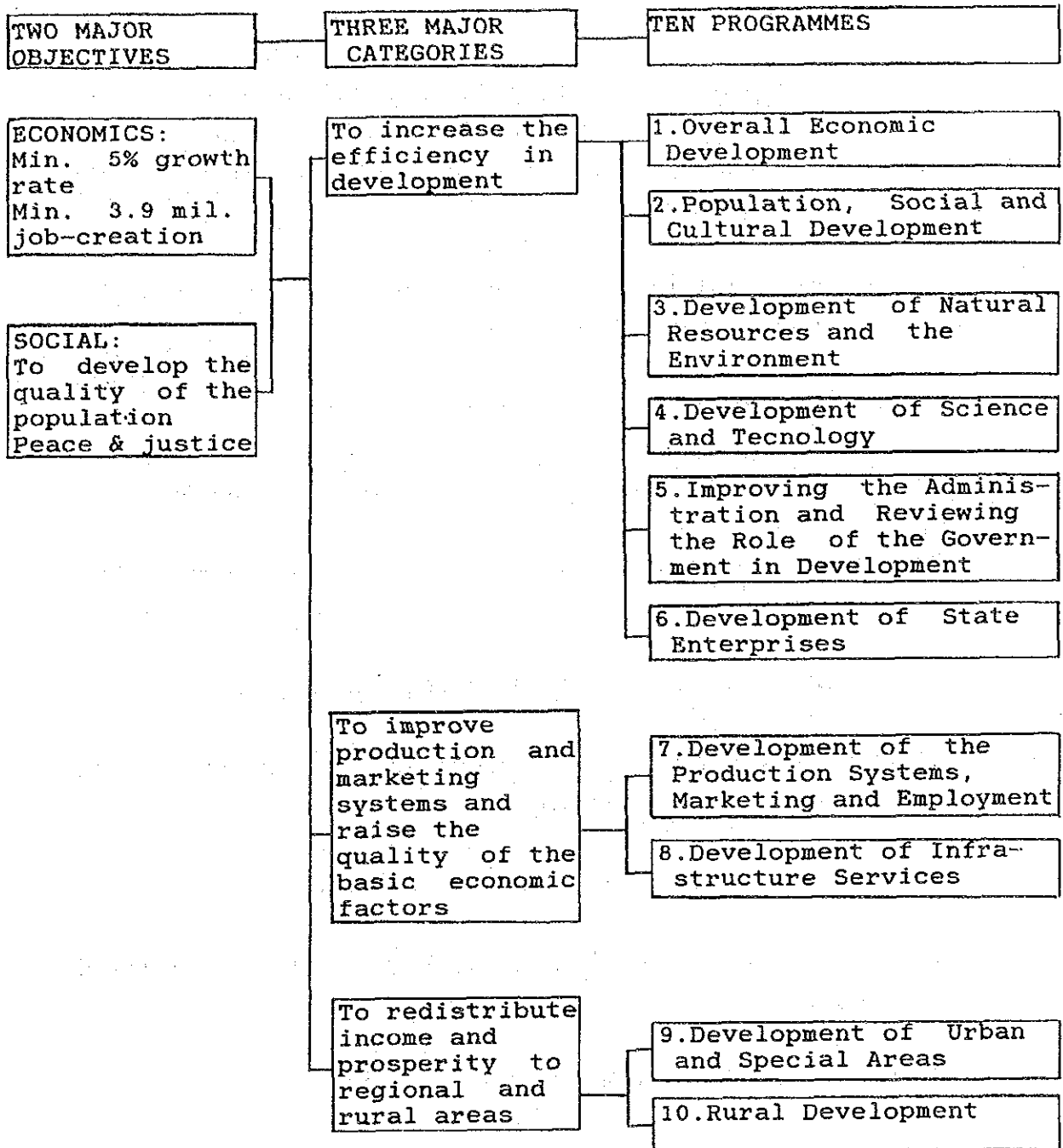


Fig. 1-1 Overall Structure of the Sixth Five Year Plan

- 3) To redistribute income and prosperity to regional and rural areas.

The second strategy refers to the improvement of the manufacturing sector by raising the quality as well as lowering the production costs of raw materials, intermediate goods, and finished goods.

The major strategies are then developed to ten major programs in each sector. These are;

- 1) Overall Economic Development Program
- 2) Human, Social and Cultural Development Program
- 3) Natural Resources and Environmental Development Program
- 4) Science and Technology Development Program
- 5) Program to Improve Management and Review the Role of the State in Development
- 6) State Enterprises Development Program
- 7) Production, Marketing, and Employment Development Program
- 8) Basic Services Development Program
- 9) Urban and Specific Zones Development Program
- 10) Rural Development Program

The Eastern Seaboard Development Project belongs to the Ninth Program of Urban and Specific Zones Development, but other Programs have close relations with the Eastern Seaboard Development Project. 8) Basic Services Development



Program has sub-goals of "raising the quality level of basic services to international standards and providing consistent services." The Eastern Seaboard Development Project constitutes an important part of this Program in providing export facilities and industrial facilities.

## (2) HISTORY OF INDUSTRIALIZATION POLICY

As is clearly manifested in the history of five plans, the industrialization policy in Thailand originated in the import substitution measures in the 1950's and export promotion in the 1970's. During the 1950's and 1960's, the Thai government introduced protective measures, such as import quotas, tariff barriers, and import bans. The Investment Promotion Act was adopted in 1960 to induce investment. Although the 1960's saw a rapid industrialization, the import substitution deteriorated the balance of payments. During this period, the industrial investment was concentrated in Bangkok area, inevitably widening the income gap between the metropolitan area and rural areas.

The Third Plan starting in 1971 made a drastic change to resolve these problems which surfaced at the end of the 1960's. The main emphasis of the industrial policy was now placed upon the development of export industries and of rural areas. In 1972 the Investment Promotion Act was amended to reflect such changes in the policy. The major revisions were;

- Including export and service industries as promoting projects
- Exemption of import duties and business tax for export
- Tax exemption on corporate income earned by export

- Dispersion of industries to narrow the gap between city and rural areas

At the same time "Alien Business Law" and "Working of Aliens Act" were introduced to curb the activities of foreigners to protect the interests of the citizens and the country. The import substitution mainly took place in consumer goods production but did not extend to intermediate and capital goods as mentioned earlier. The export promotion policy for industrialization has replaced import substitution policy for most of the manufacturing sub-sectors, though some sub-sectors such as automobile and CRT (cathode ray tube) for TVs still continue to be under the import substitution policy.

Up to date the export promotion and inducement of foreign direct investment policy have remained as the mainstay in the industrialization policy in Thailand. However, through the course of time, the Thai government showed its flexibility by adjusting its policies, as indicated by changes in promoted projects thereby selectively inducing the investment especially from abroad.

The 1980's saw an emergence of the manufacturing sector as the main foreign exchange earner. Utilizing abundant skilled labor and supported by the government, the manufacturing sector has grown to equal both in production and export to the agricultural sector, which still is the backbone of Thailand. Textile products have shown a rapid growth in export since the mid 1970's to become No.1 export item in 1985, surpassing rice which was traditionally the leading export commodity in Thailand.

Another important shift in the industrialization policy was adoption of the measures to disperse industries to rural areas. Throughout the process of industrialization, both population and industries were concentrated in Bangkok, thus causing a tremendous income gap between the metropolitan and

the rural population on one hand, and serious congestion in Bangkok. The Thai government pursued the industrial dispersion through the development of infrastructures, such as establishing industrial estates and provision of special privileges to the manufacturing activities in the designated promotion zones. Yet, these government efforts have not been able to achieve the intended dispersion of industries due to overwhelming advantages offered by Bangkok, which offers better infrastructures and services availability, not to mention the access to the market. There has been a phenomenal surge in the investments in Thailand since the mid 1980's, which has tended to overheat the economy. The majority of investments still is concentrated in Bangkok areas (refer to 1-3), causing the shortage of land. This rapid industrialization has caused other bottlenecks such as port congestions. Though the current situation offers a chance to prompt the diversion of industries to rural areas, the government faces many tasks to overcome, including the development of infrastructures such as road networks, and telecommunication networks.

## 1-2 ROLE OF MANUFACTURING SECTOR IN ECONOMIC DEVELOPMENT

In the preceding section, the industrialization in Thailand was viewed in the light of economic development policies. In this section, the focus will be on the macro-economic aspect of industrialization and its contribution to the economy.

### (1) TRANSITION FROM AGRICULTURAL ECONOMY

Thailand had been predominantly an agricultural economy until 1987, when the gross domestic product in the manufacturing sector surpassed that in agriculture (Table 1-3). The agricultural sector constituted 45%, whereas the manufacturing sector held merely a little over 10% in the 1950's. In 1987, the manufacturing sector accounted for

22.2% whereas agriculture constituted 21.0% of the total GDP. The manufacturing sector grew at around an average rate of 10% per year during the period of 1960-1980 (Table 1-4). The agricultural sector grew at only half this rate.

In terms of labor population, the agricultural sector, which accounted for 82.4% in 1960, gradually lost its share to 68.4% in 1985. During the same period, the manufacturing sector increased its employment only by 4.6% from 3.4% in 1960 to 8.0% in 1985 (Table 1-4). Due to its higher productivity, the manufacturing sector was not able to absorb all the influx labor from the agricultural sector. This discrepancy in productivity between the sectors have caused a considerable gap in incomes between urban and rural population.

## (2) REGIONAL INDUSTRIAL STRUCTURE

In the Sixth Plan, one of the highest priorities of national goals is given to the eradication of poverty. Inequity in income distribution is clearly manifested as a regional income gap in Thailand. In 1970, the average per capita GDP was 4,130 bahts in Thailand. In the same year, the GRDP (gross regional domestic products) per capita in Bangkok averaged 12,890 bahts, three times as much as that of the whole nation. On the contrary the poorest northeastern region was able to generate only 1,900 bahts, only one seventh of that of Bangkok. In 1980, the GDP per capita in Bangkok, northeast, and the whole nation amounted to 21,430, 2,740, and 6,530 bahts, respectively. The northeast produced only one eighth as much as Bangkok. There is a clear indication of a widening income gap in regional income distribution. In Bangkok, the manufacturing sector accounted for 54.3% of the total production in 1980, showing a moderate increase of 3% from 51.3% in 1970. The northeast, on the other hand, recorded a decline of 1%, from 6.1% in 1970 to 5.1% in 1980. It is evident that the northeast was not able to enjoy higher income generated by

Table 1-3 Trend of Number of Employees Classified by Industries

	1960		1970		1980		(Thousand)	
	(%)		(%)		(%)		1985	(%)
Agriculture	11,332	82.4	13,202	79.3	16,821	72.3	17,674	68.4
Manufacturing	470	3.4	683	4.1	1,308	5.6	2,066	8.0
Total	13,750	100.0	16,652	100.0	23,282	100.0	25,052	100.0

Source: National Statistical Office

Table 1-4 Trend of Economic Structure (1972 prices)

	Million Baht							
	1960	1965	1970	1975	1980	1985	1986	1987
Agriculture	28,277 (40.3)	35,931 (36.1)	48,332 (32.2)	62,080 (30.4)	72,784 (24.9)	86,839 (23.2)	86,215 (22.3)	85,712 (21.0)
Mining and quarrying	860 (1.2)	1,692 (1.7)	2,555 (1.7)	2,485 (1.2)	4,780 (1.6)	6,001 (1.6)	6,086 (1.6)	6,360 (1.6)
Manufacturing	8,389 (12.0)	14,249 (14.3)	23,320 (15.5)	37,146 (18.2)	60,597 (20.7)	77,425 (20.7)	82,612 (21.4)	90,625 (22.2)
Construction	3,343 (4.8)	5,688 (5.7)	8,705 (5.8)	8,514 (4.2)	16,576 (5.7)	17,786 (4.8)	17,911 (4.6)	19,559 (4.8)
Others	29,320 (41.8)	41,984 (42.2)	67,180 (44.8)	93,831 (46.0)	138,115 (47.2)	185,818 (49.7)	193,971 (50.1)	206,776 (50.6)
GDP	70,189	99,544	150,092	204,056	292,852	373,869	386,795	409,032

Source: NESDB, National Income of Thailand

Note: ( ) percentage rate of GDP

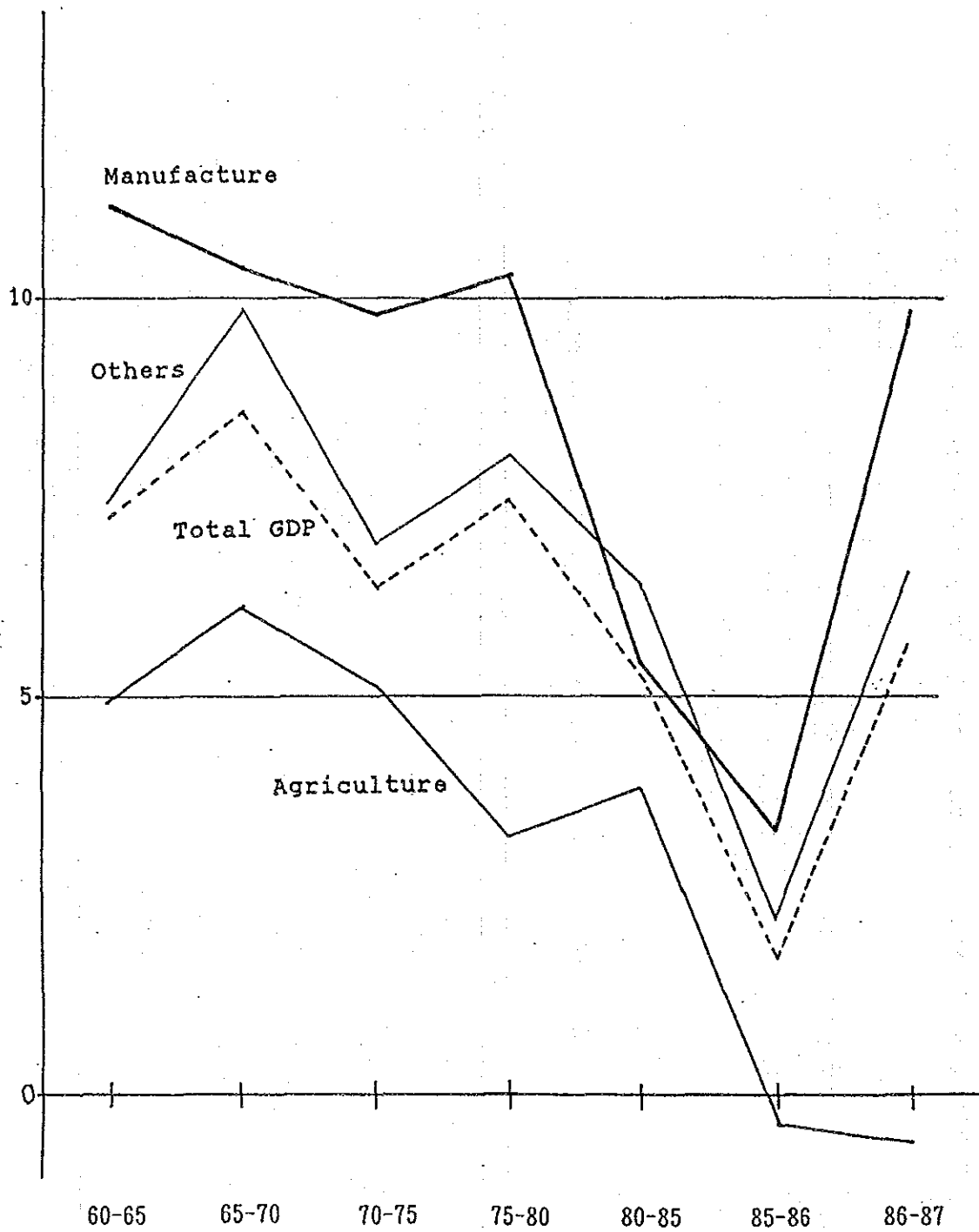


Fig. 1-2 GDP Growth Rate by Industries

growth of manufacturing sector and was left behind the growth in Bangkok.

The distribution of factories reveals that the majority of them, excluding rice milling and tobacco plants, are located in the Bangkok area, which has a more than 90% concentration of textile, leather, printing, plastics, and electric appliances (Table 1-5).

### (3) TRADE STRUCTURE

Thailand traditionally exported primary products and imported intermediate and capital goods. Although both the exports and the imports increased steadily, the balance of payments recorded a constant deficit over the years. Alarmed by a record increase of the trade deficit of 143.7% in 1983, the Thai government took emergency measures to tighten domestic economy, stepped up export promotion, and finally devaluated its currency. Combined with external factors, such as a decline in oil prices and upturn of the world economy, the trade balance showed a substantial improvement.

During the 1960's, the export structure in Thailand depended on particular primary products such as rice and rubber, which accounted for 59.9% of the total exports. The basic structure did not change during the next decade. However, the policy of diversifying agricultural products promoted by the government began to show its effects. The share of rice and rubber in the total export decreased to 14.5% and 9.3%, respectively in 1980, although the share of primary products was still over 50%. On the other hand, the export of manufacturing products was modest during the 1970's though the government emphasized to promote the export as a policy target. The 1980's saw an upsurge of manufactured goods in export. The textile products comprised 7.2% in the total export. ICs and jewelry accounted for 4.6% and 2.4% respectively. In 1985, which was a monumental year, the export of manufacturing goods exceeded that of primary goods as shown in Table 1-5.

Table 1-5 Distribution of Business Establishments 1983

	Bangkok	Central Region	North Region	North-east Region	South Region	Total *Ref
Rice mill	284	7,297	11,046	27,264	4,807	50,698 15.0
Food	1,040	1,563	657	768	502	4,530 57.5
Beverages	48	47	38	25	18	176 54.0
Tabacco and snuff	9	13	150	8	0	180 12.0
Textiles	809	585	16	70	20	1,500 93.0
Wearing apparel excepts footwear	1,289	53	9	3	1	1,355 99.0
Leather, leather products, and footwear	301	187	1	0	1	490 99.6
Wood and cork	1,157	1,279	521	310	478	3,745 65.1
Furniture and fixtures	605	185	166	207	154	1,317 60.0
Paper and paper products	351	63	6	3	4	427 97.0
Printing, publishing and allied industries	1,796	97	41	30	53	2,017 93.9
Chemicals and chemical products	633	321	84	35	19	1,092 87.4
Plastic products	1,311	165	9	17	13	1,515 97.4
Rubber and rubber products	336	196	25	44	159	760 70.0
Non-metallic mineral products	258	1,274	459	472	479	2,942 52.1
Basic metal industries	282	176	25	15	15	513 89.3
Metal products	3,918	622	172	212	185	5,109 88.9
Machinery	1,936	1,706	708	713	696	5,759 63.2
Electrical machinery and supplies	660	167	17	39	14	897 92.2
Transport equipment	1,981	1,225	421	625	365	4,617 69.4
Miscellaneous n.e.c.	688	207	85	63	61	1,104 81.1
Total	19,692	17,428	14,656	30,923	8,044	90,743 40.9

Source: M. Watanabe, Regional Difference of Thai Industry, IDE 1985.

Ref: \*Ref means percentage of the Bangkok and Central region.



As for the imports in the 1960's, consumer goods, especially non-durable goods, accounted for a large part of the total import. However, the progress of industrialization, promoted by the import substitution policy mentioned earlier, decreased the imports of consumer goods and increased that of raw materials and capital goods (Table 1-6).

The manufacturing sector in Thailand has grown large enough to serve as an economic driving force in the economy, especially in export.

Thailand will be a newly industrialized country in the near future. It is difficult to achieve an export-oriented economic growth because of the protectionism in world trade. However, in order to expand the domestic market, the export-oriented industries must be promoted.

### 1-3 STRUCTURE OF MANUFACTURING SECTORS

As shown in the preceding sections, although the government of Thailand has been changing its policy objectives from manufacturing instead of importing to manufacturing for promotion of exporting, to creation of jobs, and to regional decentralization of industries, they have not been developing exactly according to the governments plan.

If the changes in the industrial structure are considered by type of industry over time, it can be seen that in the 1960's, food stuffs, beverages, and tobacco made up more than half of the domestic primary commodities of consumption. However, their shares gradually decreased from the latter half of the '60s, and in the 1970's, textiles, clothing, electrical equipment, transportation equipment, etc., increased their share. This was the result of the policy of producing the basic needs of the people instead of importing them that was started after the 1950's. In 1975,

Table 1-6 Trend of Major Export Goods

		(million Baht)						
		1981	1982	1983	1984	1985	1986	1987
Crops		72,998	73,150	66,484	78,292	73,398	73,397	81,496
	Growth rate	16.8	0.2	-9.1	17.8	-6.3	0.0	11.0
Marine Products		6,632	7,636	8,225	8,648	10,590	14,853	17,669
	Growth rate	19.6	15.1	7.7	5.6	21.9	40.3	19.0
Mining Products		11,814	9,824	6,806	7,588	10,126	6,283	6,093
	Growth rate	-23.4	-16.8	-30.7	11.5	33.4	-38.0	-3.0
Manufacturing Products		54,743	53,205	61,358	76,095	95,615	129,170	177,253
	Growth rate	27.1	15.5	2.9	24.0	25.7	35.1	37.2
Miscellaneous		6,814	5,913	3,599	4,578	3,637	9,645	18,945
Total		153,001	159,728	146,472	175,237	193,366	233,178	301,456
Share	Crops	47.7	45.8	45.4	44.7	38.0	31.5	27.0
	Marine Products	4.3	4.8	5.6	5.0	5.5	6.4	5.9
	Manufacturing Products	35.8	39.6	41.9	43.4	49.4	55.4	58.8

Note: The figure of 1987 are estimated based on the month Report of Thai National Bank Jan. to Sept.

Table 1-7 Trend of Major Import Goods

		(million Baht)						
		1981	1982	1983	1984	1985	1986	1987
Consumer Goods		18,263	17,905	22,308	22,692	23,966	24,466	31,641
	Growth rate	19.2	-2.0	-24.6	1.7	5.6	2.1	29.3
Raw Material		58,084	53,606	66,474	69,613	75,772	84,333	122,578
	Growth rate	18.2	-8.6	25.3	4.7	8.8	11.3	45.4
Textil		3,915	3,247	4,516	5,388	5,673	5,638	8,457
	Growth rate	22.3	-17.1	39.1	19.3	5.3	-0.6	50.0
Chemical Products		18,011	16,138	20,790	20,730	23,061	26,106	35,817
	Growth rate	20.4	-10.4	28.8	-0.3	11.2	13.2	37.2
Iron & Steel		12,039	11,323	13,860	14,035	15,942	15,737	23,772
	Growth rate	-14.2	-5.9	22.4	1.3	13.6	-1.3	51.1
Capital Goods		56,985	48,192	69,814	73,607	75,404	78,316	105,584
	Growth rate	23.2	-15.4	44.9	5.4	2.4	3.9	34.8
Electric Industries		11,030	11,422	16,372	18,085	15,848	25,561	32,462
	Growth rate	-3.0	1.3	44.6	4.6	-13.2	61.2	27.0
Electrical Equipment		25,842	21,172	33,061	34,992	34,720	32,299	49,579
	Growth rate	26.7	-18.1	56.2	5.8	-0.8	-7.0	53.5
Crude oil and other		65,160	60,765	57,065	57,353	56,719	32,354	45,436
	Growth rate	10.8	-6.7	-6.1	0.5	-1.1	-43.0	40.4
Cars and its Parts		9,568	7,687	11,416	11,834	9,293	8,959	15,447
	Growth rate	38.4	-19.7	48.5	3.7	-21.5	-3.6	72.4
Total		216,716	196,616	236,609	245,155	251,169	241,373	334,999

Note: The figure of 1987 are estimated based on the month Report of Thai National Bank Jan. to Sept.

the reliance on the import of foods, beverages, textiles, leather goods, and wooden products were 2.5%, 4%, 8.4%, 4.6% and 2.1%, respectively.

During the early 1980's, the food processing and the textile industries were still the largest sector among the manufacturing sectors. The machinery industry, which is the core of the modern manufacturing sector still, maintains an insignificant share of production. However, electrical equipment and chemicals rapidly increased the share in production among the manufacturing sectors. The industrial structure will shift to an assembly and processing-oriented one for the following reasons (Fig. 1-3).

- The largest sector of the BOI-approved industry is electrical machinery.
- The largest sector of the potential investors derived from the questionnaire survey in this study is machinery, 25.2%, followed by electrical machinery, 18.0%.

The promotion of this industry becomes a key factor in embarking upon a full-fledged industrialization for Thailand.

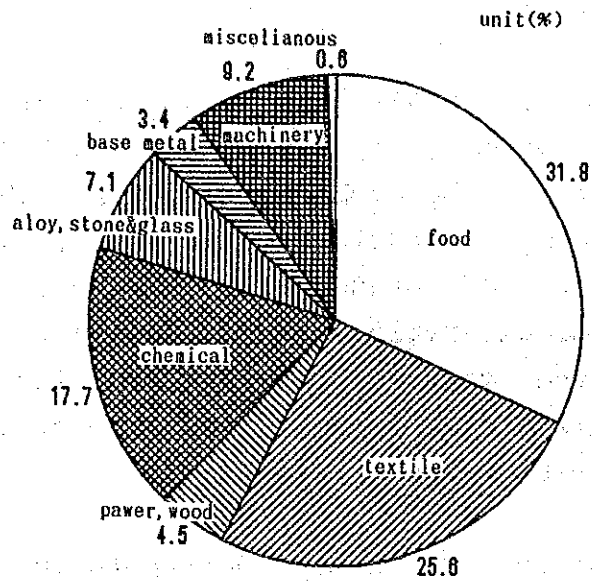
#### 1-4 COMPARATIVE ADVANTAGES OF THAILAND IN PRODUCTION

##### (1) PRODUCTION COST COMPOSITION

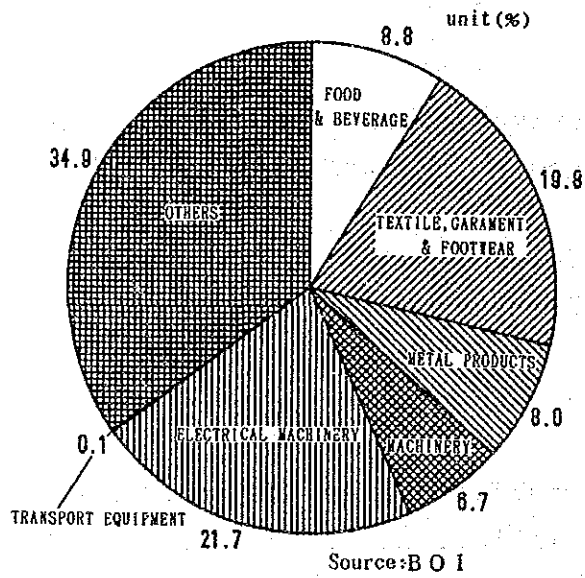
The major elements of manufacturing are generally labor, materials, machinery, utilities, and land. According to the statistics in Japan, an average small- and medium-scale manufacturer's production cost is comprised of:

1st material	46.7%
2nd labor	23.8%
3rd depreciation	2.7%
4th utilities	2.5%

① Present Industrial Structure, 1986



② Approval Companies BOI, 1987-1988



③ Potential Investors

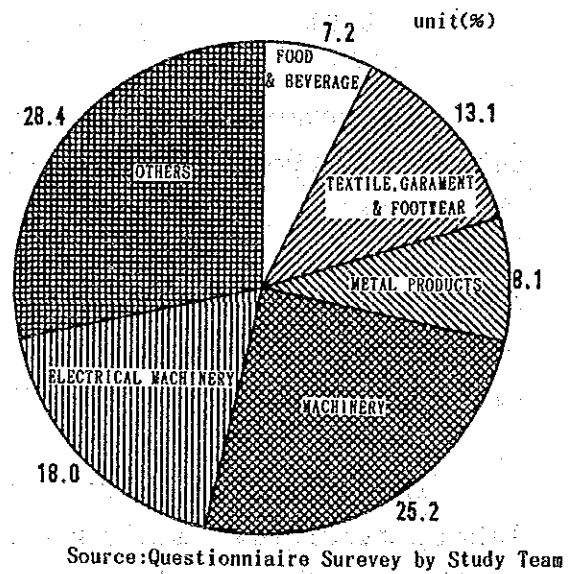
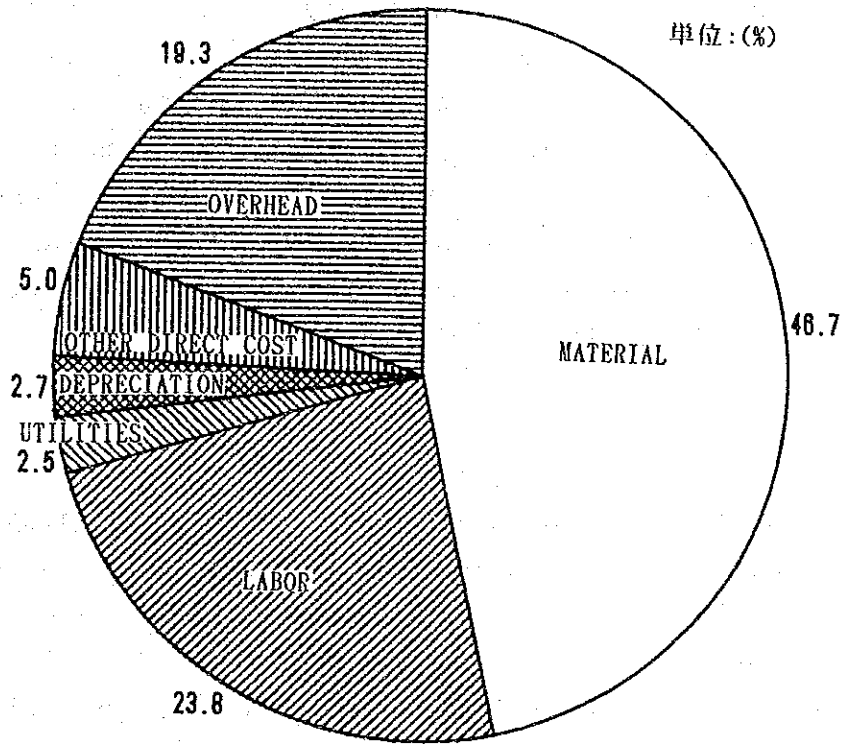


Fig. 1-3 Trend of Industrial Structure



Source: Cost Index in Small & Medium Size Companies, 1987  
Agency of Small & Medium Size Industry

Fig. 1-4 Structure of Manufacturing Costs in Japan

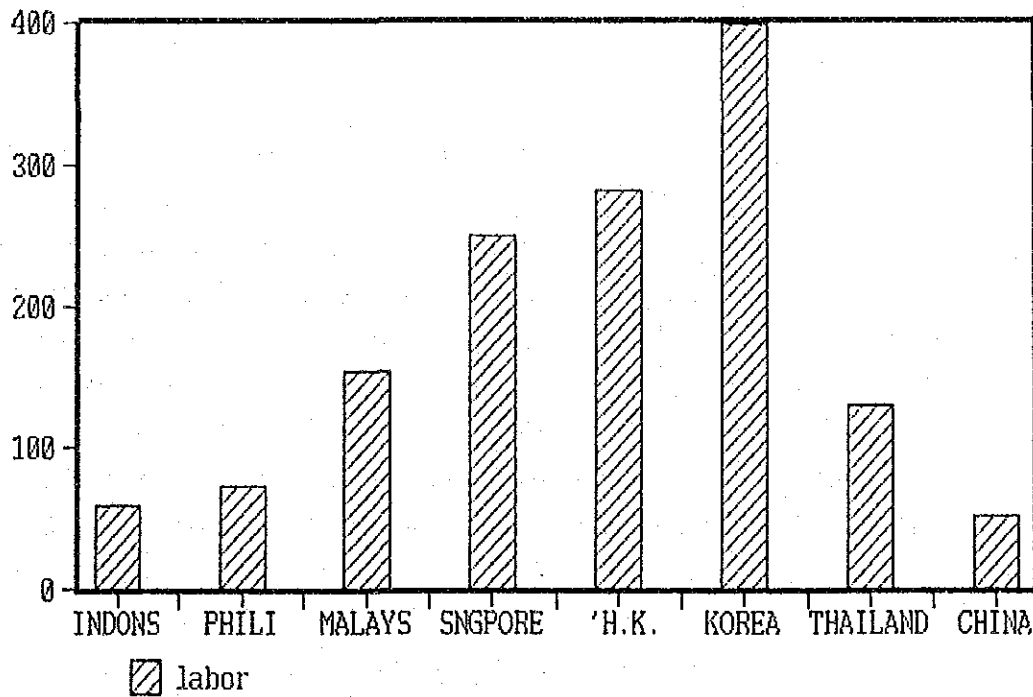
The rent is only 0.9% of the total cost. Lately, the soaring land price has become a serious social issue, but it is evident that even in Japan, which is well noted for high land prices, that land prices do not pose a large burden on production costs as a whole. Actually, the land is only held as an asset during the time of production, hence can be sold in most cases at a higher price than purchased, leaving little effect on the production cost. The above figures indicate that cost reduction comes largely from labor but not from other sources. The utilities have similar prices throughout the world and their differences are not large enough to influence production costs.

## (2) LABOR WAGES

In choosing a country for overseas production, investors would normally check labor costs first among other production costs because labor costs differ most between countries. For the investors looking for an alternative production site for labor-intensive products, the difference in wages matters the most. For the some products which are capital intensive or software-intensive, total costs, instead of labor costs must be taken into account because of the relatively small share of labor costs in the total production cost.

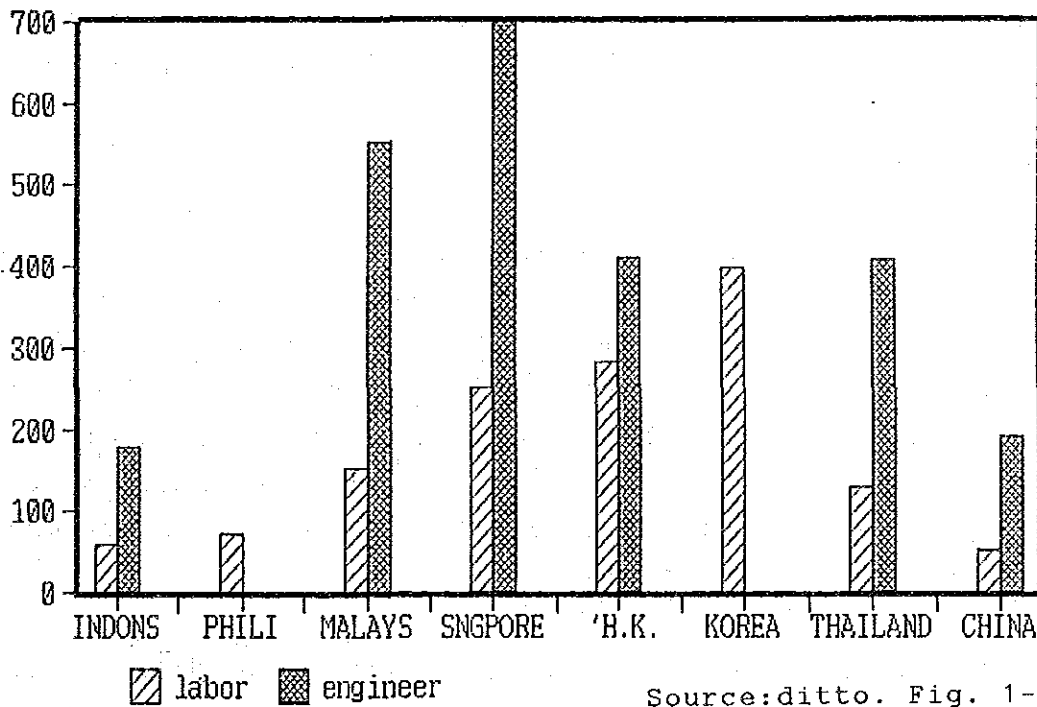
Cost advantages of one country are only temporary nowadays under rapid progress of industrialization in Asian countries and the volatile foreign exchange system. One must note that the current attempt to compare the advantages of the countries in Asia is only valid for the time being.

Thailand's labor wage level ranks in the middle. The average monthly wage of US \$130 amounts to twice as much as that in China, which ranks the lowest, but only one third that in Korea.



Source: ILO Labor Statistics. ILO.  
 Guide to personal management in Malaysia,  
 Malaysia Chamber of commerce and Industries.  
 Key Economic Indicators of Thailand, BOI

Fig. 1-5 Comparison of Wages among Countries (US\$/month)



Source: ditto. Fig. 1-5

Fig. 1-6 Comparison of Wages among Countries:  
 Engineers/General Laborers (US\$/month)

### (3) SUPPLY OF ENGINEERS

The recent investment boom in Thailand has caused a serious shortage in the supply of qualified engineers, triggering recruiting of engineers from other companies and soaring salaries for them. In the early part of the boom, the shortage of industrial sites was pointed out as a serious hindrance to the industrialization, but recently a real concern over the shortage of engineers has been voiced among the industrialists. Industrial sites can be developed in 2-3 years but education takes much longer time. Some companies are already working on the possibility of developing engineers out of skilled technicians. The importance of qualified engineers cannot be overemphasized for the industrialization of Thailand in the long run. The wage level of engineers shows a trend similar to that of laborers. Thailand ranks in the middle. The wage difference between laborers and engineers in Thailand is bigger than in other countries, reflecting the shortage of the latter. The shortage has become even more evident since the beginning of 1988, and the wage level has soared even further from the above figure. The newspapers always carry advertisements for engineers, some offering 20,000 to 30,000 bahts per month.

### (4) UTILITIES

As already mentioned, utilities contribute only to an insignificant extent to production costs, except for large consumers such as aluminum refining. Since the prices of utilities in Asian countries are generally on the same level, they are not likely to influence investors' decisions in selecting a country for overseas production. Instead, the availability and stability of supplies of utilities are much more important for investors.

The levels of development of utilities differ even within a country. Usually, rural areas have less developed infrastructures, including electricity and water supply. The



following table presents the qualitative grouping of the countries according to the level of utilities development. Group A is the countries which offer constant and stable utility services regardless of location. Group B is the countries which offer utility services available regardless of most of the industrial locations, but with occasional problems in supply. The Group C countries offer utility services, but inaccessible or insufficient at some industrial locations and with some problems in stable supply.

In Thailand, electricity and water supply are available in most industrial estates with occasional supply problems, thus factories which require highly sophisticated quality control may face some problem. In newly established estates, a delay in the construction of utility facilities causes inconvenience for early occupants. In the Philippines, there are some industrial estates opened long ago where factories are waiting for electrical power supply.

#### Level of Development of Utilities

Group A	Singapore Taiwan	Korea
Group B	Thailand	Malaysia
Group C	Indonesia China	Philippines

#### (5) LEVEL OF TECHNOLOGY / SUPPORTING INDUSTRIES

It is not possible to discuss the subject of technology as a whole in a country because the manufacturing sector consists of numerous sub-sectors. Each country with different historical background of sub-sectors displays a different picture. Even if the scope is limited to the automobile industry or electronics, its production is supported by various manufacturing processes, such as press

work, foundry, die casting, and plastic molding. The levels of technology differ significantly between companies in a country. It is far more beneficial and presentable to choose an industry which forms a core of supporting industries. It is also quite likely that other industries show a similar tendency. The mold and die making industry fits the specifications well for the comparative study. The industry produces indispensable tools for modern mass production of metal or plastic products.

#### Level of Development of Mold and Die Making Industry

##### Taiwan, Singapore

The industry has developed to a level high enough to produce molds and dies of large sizes or those requiring complicated 3-dimensional machining work and export to other Asian countries. However, high precision molds and dies such as fine blanking dies for lead frames of LSIs (large scale integrated circuits) have to be procured from Japan.

##### Thailand, Malaysia

The industry is capable of producing relatively simple molds and dies of small size. Complicated or large molds and dies are imported from Taiwan and, to a lesser extent, from Singapore. There are few mold makers who can produce molds for die casting. Inability to produce large molds and dies is closely associated with a small demand which cannot justify the purchase of large tooling machinery. In Malaysia, due to the concentration of semiconductor factories there are a couple of mold makers which can produce high precision molds for packaging LSI.

Philippines, Indonesia

The industry largely consists of small shops which can produce inexpensive molds and dies from product samples. The number of such shops are also limited. More sophisticated molds and dies are produced within foreign joint ventures, but still at immature levels.

Thailand again ranks in the middle level at present. However, the current investment boom creates a substantial demand for molds and dies, thereby justifying investments in more sophisticated molds and dies making machinery, including ones from other industrialized countries. In fact, during the last two years, a couple of molds and dies making companies from Japan received approvals from the BOI. It is expected that a larger demand and technology transfer from such foreign joint ventures will prompt the development of the industry.

#### 1-5 INDUSTRIAL LOCATION IN BANGKOK AND ITS SURROUNDING AREAS

As mentioned earlier, the concentration of industries and population in Bangkok has become a serious social problem in Thailand(Fig. 1-7).

In 1986, Bangkok had a population of over 5.4 million, constituting approximately 10% of the nation's total population. Its population density is 3434.1 person/km<sup>2</sup>. The central region including Bangkok has a density of 449.1, reaching 4.4 times of the national average.

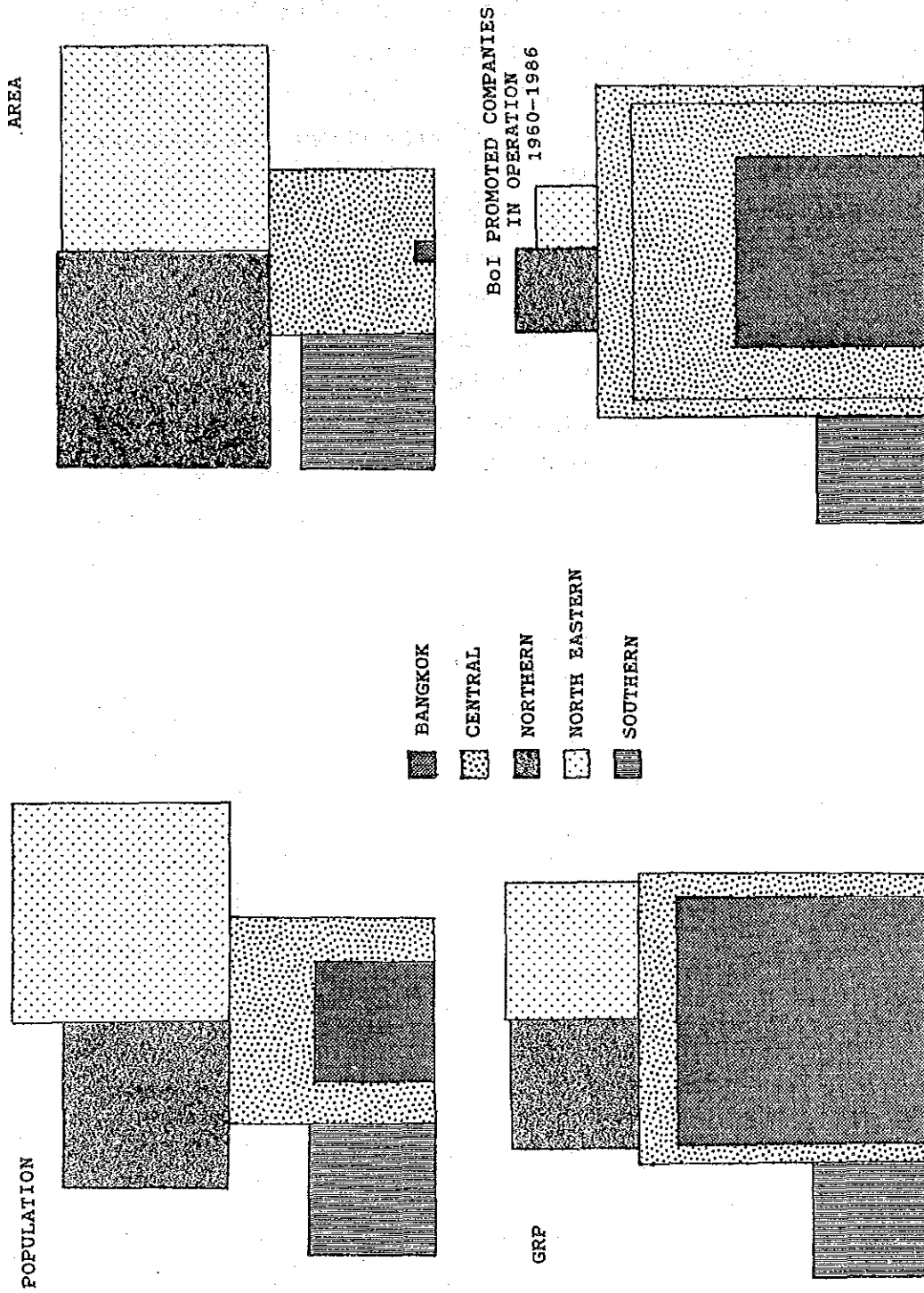
The number of manufacturing establishments in Thailand totaled approximately 40,000, excluding rice mills, in 1983, among which 29,000, around 74% of the total, were located in the central region including Bangkok. In particular, the textile industry and machinery industry are highly concentrated in this region, around 80 to 90% of the total of the subsector (please refer to Table 1-5 in section 1-3).

Among the 1,426 promoted companies approved by the BOI between 1960 and 1986, 933 companies, 65.4%, are concentrated in the Bangkok metropolitan areas including Samut Prakarn, Samut Sakorn, Nontaburi, Patum Tani.

The concentration is attributed to several factors;

- No other international port to handle a large volume of cargo.
- Major market is Bangkok area
- Superior levels of infrastructures in Bangkok area
- Best availability of urban facilities and services in Bangkok area

However, these superiorities as industrial location are being deteriorated by over-concentration recently. The problems of the city have been clearly felt, such as sinking ground, floods, traffic jams, lack of industrial land, and skyrocketing land prices. Still, the majority of industrialists consider that the merits of Bangkok as industrial location far exceed the demerits. Some of the companies interviewed have moved away from Bangkok, but only to the surrounding areas, to still enjoy the benefits of Bangkok. Other companies which still stay in Bangkok and showed a keen interest in the Laem Chabang I.E., citing high cost of land, lack of space for expansion and conflicts with neighboring residents as the reasons for their intention to move their factories. Though there are factors pressing the dispersion of industries, the alternative industrial locations to Bangkok appear to be only limited to the vicinities of Bangkok. There are 12 industrial estates in operation or under construction in Thailand, including the Laem Chabang I.E. Only two are located away from Bangkok in a real sense. They are the Northern I.E. and Suranari I.E. in the northeastern area. Six of them are located within a 60 km radius of Bangkok.



Source: Made from BOI, National Statistical Year Book NESDB

Fig. 1-7 Concentration of Industry and Population in Bangkok

There are three axes of industrial dispersion from Bangkok (Fig 1-8). The first direction is to the north along the National Highway No.1 through the Bangkok International Airport to Ayutthaya. Factories that make textiles, tires, motorcycles and cement already exist along this line. The second development has taken place in a direction through Thonburi to Samut Prakharn along the National Highway No.4 and No. 35. There already in a concentration of marine resources processing and ceramics. Since this area is close the fishery port, it is one of Asia's canning centers. The last development axis which runs along the National Highway No. 34 and No. 3 through Bang Phoo and Bang Phlee I.E. leads to the Laem Chabang I.E. and the Map Ta Put I.E. This development corridor, which already has electric appliance and automobile industries, is expected to be further boosted by the completion of the Eastern Seaboard Development Program.

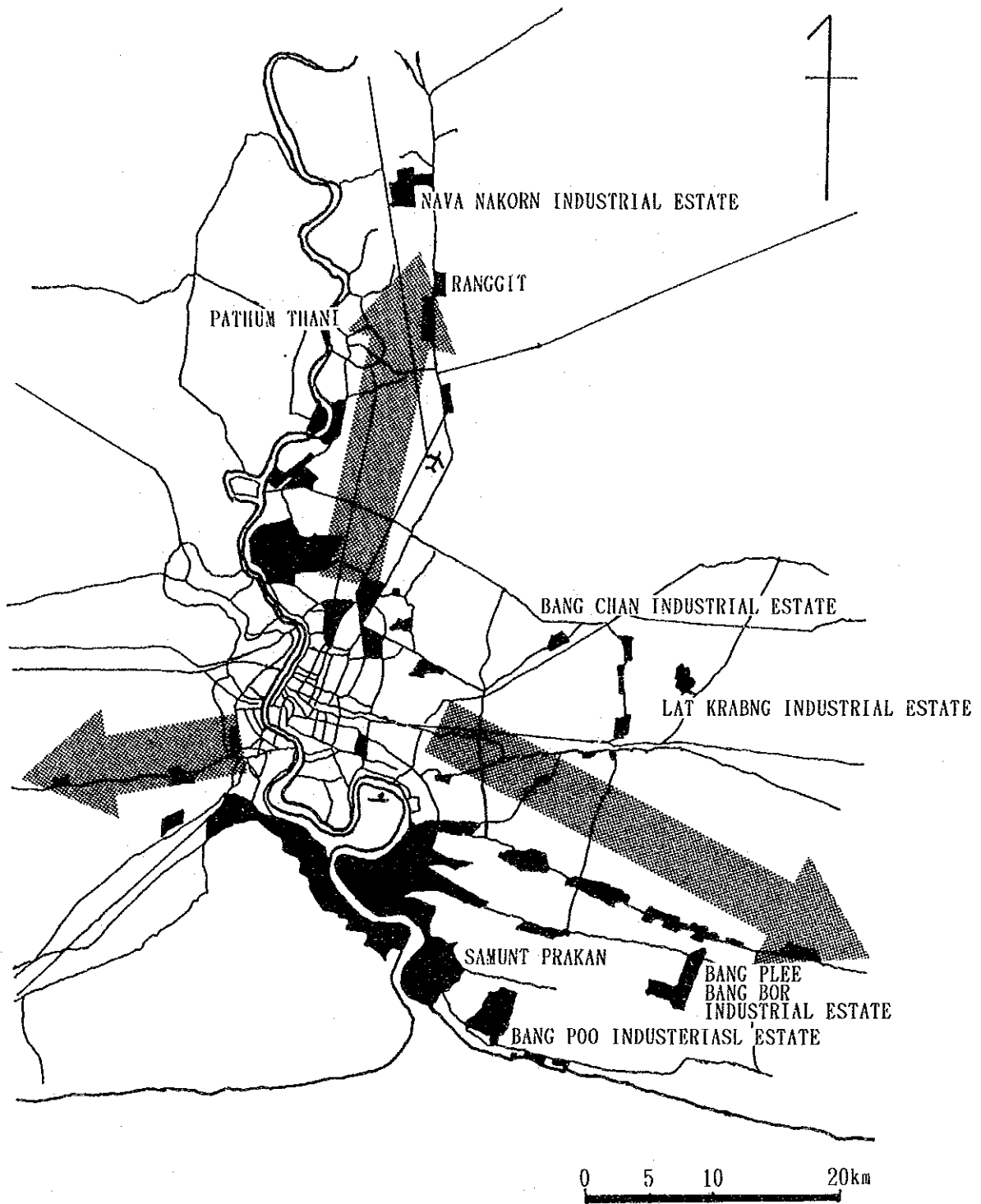


Fig. 1-8 Trend of Industrial Location in Bangkok





## 2. CURRENT SITUATION OF THE LAEM CHABANG INDUSTRIAL ESTATE

### 2-1 OBJECTIVES OF THE LAEM CHABANG INDUSTRIAL ESTATE DEVELOPMENT

#### (1) REVIEW OF THE EASTERN SEABOARD DEVELOPMENT PROGRAM

The Eastern Seaboard Development Program which was initiated under the Fifth Plan was handed down to the Sixth Plan as the top priority project. The main task imposed upon the Fifth Plan was to restructure the economic system to overcome both external and internal problems which surfaced in the late 1970's. The external problem was expanding trade deficits caused by pursuit of the import substitution policy, and internally the income distribution gap between Bangkok and rural areas. The deteriorating urban facilities in Bangkok posed serious social problems. However, the adverse international economic climate slowed down the economic growth of Thailand, thereby leaving less options for the government. Inevitably the implementation of the Eastern Seaboard Development Program was delayed till the Sixth Plan period.

The major objectives of the Eastern Seaboard Development Program are;

- to accelerate the industrial growth rate
- to offer an alternative industrial location out of Bangkok and promote regional development
- to enhance international competitive power of the Thai economy to promote new industries and to attract foreign investment
- to provide jobs and facilities to encourage urban development away from Bangkok

The Eastern Seaboard Development Program consists of two industrial bases of distinctly different characters, namely, the Laem Chabang I.E. and Map Ta Put I.E. The former is to accommodate light and labor intensive

industries and the latter is to establish a chemical industrial complex utilizing natural gas produced in the Siam Bay.

The Laem Chabang I.E. is a strategic industrial base to attract industries from congested Bangkok areas and to enhance international competitiveness of the Thai manufacturing sector which has improved infrastructures and the provision of EPZ.

At present, the international port of the country is limited to the Klong Toey Port, which is a river port up along the Chao Praya River 28 km from the ocean, thereby only allowing 10,000 ton scale ships to enter. The old facilities at the port can no longer cope with ever increasing volume of cargo transported by large container ships. The congestion at the port became a controversial problem in 1988 after dramatic increase in trade volume. Acknowledging the need to have a deep sea port, the Thai government had decided earlier to build a 14 m deep sea port at Laem Chabang. The construction was commissioned in 1987 and is planned to be completed in 1991. The new port is expected to increase Thailand's trading capacity tremendously.

## (2) REVIEW OF THE MASTER PLAN

The Master Plan of the Laem Chabang Development was described in a Final Report for the Study on the Development Project of Laem Chabang Coastal Area in February, 1985 by JICA. In this section, a review is focused on the Basic Development Policy in the Master Plan.

The Basic Development Policy in the Master Plan consists of the following three items:

- to create a new growth center of the Eastern Seaboard
- to promote an integrated development
- to provide an environment with amenities

## 1) New Growth Center

The Master Plan described that "In line with the government policy to redistribute the migration into the Bangkok Metropolitan area, the Eastern Seaboard development is designed to attract a considerable amount of population from the metropolitan area and the country", and "Laem Chabang, as well as Map Ta Put, is planned to be a growth core that will absorb major portion of migrants." In order to realize the new growth center, "it is required to provide it with sufficient urban facilities such as a business and commercial area for economic activities." Future urban areas will be not only in Laem Chabang, but also the expansion of Chonburi and the south of Pattaya is planned.

The Master Plan continued, "Laem Chabang has a possibility to become a subcapital adjacent to Bangkok". However, the prospects for the housing development are far from certain because the land prices around Laem Chabang rise sharply. The housing development plan shall be reconsidered.

## 2) New Port City with Integrated Development

The Master Plan stated that the development plan of the Laem Chabang Complex "must seek a balanced and integrated development" of three different functions, namely, an industrial estate, a port and a new town. "On the other hand, Laem Chabang must be the international entrance", therefore "Laem Chabang complex is to be constructed as a new port city including not only port related facilities, but business and commercial facilities" which will support global business activities.

### 3) Environment with Amenities

The Master Plan reported that "Development of Laem Chabang is to be proceeded also with the view point of creating a living environment with amenities. Attention should be paid specifically" to the following:

- Creation of a clean environment
- Creation of an international atmosphere
- Separation of three different functions mentioned above in order to ensure the effective operation of each activity

As for the development of Laem Chabang, it must consider the relationship between Laem Chabang and its surrounding area. This view will be more and more important along with the advance of constructions such as a industrial estate and a port.

#### (3) OBJECTIVES OF THE LAEM CHABANG I.E.

The main objectives of the Laem Chabang I.E. are as follows:

- To prompt the moving of factories from Bangkok and its surrounding areas
- To promote export oriented industries
- To provide employment opportunities

The experiences in many countries indicate that industrialization will never occur by the mere provision of industrial land. Though the congestion and rising factor costs in urban areas may plague enterprises, the benefits of agglomerated industries often override these negative aspects. The dispersion of industries takes place only when these negative factors start to offset the merits of already developed industrial areas, but it leads only to the peripheral areas equipped with developed infrastructures and access to existing urban centers.

In Japan, the ambitious industrial dispersion program called " New Industrial City " was implemented to establish industrial bases in remote areas, but most of them have not yet achieved their goals after 30 years. The industrial bases which are successfully operated are generally located near the existing large urban centers. Thailand's development axes are three-directional, first to the north toward Ayuttayah, second to the southwest toward Samut Prakarn, third toward Laem Chabang, all originating from Bangkok. Once established, the Laem Chabang is to form another nucleus for industrial activities, thus providing a direct gateway to the vast Northeastern Region. In this context, the Laem Chabang I.E. carries an important responsibility to serve as a hub of new industrial activities (Fig. 2-1).

## 2-2 CURRENT SITUATION OF THE LAEM CHABANG PROJECT

The Laem Chabang consists of three major projects of industrial estate, commercial port, and housing. In this section, the current situation will be outlined with a focus on the industrial estate.

### (1) REVIEW OF MASTER PLAN

In the Master Plan, the Land Use Plan and Layout are conducted on the basis of the basic development policy mentioned above. The basic framework of development is described in the Master Plan as follows:

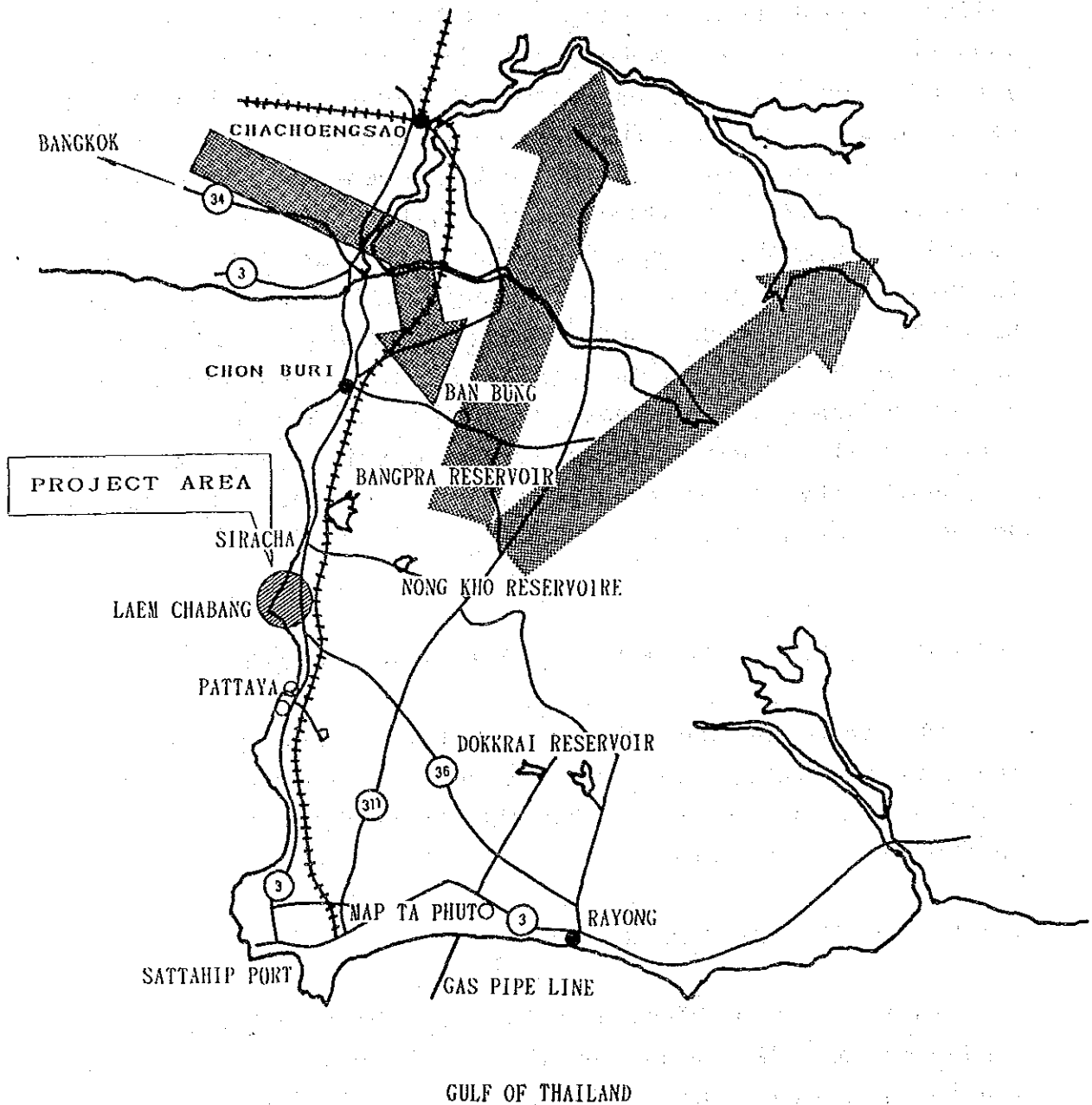


Fig. 2-1 Eastern Seaboard Development Program  
Laem Chabang Industrial Complex

Sector	Items	Short-term Development 1991	Master Plan 2001
Industrial estate		290 ha 1,800 rai	450 ha 2,800 rai
Port area	Wharf	116 ha 725 rai	260 ha 1,600 rai
	Hinterland	250 ha 1,560 rai	500 ha 3,100 rai
New Town		130 ha 820 rai	930 ha 5,800 rai

The basic policy for land use layout of three functions such as the industrial estate, the port area and the new town is as follows (described in the Master Plan).

- To minimize the mixture of different kinds of above functions.
- To minimize traffic congestion and ensure efficient traffic flow of cargoes and commuters.
- To utilize the areas already acquired by IEAT and PAT (1,550 ha).
- To accommodate long-term land demand.

The basic land use plan in the Master Plan is shown in Fig 2-2. The area allocation of the industrial estate is described in the Master Plan as follows.

#### Land Use Plan of Industrial Estate

EPZ	84 ha	525 rai
GIE	233 ha	1,456 rai
Center	7 ha	44 rai
Roads	64 ha	400 rai
Parks	11 ha	68 rai
Others(Canal and buffer green)	49 ha	307 rai
Total	448 ha	2,800 rai

THE STUDY ON THE DEVELOPMENT PROJECT OF  
LAEM CHABANG COASTAL AREA

MASTER PLAN

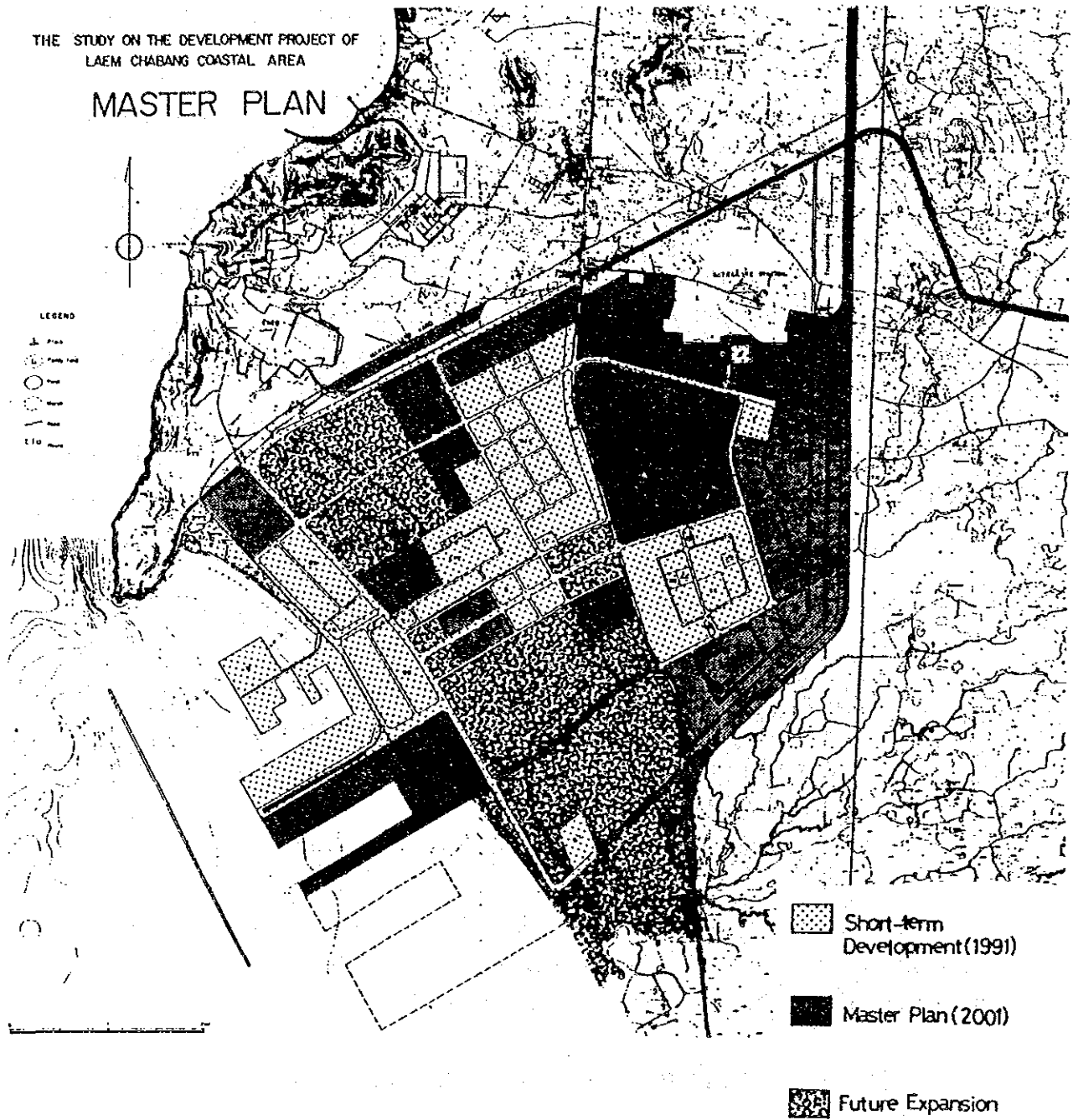


Fig. 2-2 Land Use Plan in the Master Plan



The Master Plan reserved 565 ha (3,531 rai) of land for the future long-term expansion. As mentioned in chapter 1, the circumstances in Thai economy were very severe in 1984/85 when the Master Plan was submitted. Therefore, the industrial development plan was described in moderation. However, the economic situation surrounding Thai economy changed marvelously in these two years as mentioned above. The present plan expanded the development area for EPZ and GIE to 175 ha and 370 ha, respectively. Compared to the Master Plan, the area for EPZ was almost doubled.

## (2) CURRENT SITUATION

### 1) Location

Laem Chabang is located 125 km southeast of Bangkok and 15 km north of Pattaya in the middle of the eastern gulf coast. It takes approximately one and a half hours from Bangkok by National Highway No. 34 and No. 3.

### 2) Infrastructures

#### a) Commercial Port

The Laem Chabang commercial port is to become a main gateway for international container cargo and is designed to handle 4 million tons per year in 1995. It will be able to accommodate up to 3,000 TEU container vessels and 120,000 DWT agri-carriers. The first stage development includes two container berths, one multi-purpose berth and agri-bulk berths.

#### b) Road Network

Highway No. 3, the so-called Sukumvit Highway, runs in the east of the Laem Chabang I.E. Currently there is no problem in traffic. In order to divert the anticipated heavy traffic, a 60 km 4-lane by-pass from Chonburi to the east of Pattaya will be completed by 1992 or 1993.

c) Railway

A railway between Siracha and Laem Chabang is planned to be completed in 1990, giving access to the Chachoengsao-Sattahip line, which is currently not in use.

d) Telecommunications

The capacity will be gradually expanded. The capacity will be increased to 1,536 by 1990 and to 5,000 by 1991.

e) Electricity Supply

A power distribution plant will be constructed inside the industrial estate to provide 11.5 kv electricity by 1990.

f) Water Supply

The Nong Kho reservoir will supply water at the rate of 39,800 m<sup>3</sup>/day to the industrial estate. The pipeline to connect the reservoir and the industrial estate is under construction and its completion is scheduled in early 1989.

g) Waste Water Treatment

A waste water treatment plant with a capacity of 29,400m<sup>3</sup> /day is planned to be constructed inside the industrial estate. The completion is scheduled in 1990. In the Master Plan, a capacity of 37,900 m<sup>3</sup>/day was planned to be constructed outside the industrial estate.

3) Industrial Estate

The industrial estate covering 3,556 rai (569 ha) in total consists of General Industrial Estate 2,312 rai (369.9 ha) and Export Processing Zone 1,098 rai (175.7 ha)

and Commercial and Business Area 146 rai (23 ha). The GIE offers a total of 112 plots, ranging from a 2 rai plot to a 200 rai plot. The EPZ offers a total of 173 plots, ranging from a 2 rai plot to a 33 rai plot.

In September 1988, the construction was commissioned and the construction is already underway. By mid 1990, the construction is scheduled to be finished. All the land will be leased for a period of 20 years with possible 10 year extension. The leasing is currently priced at 59,000 bahts per year, which is fixed for 10 years and a maximum 10 % increase every 10 year.

The industrial estate aims to attract agro-based industries, electric appliances and electronics, automobile, machinery, metal working, textiles, plastic molding, chemical intermediate products, packaging materials, etc. (please refer to Chap. 3 for the details).

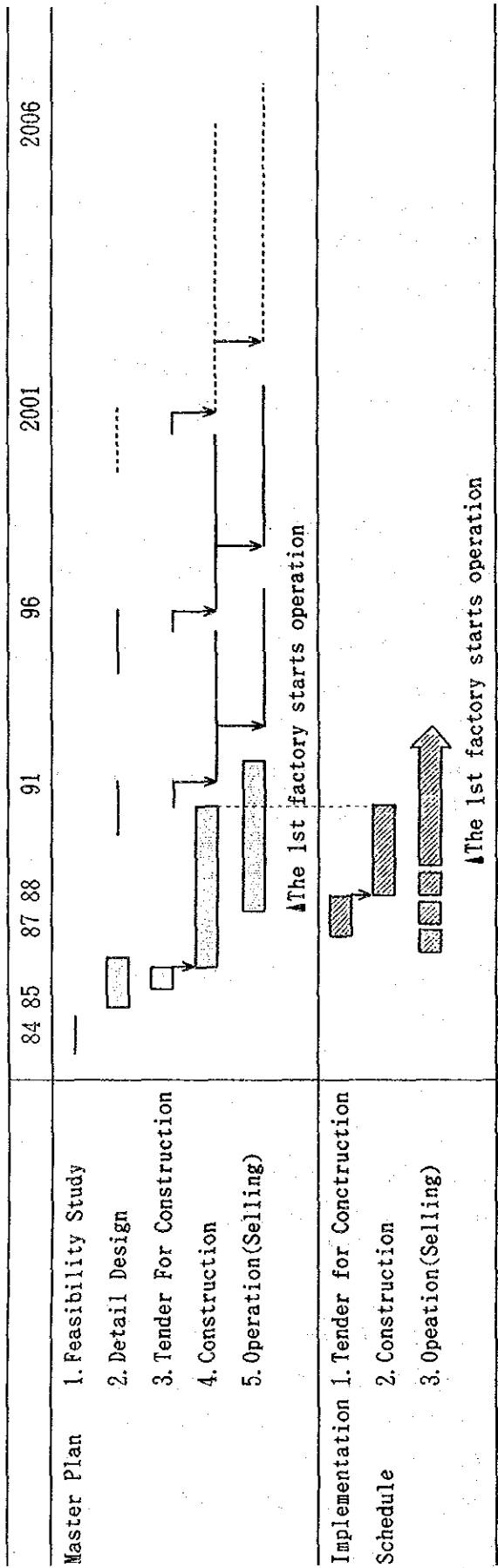
Two factories are already under construction. One is a CRT factory and the other is a tire factory.

### (3) DEVELOPMENT SCHEDULE

The short-term development plan for industrial estate in Master Plan was outlined as follows.

- 1986 - Start land formation and land sale
- 1987 - Partial completion of land formation  
- Start construction of factories
- 1987 - The first factory starts operation
- (end)

The present stage of the development plan is the starting of land formation and factory construction. Therefore, the actual work is 2 years behind the original schedule. According to the present schedule, the land formation will be completed in September, 1990 (Fig. 2-3).



Note

- 1) [Hatched Bar] : Short term development in Master Plan.
- 2) Construction in Implementation Schedule will complete in Oct. 1990.  
Development area in Implementation Schedule covers both short term and long term development area in Master Plan.
- 3) The 1st factory in Implementation Schedule, thai CRT, is now underway of factory construction.

Fig. 2-3 Development Schedule of Industrial Estate in Master Plan and Implementation Schedule

#### (4) PROBLEMS RELATED TO LAEM CHABANG

Having been already initiated, the Laem Chabang I.E. only awaits its scheduled completion. For a large scale industrial estate development, the supporting and urban facilities play a crucial role in its development. Housing for workers is an indispensable facility for the incoming industries and the development of housing is one of the important elements in investment decision making. However, housing for the Laem Chabang I.E. faces an inevitable delay due to failure to procure land, partly because of speculation on land. This may produce a setback of the project.

Obviously, the development of an industrial estate is a tool for industrialization of a region, and not a goal in itself. The success of the project rests upon how many and how soon factories operate in the industrial estate. Therefore, the promotion is of the utmost importance in achieving the goals (please refer to chapter 5).

### 2-3 REVIEW OF FINANCIAL PLAN OF THE LAEM CHABANG INDUSTRIAL AREA

#### (1) PRESENT STATUS

The Laem Chabang I.E. was commissioned in 1988 for the construction of 688 rai of EPZ, 1,406 rai of GIE, 138 rai of business district to be completed in August, 1990. The contract amounts to 1,156 million bahts, including water supply, sewerage, solid waste disposal system, and power distribution system. The Overseas Economic Cooperation Fund of Japan is lending 4,366 million yen for this project. The plots will not be sold, but all will be leased at the price of 59,000 bahts per rai for a year with a condition to revise the price every ten years up to a 10% increase over the original price.

## (2) FINANCIAL ANALYSIS BY JICA MASTER PLAN

According to the Master Plan made in 1985, the financial earning rate of the Laem Chabang Project was 8.4% if utilities are included. It was 8% if only the leasing is included. The estimated construction cost was 1,114 million bahts for 525 rai of EPZ, 1,456 rai of GIE, and 44 rai of business district, a slightly smaller area than the actual implementation. The plan anticipated the sales of the developed plots for 560,000 per rai for GIE and 480,000 per rai for EPZ. Although the differences between the original plan and the latest data are small, the financial plan will be reviewed in the following sections to reconfirm the soundness of the financing of the Laem Chabang I.E.

## (3) ASSUMPTIONS FOR THE REVIEW OF THE FINANCIAL PLAN

The review of the financial plan for the Laem Chabang I.E. is based upon the following assumptions.

1) Project Life: 20 years from the first full operation year of 1991.

2) Occupancy:

	1990	period for full occupancy
EPZ	20%	7 years
GIE	15%	7 years
BD	0%	5 years

3) Lease Charge: The first group of entrants will be charge 59,000 baht per rai and there will be a 5% increase in the charge each year for those entering in the subsequent years. All the charges will be raised by 10% after 10 years from the initial contract year.

4) Utilities: The IEAT can directly charge for only waste water treatment. The government has approved a maximum of 10 bahts per  $m^3$ , but conservatively only 5.2 bahts per  $m^3$  is assumed in contrast to the treatment cost of 4.12 bahts per  $m^3$ .

5) IEAT Maintenance Fee:

The government has approved a maximum of 9,600 bahts per rai for a year, but conservatively, 5,000 bahts per rai for a year is assumed.

6) Investment Cost:

The investment cost for the project was calculated by subtracting the construction cost for the water treatment which will be operated separately and adding 5% for the construction supervision. The total cost is estimated to be 1,120.1 million bahts. On top of this investment cost, the land acquisition cost the IEAT 199 million bahts in 1985.

7) Operation/Maintenance Cost:

According to the IEAT, it will cost 4,600 bahts per rai to operate the industrial estate. However, 8 million bahts is assumed at the beginning of the project because large costs for promotion, etc., are anticipated. The maintenance of the facilities within the industrial estate is assumed to be 1% of the total investment cost for the first five years and 2% thereafter.

#### (4) RESULTS OF FINANCIAL REVIEW

Although most of the parameters changed more favorably than the original plan, the financial internal rate of return (FIRR) showed a small improvement at 8.1% (Table 2-1). This marginal difference is due partly to more costly estimate for the O/M costs.

It is appropriate to assume that it will take 7 years to fill up the developed industrial estates from the principle of conservatism. However, in reality, it should be shortened as a targeting promotion period in order to recover the investment in a short period. The need to fill up the plots quickly is repeatedly stated in Chapter 5. In order to clarify the need, the case of shorter fill-up period with more promotion investment will be examined as follows;

Case : doubling the promotion expense from 8 to 16 million bahts,

Occupancy	1990	period for full occupancy
EPZ	30%	4 years
GIE	30%	4 years
BD	0%	3 years

In this case the FIRR improves by 1% to 9.1% (Table 2-2). It is obvious that a small investment in the initial promotion could improve the financial performance of the whole project.



Table 2-1 Financial Analysis: Case 1

PROJECT: ICB GIE/RPZ	BASE CASE												
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>CASH FLOW CALCULATIONS</b>													
Fixed Capital Investment	0	0	0	28.23	169.35	84.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(D)-labour	0	0	0	10.98	65.86	32.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(D)-material	0	0	0	72.80	436.83	218.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(F)	0	0	0	112.01	672.04	336.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal Fixed Capital	0	0	0	112.01	784.05	1120.1	1120.1	1120.07	1120.07	1120.1	1120.07	1120.07	1120.07
Acc Fixed Capital Investment	0	0	0	112.01	784.05	1120.1	1120.1	1120.07	1120.07	1120.1	1120.07	1120.07	1120.07
Land Acq	119	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Operations</b>													
Revenues (D)	0	0	0	0.00	47.3	59.6	81.9	104.7	128.7	154.0	176.1	201.5	184.3
Revenues (F)	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mtce Cost (D)	0	0	0	0.00	0.00	0.00	6.32	6.32	6.32	6.32	6.32	12.63	12.63
Mtce Cost (F)	0	0	0	0.00	0.00	0.00	4.88	4.88	4.88	4.88	4.88	9.77	9.77
Oper/Prod Cost (D)	0	0	0	0.00	2.45	6.01	9.73	8.37	11.19	14.18	17.23	20.45	22.76
Oper/Prod Cost (F)	0	0	0	0.00	0.12	0.20	0.41	0.61	0.81	1.03	1.25	1.48	1.65
NCF FROM OPNS				0.00	44.71	53.42	60.54	84.51	105.50	127.56	146.37	157.12	137.50
INVEST NCF	-119.00	0.00	0.00	-112.01	-627.33	-282.60	60.54	84.51	105.50	127.56	146.37	157.12	137.50
Acc invest NCF	-119	-119	-119	-231.006	-858.336	-1140.93	-1080.40	-995.893	-890.391	-762.826	-616.452	-459.331	-321.836

8.1%

INVESTMENT IRR

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187.6	191.6	191.6	197.6	200.4	203.0	205.5	207.7	209.7	209.7	212.2	214.0	216.0
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63
9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77
25.23	26.14	27.17	27.47	27.47	27.47	27.47	27.47	27.47	27.47	27.47	27.47	27.47
1.83	1.91	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
138.19	140.80	142.77	145.71	148.49	151.13	153.64	155.79	157.82	157.82	160.32	162.17	164.11
138.19	140.80	142.77	145.71	148.49	151.13	153.64	155.79	157.82	157.82	160.32	162.17	164.11
-183.646	-12.8187	99.92135	245.6314	394.1238	535.2573	698.8924	854.6856	1012.506	1170.326	1330.641	1492.809	1656.921

Table 2-2 Financial Analysis: Case 2

PROJECT: LCB GIE/EPZ	DOUBLING PROMOTION BUDGET CASE												
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>CASH FLOW CALCULATIONS</b>													
Fixed Capital Investment	0	0	0	28.23	169.35	84.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(D)-labour	0	0	0	10.98	65.86	32.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(D)-material	0	0	0	72.80	436.83	218.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-cap inv(F)	0	0	0	112.01	672.04	336.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotal Fixed Capital	0	0	0	112.01	784.05	1120.1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acc Fixed Capital Investment	0	0	0	112.01	784.05	1120.1	1120.1	1120.07	1120.07	1120.1	1120.07	1120.07	1120.07
Land Acq	119	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Operations</b>													
Revenues (D)	0	0	0	0.00	77.3	93.4	127.6	162.2	191.8	169.3	173.3	175.3	177.3
Revenues (F)	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mtce Cost (D)	0	0	0	0.00	0.00	0.00	6.32	6.32	6.32	6.32	6.32	12.63	12.63
Mtce Cost (F)	0	0	0	0.00	0.00	0.00	4.88	4.88	4.88	4.88	4.88	9.77	9.77
Oper/Prod Cost (D)	0	0	0	0.00	4.29	10.86	17.23	13.25	17.35	20.13	23.09	24.55	26.01
Oper/Prod Cost (F)	0	0	0	0.00	0.20	0.32	0.67	0.96	1.26	1.46	1.67	1.78	1.88
NCF FROM OPNS				0.00	72.77	82.17	98.48	136.79	162.03	136.54	137.37	126.58	126.99
INVEST NCF	-119.00	0.00	0.00	-112.01	-599.27	-253.85	98.48	136.79	162.03	136.54	137.37	126.58	126.99
Acc invest NCF	-119	-119	-119	-231.006	-830.276	-1084.12	-985.640	-848.850	-686.818	-550.281	-412.913	-286.334	-159.345

INVESTMENT IRR 9.1%

1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07	1120.07
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
179.3	184.4	188.0	191.3	194.5	197.1	197.1	197.1	197.1	197.1	201.2	204.0	207.0
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63	12.63
9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77	9.77
27.47	28.50	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28	29.28
1.99	2.06	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12
127.40	131.40	134.17	137.54	140.70	143.33	143.33	143.33	143.33	143.33	147.40	150.21	153.16
127.40	131.40	134.17	137.54	140.70	143.33	143.33	143.33	143.33	143.33	147.40	150.21	153.16
-31.9447	99.45228	233.6213	371.1646	511.8624	655.1880	798.5135	941.8390	1085.164	1228.490	1375.892	1526.104	1679.267



