dispersed entrances to the world economy. Urbanization will spread not only in present cities but many small centers, including present sanitary districts. Bangkok will be specialized not into the center of industrial and distribution but into the center of information and management, while concentration of goods flows and industrial activities will have been shifted to Eastern Seaboard.

Under this situation the Upper South will be a unified subregion on the basis of the east-west development axis in which Bangkok/Eastern Seaboard on one hand and a part of the world economy on the other will be interlocked. Within the South, Phuket and Surat Thani Urban Areas form the three poles together with Songkhla - Hat Yai.

5.4.2 Projects

Table 5.3 summarizes the projects/programs proposed in our sector plans as well as those committed or planned already by specific implementation agencies. From the viewpoint of the development phasing described earlier, the incremental process and the interactions of project development, these projects/programs are categorized into (l) Major ongoing projects to be completed by the end of the Fifth Five-Year plan period, (2) Those to be implemented during the Sixth Five-Year Plan period (1987 to 91), (3) Those to be implemented afterwards and by the year 2000 (1991 to 2000) and (4) Non-period-specific actions to be continued toward the year 2000.

Formation of the east-west development axis is the basic concept underlying the Upper South development strategy. This axis will have to be formed in a phased manner. Thus, two sets of integrated actions are emerged from this considerations: (l) Integrated Action for Resource-Based East-West Axis Development to be launched during the Sixth Five-Year Plan period and (2) Integrated Action for Industrial/International-Based East-West Axis Development to be launched afterwards and by the year 2000. Projects to be incorporated in these actions are identified as the high priority projects, on which prefeasibility studies have been undertaken.

5.5 HIGH PRIORITY PROGRAMS AND PROJECTS

5.5.1 Industrial Development Program

OBJECTIVES:

1) To encourage industrial investments in the Upper South, Surat Thani and Phuket in particular, in an effort to diversify and stabilize the economic base of the subregion

Table 5.3 POSSIBLE PRIORITY PROJECTS: INTEGRATED ACTIONS FOR EAST-WEST AXIS DEVELOPMENT

PERIOD	HINTERLAND DEVELOPMENT UNDER PHUKET URBAN AREA	PHUKET URBAN AREA DEVELOPMENT	EAST-WEST LINK DEVELOPMENT	SURAT THANI URBAN AREA DEVELOPMENT	HINTERLAND DEVELOPMENT UNDER SURAT THANI URBAN AREA
1984 - 1987 COMPLETING MAJOR ONGOING PROJECTS	* Phangnga Bay Fish Farming	* Phuket Deep Seaport * Phuket Bypass Road * Phuket Airport Improvement * Phuket Water Supply	* Phanom - Thap Put Road Improvement	* Dredging of Tha Thung Port * Surat Thani LPG Base	* Surat Thani Small/ Medium Irrigation * Chiew Larn Dam Devekiopment * Ban Don Bay Fish Farming
1987 - 1991 INTEGRATED ACTION FOR RESOURCE-BASED EAST-WEST AXIS DEVELOPMENT	- Central Lowland Development	- Phuket Industrial Development - Phuket Urban Development	- Phuket - Surat Thani Highway Upgrading	- Surat Thani Industrial Development - Surat Thani Urban Development	- Central Lowland Development - Tapi-Phum Duang River Management
HIGH PRIORITY PROJECTS	- Takua Pa Land/Industrial Rehabilitation - Phuket-Krasi Ferry System * Krabi Lignite Power Development - Kantang New Fishery Port - Kantang Port Channel Dredging			- Surat Thani Airport Improvement	* Chiew Larn Irrigation * Kaeng Krung Dam Power Development/Transmission - Surat Thani - Krabi Highway Improvement - Chaiya Historical Park Development - Tha Thong Port Fishery Base
1991 - 2000 INTEGRATED ACTION FOR INDUSTRIAL/INTERNATIONAL-BASED EAST-WEST AXIS DEVELOPMENT	- Oil Refinery Development * Krabi Thermal Power Expansion/Transmission	- Phuket Airport/ Industrial Development - Phuket Urban Development	- Phuket - Phun Phin Railway Development	- International Port/ Industrial Development - Surat Thani Urban Development	
NON-PERIOD-SPECIFIC ACTIONS	* Rubber Replantation * Phangnga Bay Fish Farming - Kantang Bay Fish Farming - Artificial Reef Development - Reforestation - Intermediate Urban/ Industrial Center Development 2/ - Rural Infrastructure Development 3/ - Social Education System Development - Special Medical Service Development	- Phuket Social Services - Tourism Promotion/ Management		- Surat Thani Social Services	* Rubber Replantation - Ban Don Bay Fish Farming - Artificial Reef Development - Coconut Land Development - Livestock Expansion - Reforestation - Intermediate Urban/ Industrial Center Development 2/ - Rural Infrastructure Development 3/ - Social Education System Development - Special Medical Service Development

1/ * Projects to be implemented as commited/planned already by specific implementation agencies

and promote regional development.

2) To contribute to national industrialization by further processing of various locally available resources and the conscious effort to develop the possible export industries, in Phuket and the various industries in Surat Thani based mainly on the southern regional market in the short/medium term and broader market in the long-run.

3) To get industrial and infrastructural base of the Upper South in readiness for accelerated industrial decentralization from Bangkok toward the twenty-first century.

TARGETS:

The target manufacturing output is about 25,500 million baht as of the year 2000 in value added term compared to 2,200 million baht in 1980. This target is possible without changing the share of the Upper South in the national total industrial output, if Thailand is to follow the industrialization trend observed among the newly industrializing counties. This target output has been set to be high enough for the subregion to maintain the past per capita income increase without the high growth of mining activity as experienced.

If the national industrialization is not as rapid as mentioned above, however, the relative magnitude of the Upper South will have to increase its share from 2.5 to 3.7 percent in the national industrial output through intentional government policy input.

The target output will involve the structural change of industries; the share of nonlocal resource-based industries to increase from 24 to 34 percent of the Upper South industrial output during the period 1980 to 2000 while the share of local resource-based industries to decrease from 74 to 43 percent.

Manufacturing employment will increase from 23,000 persons or five percent of total employment in 1980 up to 140,000 persons or 13 percent in the year 2000.

COMPONENTS AND PHASING:

In early stage of industrial development, two industrial estates are to be developed; one in Surat Thani and the other in Phuket. They are expected to be in full operation by the middle of the 1990s.

In late stage, two more industrial estates are proposed to be developed, including a Coastal industrial estate directly linked with the proposed Khanom Deep Seaport and a rather small-sized urban esatate at the northern fringe of Phuket Urban Area. A petroleum refinery is also proposed in our energy planning study.

Other specific areas such as the area to support port activites, fishing activities and agricultural processing are proposed to be designated at around existing/ongoing ports such as Phuket, Tha Thong, and Kantang and other changwat centers including Krabi and Phangnga.

Outline of the two major industrial estates are as follows:

	Surat Thani Industrial Estate	Phuket Airport Industrial Estate and Export Processing Zone
Location	Phun Phin Highway Junction	Immediate North of Phuket Airport
Gross Land Area (ha)	190	100
Net Factory Area (ha)	125	65
Number of Employees (persons)	9,900	8,900
Value of Annual Output (million ฿)	8,600	5,000
Candidate Types of Industries	Resource-based Palmoil refinery Rubber processing Other processing Regional market-based Food processing Construction materials Furniture & Fixture Machinery, tool Other goods Domestic/foreign market-based Electric machines, appliances and equipment Garments Other goods	Electric appliances and components Electronics appliances and parts Industries related to tourism

PRELIMINARY COST ESTIMATES:

1) Surat Thani Industrial Estate 331 million baht

2) Phuket Industrial Estate and Export Processing Zone 453 million baht

(Cost of proposed projects are described in 1983 prices in this report)

CONDITIONS FOR IMPLEMENTATION:

The following measures are recommended:

	National Measures	Local Measures
Industrial Area development	• Major infrastructure development	• Establishment of Industrial Development Corporation • Strengthening of urban service functions
	• Industrial estate development	
Investment	• Improved incentives for investment in nonmetropolitan region • Designation of Industrial Promotion Zone	
	• Establishment of Industrial Promotion Centers in Surat Thani and Phuket	
Productivity improvement	• R&D center for application and consultation of new technologies	• Establishment of local technology/vocational training centers • Encouragement of JPPCC activities
	• Expanded long-term/low interest credit	

5.5.2 East-West Link Development

OBJECTIVES:

East-West Link is planned to connect Phuket on the Andaman Sea Coast with Surat Thani on the Gulf of Thailand coast (1) to stimulate and support the development of the Upper South as well as (2) to provide an inland transportation linkage to Phuket Deep Seaport, another gateway to the western situated countries, directly from Bangkok/Other regions. East-West Road Link which is to be developed based on the road network improved under the Fifth Five-Year Plan serves for the first objective, and East-West Rail Link which is to be extended from the existing Khiri Ratthanikhom Spur Line serves for the second objective, in addition to facilitating transportation of cargoes and passengers between the Upper South and Bangkok/Other regions.

TARGETS:

East-West Road Link is planned to be a primary highway with two lanes. Total length reaches 224 kilometers; 88.3 kilometers for new construction and 135.7 kilometers for partial improvement. Major sections for new construction consist of (1) Surat Thani Bypass-Airport-Phanom Section which is planned to avoid hilly/mountainous terrain and (2) Phuket New Bridge Section which is planned to take over the function of the existing Sarasin Bridge and attain shorter travelling distance.

East-West Rail Link is developed by extending the existing Khiri Ratthanikhom Spur Line. Total length reaches 201 kilometers; 170 for new construction and 31 kilometers for improvement of the existing line. This rail link runs mostly in parallel with the road link and terminates at Phuket Deep Seaport.

Traffic volume in the year 2000 is estimated at 6000 vehicles per day in terms of Passenger Car Unit (PCU) for the road link, and nine freight trains and three passenger trains on daily basis for the rail link.

PHASING:

Phuket New Bridge which is to be used for both road and railway is the critical section for determining the development schedule of East-West Link. The bridge is scheduled to be constructed in 1990/1991. Most parts of the road link are scheduled to be completed before the completion of the bridge, the opening year of the whole link being

1993. Most parts of the rail link are scheduled to start construction after the completion of the bridge, the opening year being 1995.

PROJECT COST:

Project cost of East-West Road Link with two lanes is estimated at 1,382 million baht and that of East-West Rail Link is estimated at 2,733 million baht including 1,291 million baht for rolling stocks. Construction cost of Phuket New Bridge is estimated at 440 million baht of which 66 percent is allocated to road and 34 percent to railway in proportion to the relative share of bridge surface occupied by each mode.

PRELIMINARY EVALUATION:

Based on the estimated traffic demand, benefit expected to be generated from the project is estimated with reference to a period of 25 years after the completion of East-West Link. Benefits taken into account are:

- Energy saving through the expected diversion of traffic from road to railway;

- Saving on Vehicle Operating Cost (VOC) through the shortened road distance and the improved terrain; and

- Saving on VOC producted by the improved travelling speed of vehicle through the expected shift of traffic from road to railway.

The economic internal rate of return is calculated at 18 percent, the net present value at 1,187.1 million baht (discount rate of 12 percent) and the benefit cost ratio at 1.7.

This project is considered to be worthy of further detailed studies.

CONDITIONS FOR IMPLEMENTABILITY:

Though East-West Road Link is composed of several road sections, this project should be considered as one package to cover the whole length. Sequential development/improvement of each section is very important, taking account of the functions required for the project. Budgetary constraint is the most serious problem for implementing East-West Rail Link. Considering a substantial benefit expected from the viewpoint of the national economy, every effort is necessary to relieve this constraint by reviewing the roles of the government and the State Railway of Thailand (SRT) in

the allocation of investment cost and the degree of discretion bestowed to SRT for attaining its more effective mangement and operation. Our financial analysis suggests that the East-West Rail Link should be financially feasible at a financial rate of return being 12 percent on the conditions that SRT bears and returns the maintenance and operation cost plus the cost of rolling stock procurement only, whereas the project will hardly be feasible at a financial rate of return being four percent with no such conditions at all.

5.5.3 Khanom Deep Seaport

OBJECTIVES:

The objectives of Khanom Deep Seaport are:

1) To retrench relay transportation cost of primary products of the subregion to Bangkok (650 kilometers) and Songkhla (300 kilometers) for realizing more competitive prices in the international market;

2) To facilitate the export of manufactured products from inland industrial estates without recourse to transshipment to Bangkok/Songkhla, thus enhancing the possibility of relocating and attracting industries from Bangkok to the Upper South; and

3) To prepare the space for the integrated development of port facilities and industrial sites for large scale industrial expansion in the long run.

TARGETS:

Cargo handling volume is estimated at 823,300 tons in the year 2000. Major cargoes expected to be handled are 379,000 tons of rubber, 200,000 tons of gypsum and 244,300 tons of manufactured and miscellaneous products. Four berths are necessary for exporting these cargoes by ocean going vessels of 15,000 dead weight tons which are usually operated between Bangkok and Singapore. South Khanom is selected to be the port site because of easy access to international shipping route, maneuverability of vessels, availability of surrounding space to meet long-term expansion and little excessive cost for construction and maintenance.

PHASING:

Songkhla and Phuket Deep Seaports are scheduled to be completed by the end of the Fifth Five-Year Plan period. The first phase construction of this port with two berths should follow the completion of these ports so as to attain the above mentioned objectives 1) and 2) as early as possible. The second phase construction will be synchronized to the timing when East-West Link is completed.

COST:

Project cost of Khanon Deep Seaport is estimated at 1,020 million baht for the full-scale development. The cost of channel and basin dredging amounts only to 87.5 million baht owing to the short distance of channel (2.4 kilometers) and deep natural water level (-6 meters - 10 meters).

EXPECTED BENEFIT:

The effects of port development appear and spread in many forms compositely including reduction in transportation cost, increases in employment opportunities, increasing income and regional and national prosperity. "Direct economic benefits" in terms of retrenchment of transportation cost will be reduced to some extent after the completion of Songkhla Deep Seaport. The economic internal rate of return is calculated at 12 percent on the basis only of this direct economic benefits. "Regional economic benefits" in terms of enhancement of regional proserity, however, will remain substantive, especially in case of the integrated development of port and industries, though these long-term benefits are difficult to be quantified.

CONDITIONS FOR IMPLEMENTABILITY:

From the engineering viewpoint, wave observation and hindcasting as well as field survey on sedimentation should be performed prior to any further studies because these phenomena greatly influence the project cost. From the managerial viewpoint, it would be better for a unitary public body to assume the responsibility for construction, maintenance and operation, especially for the integration of port and industrial development.

5.5.4 Oil Refinery Development

OBJECTIVES:

1) For southern regional development, to cope with increasing petroleum products demand within the region and to ease the current problem of relative petroleum prices in the South being disadvantageous over those in Bangkok. This problem would otherwise be increasingly serious in the way of regional industrialization.

2) For national development, to help decentralization of refinery facilities as well as industries in the Bangkok Metropolitan Region thereby maximizing the effect of petroleum import substitution through reduced transport costs of both crude and products of petroleum.

TARGETS:

To produce and distribute, in the South, 60,000 barrels per calendar day of oil products in total and in correspondence to the regional demand pattern of petroleum products in future. A new oil refinery with hydrocracker is thus to be set up with its planned capacity of 67,000 barrels per stream day at North Krabi.

COMPONENTS AND PHASING:

The oil production/distribution system comprises of three components; the crude procurement component, the refinery component and the distribution component including a product pipeline between North Krabi at the Andeman Seaboard and South Khanom at the coast of the Gulf of Thailand.

The three components are recommended to be in operation in 1995. Prior to the development of these components, it is useful to construct a dead crude/product stockyard with necessary marine facilities as a first step to this development.

PRELIMINARY COST ESTIMATES:

TOTAL CAPITAL REQUIREMENT FOR KRABI REFINERY PROJECT

Unit: Million baht

	Total	Public *1	Private
Total Capital Requirement	15,012.1	3,039.8	11,972.3
Total Fixed Cost	12,896.1	2,936.6	9,959.5
Base Total Requirement	11,336.7	2,579.2	8,757.5
Base Refinery Portion	10,037.2	1,279.7	8,757.5
Land Acquisition	1,320.2	168.3	1,151.9
Refinery Cost	8,303.0	1,058.6	7,244.4
Physical Contingencies *2	414.0	52.8	361.2
Pipeline *3	1,299.5	1,299.5	–
Inerest During Construction	1,559.4	357.3	1,202.1
Initial Working Capital *4	2,116.0	103.2	2,012.8

Source: The Team

Notes: *1 Public share is assumed to be 100 percent for pipeline and 12.75 percent of the rest.
*2 Five percent of refinery cost.
*3 Includes land acquisition and physical contingencies
*4 1.3 times as much as the total cost of operation.

EXPECTED BENEFITS:

In correspondence to the objectives, the benefits to be generated from this project is measured in terms of the effect of import substitution. This project will yield an Economic Rate of Return of 24 percent compared to an ERR of seven percent to be yielded from an alternative refinery which is assumed to be set up in Bangkok Region to meet the petroleum products demand of the South.

CONDITIONS FOR IMPLEMENTATION:

1) Actualization of the petrtoleum products demand in the South to reach 65,000 barrels per day in the year 2000 as forecast, in parallel with the national total demand expansion.

2) The escalation of international crude oil price to be at an annual rate of 1.6 percent and over during the 1990s after the price reaches the level of 33.00 US dollars per bar-

rel in 1990 (at 1983 prices), and the average product/crude ratio to stay at a level of at least 1.12 throughout the project life period for viability of the project.

3) Goverment policies and administrative guidances to encourage the petroleum products of the proposed refinery to penetrate into the current product distribution/marketing channels.

4) Public investment in crucial parts, including (1) the pipeline development (100 percent participation proposed), (2) the stock financing capital (51 percent participation proposed in the stock financing capital which is assumed at 25 percent of the total fixed cost subtracting the pipeline cost) and possibily the land acquisition cost.

5) An enormous increase in diesel oil import both in volume and value will warrant this project further. Even with the government efforts including pricing policy to rectify the imbalanced structure of petroleum demand/supply, the large possibility exists still for this to prevail considering the future Far East petroleum market.

5.5.5 Urban Development

OBJECTIVES:

1) To strengthen urban service functions of Phuket and Surat Thani for the integration, industrialization and internationalization of the economy and society of the Upper South, thereby responding to the issue of decentralization of Bangkok.

2) To reinforce the physical structure and the institutional/financial mechanism to support the growth of Phuket/Surat Thani Cities and to intensify urban-rural interactions within the Upper South.

TARGETS:

1) To develop Phuket, with 150,000 urban population in the year 2000, as an international city specialized into business, trade, tourism and technology development by making full use of its location being the single entrance of Thailand to the Andaman Seaboard.

2) To develop Surat Thani, with 170,000 urban population including Phun Phin in the year 2000, as an industrial and distribution city by making full use of (1) its location being at the midpoint between Bangkok and the South, and (2) great potential of its

vast and fertile hinterland.

COMPONENTS AND PHASING:

The following actions are to be taken:

First Phase (1987 to 91)	1) To remove existing bottlenecks and defficiency of urban infrastructures, water supply and drainage, in particular 2) To secure sites and facilities for the expansion of industrial and other economic activities 3) To expand local revenue source and assess further institutional/ financial improvement for urban development
Second Phase (1992 to 2000)	1) To expand major urban and industrial infrastructures 2) To improve social infrastructures and environmental conditions 3) To adjust and reinforce the administration for development
Third Phase (Beyond 2000)	1) Efficient operation of facilities 2) Further improvement and expansion of urban economic infrastructures

Proposed physical projects are listed up in Table 5.4.

PRELIMINARY COST ESTIMATES:

Unit: Million baht

	Total	Phuket Urban Project	Surat Thani Urban Project
Total	11,406	6,145	5,261
Public Investment	7,739	4,359	3,380
Private Investment	3,667	1,786	1,881

Source: The Team

Table 5.4 PROJECT COMPONENT IN URBAN SECTOR

SURAT THANI URBAN DEVELOPMENT

(I) FIRST PHASE (- 1991)

A.11 Industrial Estate at Phun Phin Junction

A.12 Infrastructure improvement in Industrial Promotion Zone located between Phun Phin and Surat Thani

A.13 Developments of Tha Thong Port and its Supporting Area

A.14 Distribution Business Center Development

A.15 Technical Training Center

B.11 Water Supply System Development

B.12 Drainage System Development

B.13 Up-Grading Tele-communication Development Program

B.14 Secondary Arterial Streets Development/Improvements

C.11 Housing and Residential Area Developments Including Public Services

C.12 Slum Up-Grading Program

E.11 Inter-Regional Bus Terminal and Local Market Development

(II) SECOND PHASE (1992 - 2000)

A.21 Industrial Estate Expansion

A.22 Industrial Promotion Zones Development

A.23 Tha Thong Port Development

A.24 Distribution Business Center Development (Phase II)

B.21 Urban Infrastructure and Utilities Development

B.22 Arterial Streets Development

B.23 Secondary Arterial Streets Development

C.21 Housing and Residential Area Development Including Public Services

C.22 Slum Up-Grading Program

D.21 Ban Don Port Area River-Frontage Development

D.22 Recreational Zone Development

D.23 Chaiya Historical Parks Development

(III) THIRD PHASE (Beyond 2000)

A.31 Industrial Promotion Zones and Estates Expansion/ Development

A.32 Distribution Business Center Development

A.33 Central Commercial Area Re-Development

A.34 Comprehensive Commercial Sub-center Developments

B.31 Secondary Arterial and Lower Order Streets Improvements

B.32 Urban Utilities Developments

C.31 Housing and Residential Area Development Including Public Services

D.31 Promotion of Urban Beautification Program and its Relavant Facilities Development

E.31 Railway Station Plaza Developments

PHUKET URBAN DEVELOPMENT

(I) FIRST PHASE (- 1991)

A.11 Deep Seaport Supporting Area Development

A.12 Industrial Promotion Zone Infrastructure Development

A.13 Industrial Complex Development for Small/Medium Scale Factories

A.14 Goods Distribution Center Development

A.15 Specific Tourism Promotion Zone Development (Patong, Karon and Kata Beaches)

B.11 Water Supply System Development

B.12 Drainage System Development

B.13 Solid Waste Treatment System Development

B.14 Major Arterial Street Development

B.15 Outer Ring Road Development as a Part of Secondary Arterial Streets.

B.16 Improvement Program of Other Secondary Arterial Streets

C.11 Housing and Residential Area Development Including Public Services

C.12 Slum Up-Grading Program

D.11 Central Shopping Zone Environment Improvement (Thalang Road)

D.12 Phuket University or Graduate School Development

E.11 Inter-Regional Busterminal Improvement/Development

(II) SECOND PHASE (1992 - 2000)

A.21 Deep Seaport Supporting Area Development

A.22 Industrial Promotion Zone Infrastructure Development

A.23 Industrial Estate Development

A.24 Distribution Business Center Development

A.25 Sub-Center Development

B.21 Drainage System Development

B.22 Secondary Arterial Streets Development

C.21 Housing and Residential Area Development Including Public Services

C.22 Slum Up-Grading Program

D.21 Phuket Medical Center Development

D.22 International Conference Hall Development

E.21 Railway Station Plaza Development

(III) THIRD PHASE (Beyond 2000)

A.31 Industrial and Tourism Promotion Zones and Industrial Estates Expansion/ Development

A.32 Central Business District Re-development

B.31 Secondary Arterial Street and Lower Order Streets Improvement/Development

B.32 Urban Utilities Development

C.31 Housing and Residential Area Development Including Public Services

D.31 Enrichment of Phuket Medical Center/University or Graduate School/International Conference Hall

D.32 Promotion of Urban Beautification Program and Related Facilities Development

CONDITION FOR IMPREMENTABILITY:

1) Through the maximum utilization of existing local financial system supported by the central government loan at five percent interest rate, municipal financial capacity could be enlarged only to the extent that it meets 23 to 24 percent of the public capital expenditure demand of urban development. The central government will have to bear a considerable financial share either through existing national sector programs or through earmarking a special grant for urban development.

2) Not only municipal but also changwat governments or changwat administrative organizations should full be involved in urban development. It is essential to improve administrative, financial and planning capability of these local governments.

3) For the effective control of urban development, it is very necessary to prepare a sub-changwat wide city plan as being linked with land management regulations and to let the plan institutionalizedór in other words, identify clear administrative and financial responsibilities for plan implementation.

5.5.6 Central Lowland Development

OBJECTIVES:

1) To fully utilize the vast land under low intensity use in the Central Lowland.

2) To mobilize small farmers for oil palm development to the maximum possible extent.

3) To improve productivity and market competitiveness of Thai oil palm.

TARGETS:

Targets for Central Lowland Development are set as follows:

	1985	2000
Area (000 rai)		
Total	240	1,000
Large Scale Estate	120	300
Small Holder	120	700
Yield (ton/rai)		
Average	1.85	2.6
Large Scale Estate	2.2	3.2
Small Holder	1.5	2.3
Production *1 (000 ton)		
Total	444	2,570
Large Scale Estate	264	960
Small Holder	180	1,610

Note: *1 Fresh Fruit Bunch production

COMPONENTS AND PHASING:

The following actions are to be taken:

Component Major Actions	Large-Scale Estate Development	Small Holder Development
Land Management	1. Expansion of government concession area at strategic locations 2. Provision of resettlement area and land title for evicted farmers	1. For small oil palm cultivators, provision of permanent right for cultivation in government land and upgrading of land title in private land
Financial Assistance	1. Provision of BOI priviledge 2. Subsidy for developing social infrastructures in the estate 3. Financial assistance to evicted farmers	1. BAAC and other possible loans for the small oilpalm cultivators with upgraded land title
Research & Development, and Extension Service	1. One percent each of palm oil production value to be collected for R&D and extension especially for developing, applying and extending high yielding varieties 2. Creating local centers of R&D and extension for oilpalm development 3. Encouraging/assisting private R&D activities	

Phasing is as follows:

	Major Actions	Priority Component
Sixth Five-Year Plan Period (1987 - 91)	• Institutional arrangement for land management and financial assistance • Research and Development	• Large-scale estate development
Seventh Five-Year Plan Period (1992 - 96)	• Land management and financial assistance • Extension services	• Small holder development
Toward the 21st Century (1997 -)	• Reorganization of extraction plants to sustain export competitiveness	• Small holder development

PRELIMINARY COST ESTIMATES (1985 - 2000):

Unit: Million baht

	Total	Large-Scale Estate Development	Small Holder Development	R&D and Extension
Total	7,344	1,800	4,032	1,512
Public Investment	2,560	90	958	1,512
Private Investment	4,784	1,710	3,074	—

EXPECTED BENEFITS:

1) Foreign currency saving earnings through import substitution in the short-run and export expansion in the long-run. The benefit from import substitution is promising while that from export expansion should be possible with R&D and other efforts for productivity increase since target palm oil export volume of 500,000 tons in the year 2000 is equivalent to no more than 10 percent of the world trade market at the present.

2) Income increase of small farmers especially through the small holder development. Further study is important and necessary regarding this benefit, for it depends on the relationship among the farmers income level, the conditions of loans to farmers through the program and the affordability of government to bear the cost for providing soft loans.

COORDINATION FOR IMPLEMENTABILITY:

Key to successful implementation, especially of the small holder development, is the coordination among the agencies involved, and R&D and extension at the local level. The agencies to be coordinated include:

For land management, Royal Forestry Department and Department of Land;

For financial assistance, Bank for Agriculture and Agricultural Cooperative, Office of Rubber Replanting Aid Fund (ORRAF) and Board of Investments (incentive); and

For R&D and extension, ORRAF and Horticulture Research Institute.

5.5.7 Water Resource Development

OBJECTIVES:

1) To utilize and control the Tapi and Phum Duang Rivers for hydropower development in the upstream and for irrigation, urban/industrial water supply and mitigation of floods in the down stream.

2) To ensure water supply in long-term for urban, tourism, port and industrial development on the Phuket Island through a consistent schedule to develop a decentralized pattern of water supply system comprising of reservoirs and pipelines in the island.

TARGETS:

1) To generate electric power of about 720 gigawatt-hours per annum by Chiew Larn and Kaeng Krun Dams during the 1990s. This supply will meet 34 percent of power demand in the Upper South as of 2000, or 16 percent of the total demand in the South as of 1996.

2) To mitigate downstream floods of Tapi and Phum Duang Rivers by reducing flood peak of Phum Duang River with Chiew Larn and Kaeng Krung Dams and increase river flow capacity by developing a bypass water way around the crossing of Phum Duang and Tapi Rivers.

3) To irrigate about 55,000 hectares or 344,000 rai of exising and potential paddy area at the down stream by the mid 1990s so as to enable nearly 100 percent rice self-

sufficiency of the Upper South.

4) To expand urban/industrial water supply system to meet the water consumption demand of about 65,000 cubic meters per day in Surat Thani/Phun Phin and 54,000 cubic meters per day in Phuket, both as of the year 2000.

COMPONENTS AND PHASING:

The following actions are to be taken:

	Tapi-Phum Duang River Management			
	Hydropower Development	Flood control	Irrigation	Water supply
Fifth Five-Year Plan Period (1982 - 86)	Chiew Larn Hydropower Plant (240MW)	Flood peak reduction by Chiew Larn Dam	Ongoing small-scale irrigations	Phuket Distribution System of Wat Dam
Sixth Five-Year Plan Period (1987 - 91)	Kaeng Krung Hydropower Plant (68MW)	Bypass Waterway and Diversion Dike at the Tapi-Phum Duang Crossing	Irrigation Phase I by Chiew Larn Dam (14,700 ha)	Phuket Distribution System of new reservoirs. Surat Thani Distribution System Stages 1 & 2
Seventh Five-Year Plan Period (1992 - 96)			Irrigation Phase II by Kaeng Krung Dam (40,325 ha)	Expansion of Phuket Distribution System. Surat Thani Distribution System Stage 3
Toward the 21st Century (1997 -)		Tapi Flood Plain Drainage		

PRELIMINARY COST ESTIMATES:

	Unit: Million baht
Total	4,394
Kaeng Krung Dam	1,914
Bypass Waterway	24
Tapi Flood Plain Drainage	100
Irrigation	1,669
Surat Thani/Phun Phin Water Supply	280
Phuket Water Supply	947

Source: The Team

EXPECTED BENEFITS:

1) Benefit from Tapi-Phum Duang River Management is subject to further study but it is presumed safe to say that the economic benefit of power generation and irrigation from Kaeng Krung Dam is large enough to cover all the costs necessary for power generation, flood control, irrigation and urban/water supply. The project as a whole yields an internal economic return of 18 percent.

2) As to Phuket Water Supply, the benefit is not quantified. Two alternatives of supplying water (1) by the resource on the island alone and (2) by the resource in Phangnga to be transported by pipeline are compared, however, the former alternative is found less costly than the latter by about 46 percent.

CONDITIONS FOR IMPLEMENTABILITY:

1) River management has been conducted by different agencies in rather independent manner. Thus investment decision has been made on the basis of cost-benefit performance with regard to different purposes of different project. It is very much needed, however, to establish a committee or an authority to prepare an integrated river management plan and implement it for the sake of coordinating benefits and costs of different purposes such as power generation, flood control, irrigation and urban/industrial water supply.

2) Especially for flood control and environmental management, two noninvestment measures are of pressing needs:

   A. Preparation of basic data such as those on waterflow, tidal effects and silting performance.

   B Establishment of realistic and effective landuse control zoning to regulate flood plain landuse and urban/industrial expansion from the risk of floods and to protect primary forest.

   C Assessment of possible adverse effects of water management projects such as waterlogging, salination, tidal effects and siltation.

3) Regarding urban/industrial water supply, it is necessary to work out clear division of works among PWA, RID, IEAT, Municipality and Changwat Administrative Organization in cost and revenue sharing for investment, maintenance and operation.

4) Unlike the water supply for Surat Thani, the water supply for Phuket is a high-priced work in any case. It will be necessary to provide approximately five baht per cubic meter of subsidy for domestic water, if the government is to keep the current low water charge at 3.5 baht per cubic meter and 1.5 to 2.0 baht per cubic meter for industrial use so that the water is attractive enough for industrial investors. Preferred industrial water charge is 3.0 baht per cubic meters. The water charge at industrial estate near Bangkok is currently 3.6 baht per cubic meter.

6. PUBLIC INVESTMENT CAPACITY VERSUS REQUIREMENT

The high priority projects proposed in our study will require the total public investment of 24,192 million baht during the 14 year period from 1987 to 2000 (see Table 6.1). It is a key question that whether the government can afford to allocate this amount to the Upper South development.

The cumulative public investments of the country is estimated roughly at 1,974,796 million baht during the period 1987-2000. This estimate is made on the assumption that the ratio of public investment to GDP will be maintained at 8.8 percent as experienced during the period 1977 to 1981. We assumed this for a first-round examination despite that the ongoing Eastern Seaboard and other development projects will tend to work on the ratio to rise and the tax/GDP ratio of Thailand is lower than other Asian developing countries. The GDP is assumed to grow at a rate of 5.5 percent until the year 2000, the rate being projected by the government for the Fifth Five-Year Plan period.

The public investments comprise of those by the central government, the local governments and the state enterprises. They account respectively for 48.9, 9.6 and 41.4 percent of the total on average during the period 1977 to 1981, according to the World Bank Report, Managing Public Resources for Structural Adjustment, 1983.

This cumulative public investment is supposed to cover every public projects ranging from the large-scale national projects such as metropolitan express highway down to the small-scale local project such as improvement of tambon road or primary school building. In order to limit the scope of public investment so as to be compared with the magnitude of our proposed projects which are mostly basic infrastructures of regional or national importance, it is assumed that 357,438 million baht or 18.1 percent of the cumulative public investment is allocated to such regional/national projects. This figure is derived, hypothetically, from the cumulated cost of the projects partly financed by foreign loans in the field of (1) industrial development, (2) exports, imports and tourism promotion, (3) regional urban centers and Bangkok metropolitan rehabilitation, and (4) distribution of infrastructure services, as specified in the Fourth Five-Year Plan.

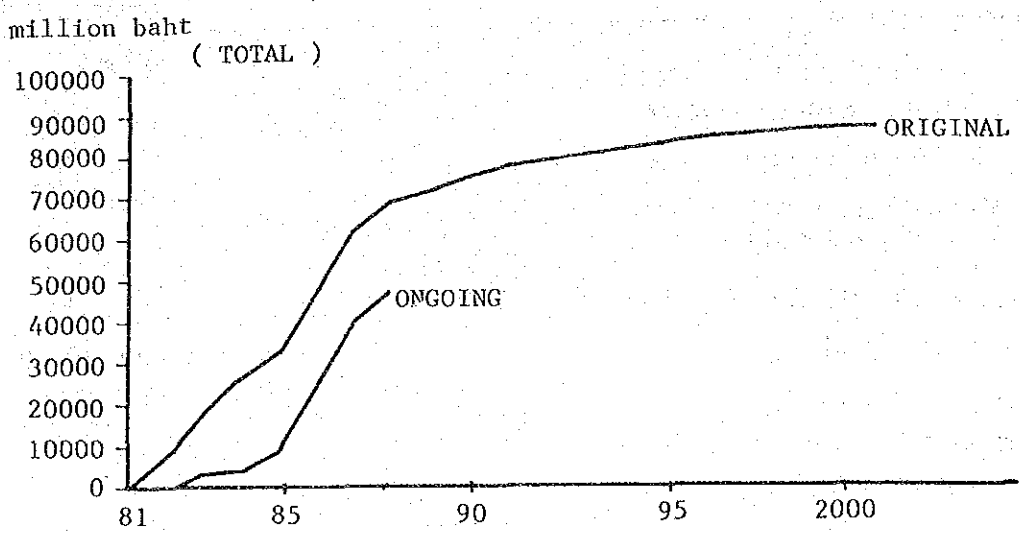
The public investment in Eastern Seaboard is estimated at 35,202 million baht at least, although the ongoing annual investment program is behind the original schedule in the masterplan for a couple of years (see Figure 6.1). This amount, being at 1981 prices, is estimated based on the total program investment cost estimated in NESDB,

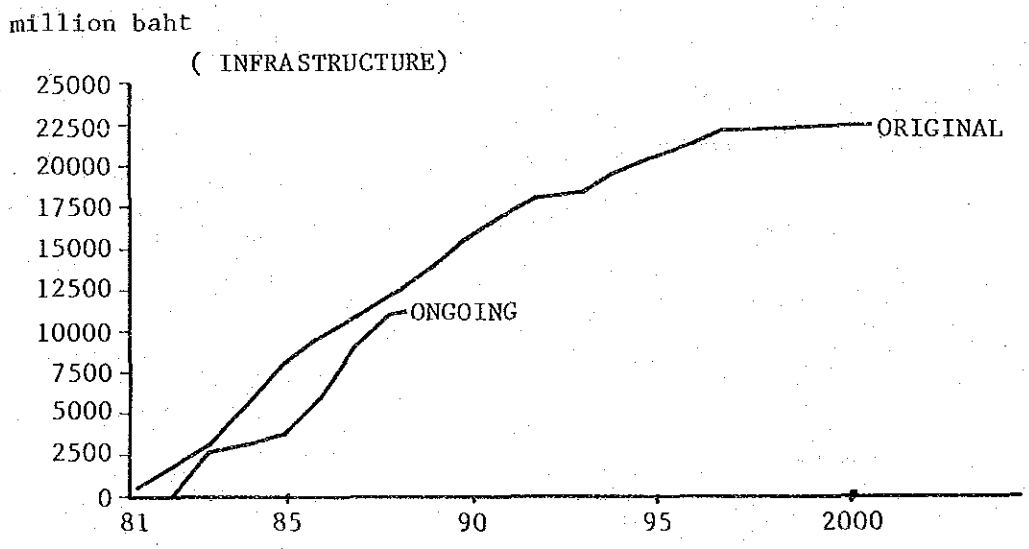
Table 6.1 PUBLIC INVESTMENT REQUIREMENT FOR HIGH PRIORITY PROJECTS

Unit: Million baht

Project	Cost	Remarks
INDUSTRIAL DEVELOPMENT		
1. Surat Thani Industrial Estate	331	
2. Phuket Airport Industrial Estate and Export Processing Zone	453	
EAST-WEST LINK DEVELOPMENT		
3. East-West Link	4,115	Road, railway and rolling stocks to be covered
PORT DEVELOPMENT		
4. Surat Thani International Port	1,020	
OIL REFINERY DEVELOPMENT		
5. Krabi Oil Refinery and Pipeline	3,040	12.75% of total investment for refinery and related facility development and 100% of pipeline to be covered by public funds
URBAN DEVELOPMENT		
6. Phuket Urban Development	4,359	71% to be covered by public funds
7. Surat Thani Urban Development	3,380	64% to be covered by public funds
CENTRAL LOWLAND DEVELOPMENT		
8. Central Lowland Development	2,560	18% of plantation development and 100% of R&D and extension to be covered by public funds
WATER RESOURCE DEVELOPMENT		
9. Tapi-Phum Duang River Management	3,987	Hydropower, flood control, irrigation and urban/industrial water supply to be covered
10. Phuket Water Supply	947	Alternative 1
TOTAL	24,192	

Source: The Team





Note: Both original and ongoing schedules are shown at 1981 prices

Fig. 6.1 INVESTMENT FOR EASTERN SEABOARD DEVELOPMENT: ORIGINAL AND ONGOING SCHEDULES COMPARED

ESB Study, 1982 and on the ratio of public to total investment being 35.6 percent in CIPO, ESB Programme Construction Phase Cash Requirement, Updated 1984. The amount corresponds to 1.8 percent of the total public investment which we estimated for the period 1987 to 2000 or 9.8 percent of the assumed public investment for the regional/national projects during the same period (the percentages are computed on the basis of 1983 prices).

Of the total public investment of 1,974,796 million baht during the period 1987 to 2000, 64,531 million baht or 3.3 percent is estimated to be allocated to the Upper South Subregion based on the following assumptions:

1) Of three sources of the national public investments, namely central government, local governments and state enterprises, the central government investment is allocated to the sectors of agriculture, industries/mining, trasportation/communication, energy, and social/the period 1978 to 1982.

2) The local government investment is allocated to the same sectors based on the assumption that intersectoral allocation of the local government investment is same as that of the central government investment disbursed through specific changwat treasures in 1983.

3) The state enterprise investment is allocated to the same sectors based on its intersectoral allocation planned under the Fifth Five-year Plan (1982-1986).

4) The national public investment thus allocated by sector is assumed to be distributed to the Upper south Subregion in proportion to the regional share of the Upper south in:

   A. agricultural GDP for agricultural investment,
   B. industrial/mining GDP for industrial/mining investment,
   C. whole GDP for transportation/communication,
   D. whole GDP for E. population for social/others
   E. population for social/others

Thus the amount of 64,531 million baht is supposed to be allocated to the Upper South if the present pattern of intersectoral and interregional budget allocation is unchanged in future. In other words, this is a base allocation for the Upper South.

On the other hand, the Upper South will require an amount of 104,905 million baht during the period 1987 to 2000 if it is to attain the macro targets set for this study. The

amount exceeds the base allocation by 40,374 million baht. This amount is hypothetically drived based on the sectoral GDP target and pupulation target for the Upper south development and on the public investment/GDP output ratio by sector and per capita investment on the present national average, using the similar relationships applied to work out intersectoral allocation of national public investment as described in the previous paragraph.

The differential amount is equivalent to about 11 percent of the assumed public investment for the regional/national projects. This percentage is considerably larger than the subregional share in terms of both GDP and population.

Whether national investment can be diverted to the extent of meeting this differential depends on the three external factors which away the development scenario proposed in this study. They are (1) the national economic performance which is partly subject to the international economic environment, (2) the national government readiness and strength to lead development and (3) the course of regional decentralization in terms of both natural and induced.

In an attempt ot measure the impact of these three factors on the proposed development scenario, they are interpreted as national economic growht rate, tax to GDP ratio and percent change in regional allocation of public investment. There are three extreme cases to realize the additional public investment of 40,374 million baht for the Upper South as follows:

1) The national economy grows at an annual rate of 7.6 percent. In this high growth case, scale of the national economy is large enough to generate the additional public investment for the Upper South without either strengthening tax collection effort or additionally diverting the national budget in favor of the Upper south development.

2) The tax to GDP ratio is reised from the present level of 14 percent to 20 percent which is a little bit higher thatn the international level of Asian developing countries at present. In this case of assuming increased relative magnitude of public investment, the government budget is large enough to finance the additional public investment requirement for the Upper South without additionally diverting the national budget even under the national economic growth at 5.5 percent per annum.

3) The investment allocation to the Upper south is reised by 63 percent. In this case of assuming intersive public investment policy for the Upper South, the assumption itself naturally enables the additional public investment for the Upper South without

either strengthening tax collection effort or accelerating the national economic growth, in other words, possible at the cost of other regions.

More plaushible solution would be a policy-mix of 1), 2) and 3). For example, the additional public investment requirement of 40,374 million baht can be met by a national economic growth rate of six percent per annum, a tax to GDP ratio of 18 percent which can be attained partly by spontaneous tax revenue inv = crease through per capita GDP increase and 19 percent increase in the investment allocation for the Upper South.

In this case, the public investment abount of 24,192 million baht required for the projects proposed in our study cound be financed though in rather narrow budgetary circumstances until 1993 or so (See Figure 6.2). If these three conditions will not be realized at all, namely, the national economic growht rate of 5.5 percent per annum, no increase in tax/GDP ratio and no change in regional allocation of public investment, it ould take six years more after the year 2000 in order to accumulate the public investment to reach the aboutn which could be accomplished by the year 2000 through the policy-mix above described. In this case, the public investment required for the projects in our study would far exceed the public funds available for the Upper South during the whole period 1987 to 2000. The only possible and best solution in such an unfavorable case would be to reserve the intensive Upper South development until the beginning of the Seventh Five-Year Plan and to concentrate efforts on fully utilizing and maintaining existing facilities and services as well slowly completing ongoing projects during the Sixth Five-Year Plan period.

We propose to commence the Upper South development under the Sixth Five-Year Plan on the conditions that the national ecomony will grow at a rate more or less six percent on average toward the year 2000, that the central government will strengthen its tax collection effort up to the average level of Asian developing countries and that the Upper South is given priority in regional development so as for it to receive public investment allocation being 20 percent larger than at present. Regarding the regional allocaiton of public investment, however, it is strongly recommended to compile budgetary information on areal basis. Otherwise, not only the Upper South development but any regional development can not be linked with the national financial policy.

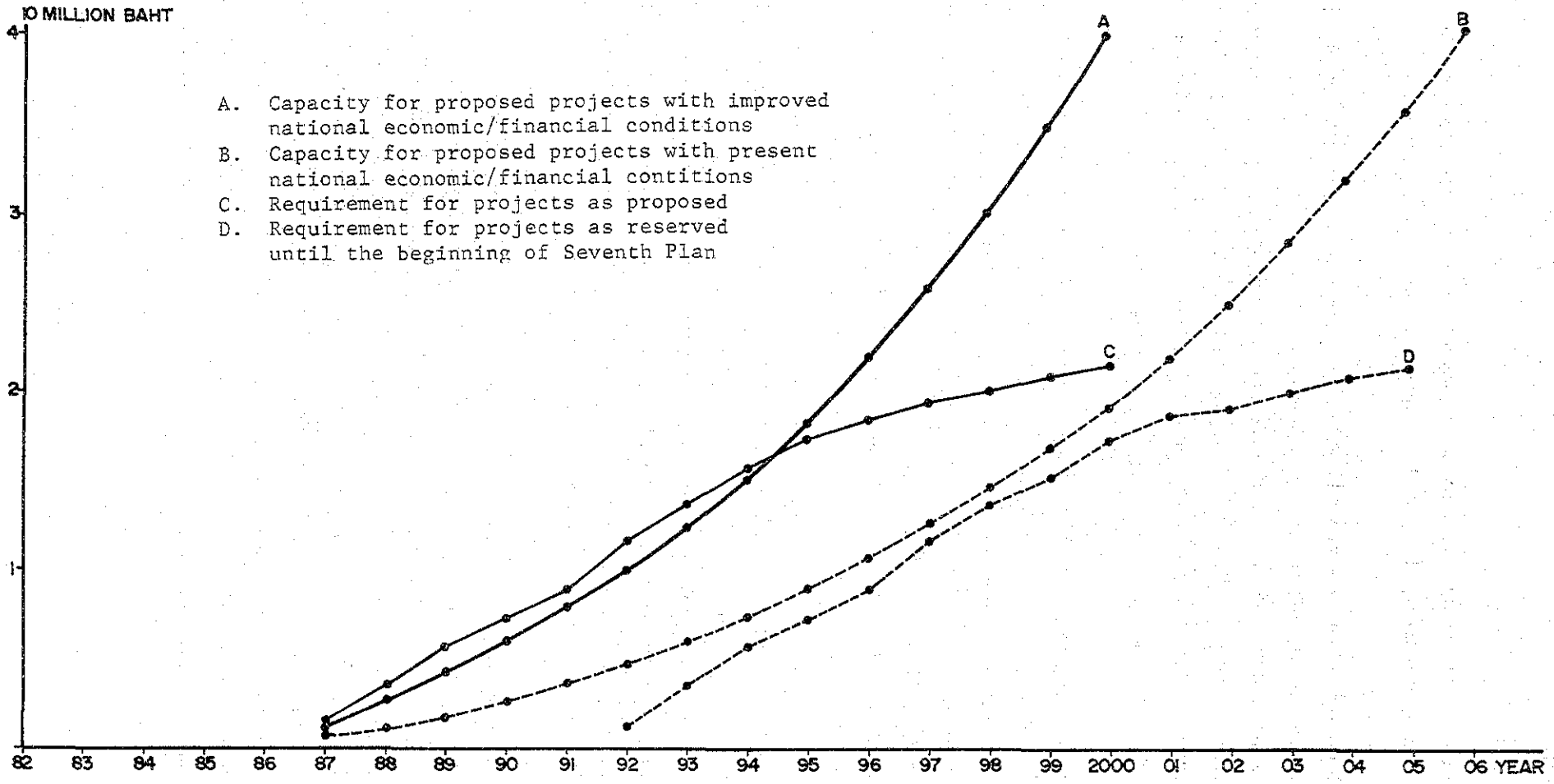


Fig. 6.2 CUMULATIVE PUBLIC INVESTMENT FOR UPPER SOUTH: REQUIREMENT AND CAPACITY COMPARED

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ANNEX I ECONOMY AND FINANCE : TECHNICAL PAPER

1. NATIONAL AND REGIONAL ECONOMY

1.1 NATIONAL ECONOMY

Economy of Thailand has been growing rapidly at an annual average of 7% over the last decade. The economic growth performance of Thailand in the last decade was remarkably high, even among high growth recorded countries in the Southeast Asia. Thailand achieved a per capita income level of $670 (14,000 bahts) in 1980. This high economic growth was achieved by relatively good performance of agricultural sector, and its rich natural resources. The growth of Thai agricultural production was rapid by international standards. This was mainly achieved by increase in newly cultivated agricultural land. Industrial sector and service sector (in wide sense) also achieved high growth rates. In sum, Thailand's economic growth has been based on rapid expansion of all three major sectors of the economy.

With a rapid increase in economic growth rate, Thailand experienced diversification and transformation of economic and social structure, such as agriculture to manufacture and/or certain service sectors. Diversification and transformation also took place within a sector, for instance in the agricultural sector, from traditional rice dependent farming to cash crop farming such as tapioca, maize and rubber. The diversification was caused mostly by change in relative prices without strong policy guidelines, and as the consequence rather small holders changed marginal land from rice fields to new croppings. With its continued heavy reliance on agriculture and large tertiary sector, government intervention has been limited and share of government in total economic activity was rather low in the past compared to other less developed countries.

Another contribution to the high economic growth came from Bangkok Metropolitan Region. Bangkok Metropolitan Region showed the fastest growth, and it has led the rapid national economic growth.

However rapid economic growth in the recent decades there are emerging difficulties which confront with the economic development of Thailand. In addition to the emerging internal problem there are external problems derived from anomalous changes in the world economic situation.

First of all Thailand was heavily affected by the two oil crises and following world wide economic recession which coincide with high interest pressure in the international monetary market. Adjusting to the first oil crisis successfully, Thailand embarked on an ambitious strategy of heavy

industrialization requiring both support and interventions of the government. Because heavy industrialization based on gas exploration is costly, it is indispensable to continue import substitution policies which prolonged since 1960s. Moreover, processing industry which uses the products of heavy industrialization will be affected by the high cost input materials. These make it inevitable for government intervention and increase government supports in the process of industrialization.

Another important problem is that the growth in the agricultural sector is expected to stagnate in the foreseeable future because of low and sluggish productivity and limited land suitable for cultivation.

Third, associated with the high economic growth in Bangkok Metropolitan and Central Region, regional income disparity has been widened. The Fifth Development Plan sets the highest economic growth rate for Bangkok Metropolitan Region as the target rate during the plan period. It is important to mention, however, in spite of its high regional economic growth, the labor productivity (gross regional product per employment) in Bangkok Metropolitan Region started declining since late 1970s. The reason is that the high economic growth of Bangkok Metropolitan Region in the 1970s was achieved by high labor migration from other areas rather than the improvement in productivity. Since this area reached its full capacity to absorb labor, it is most likely that economic growth in Bangkok Metropolitan Region will be stagnant in the future. This may reduce the economic growth of the whole Kingdom.

Increasing number of unemployment is a serious concern, although unemployment ratio is remarkably low at around 1%. Employment and unemployment problems should be tackled with the concept of underemployment or disguised unemployment which accounts nearly 20% of total labor force. Underemployment also caused low labor productivity especially in agricultural sector.

The last but most critical problem is the emerging balance of payments difficulties. The share of current account deficits in gross domestic product was less than 1% before oil crises, whereas the share jumped to 4.4% after the first oil crisis, and then to 7.4% after the second. The large current account deficits occurring after the two oil crises cannot be attributed only to oil price hike and world economic recession. Rapid industrialization strategy and increasing government expenditures embarked in the late 1970s were also the causes of the large balance of payments deficits.

Major macro economic problems which should take into account for concerning development strategy and policy of the study area can be summarized as follows:

1) The economic prospects of Thailand in 1980s seems to be less favorable compared to the past as the consequence of the world economic conditions and emerging economic problems endogenous in the Thai economy.

2) Increasing regional income disparity brought two serious problems. The first is the increasing number of under-employment with less employment opportunities in rural area, that arrests the growth of productivities. The second, concentration of economic activities on Bangkok Metropolitan Region also induces decreasing economic return and lowering the labor productivity in the region.

3) Increasing current account deficits and emerging debt servicing problems caused by deterioration in external conditions and rapid increasing government expenditure will be the serious concern in the near future.

1.2 REGIONAL ECONOMY

1.2.1 Profile in the Southern Region

The South is the smallest of the five regions (Bangkok, Central, North, Northeast, and South) of Thailand in terms of gross regional product, having a total GDP of 79,093.6 mil. bahts at current prices in 1980, which accounted 12% of total GDP in Thailand. Average per capita incomes in the region, however, are higher than the North and the Northeast and almost equal to the average incomes of the whole Kingdom. In the last five years GDP of the Southern Region have increased significantly and real growth rate was 7.8% per annum. Rubber and tin are the two major commodities in the region but fisheries, coconuts and oil palm are also important.

1.2.2 Regional Economic Structure and Recent Growth Trends

Gross regional product of the study area at 1980 is 27,272.6 mil. bahts in current prices, which accounts 4%, while the economy of the Southern Region as a whole shares 12% of the total GDP in Thailand (See Table 1.2), therefore, accounts one third of the Southern Region.

Among the study area, Phangnga has the largest gross provincial production of 11,339 mil. bahts, followed by 8,113 mil. bahts of Surat Thani, 5,560 mil. bahts of Phuket and 2,261 mil. bahts of Krabi respectively in current prices. Real GDP of Phangnga grew very rapidly during the latter half of 1970s, as the result, its share in the study area hiked from 23.0% in 1970 to 33.6% in 1980. This is totally due to the high growth of tin mining production and also rapid rise in tin prices. For the rest of the changwats in the study area, Surat Thani has

Table 1.1 GROSS REGIONAL PRODUCT AT CONSTANT 1972 PRICES - 5 Regions

Unit : Million Bahts

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	Growth Rate 70 - 80 (%)
Whole Kingdom	150,002.0	157,088.0	164,625.0	180,146.0	189,950.0	203,514.0	221,225.0	237,153.0	261,097.0	276,907.0	292,853.0	6.9
1. Agriculture	48,332.0	50,539.0	49,919.0	56,237.0	56,962.0	62,081.0	65,898.0	65,537.0	72,513.0	71,408.0	72,784.0	4.2
2. Manufacturing	23,320.0	25,200.0	27,864.0	31,523.0	34,403.0	36,787.0	42,529.0	48,071.0	52,521.0	57,841.0	60,597.0	10.0
3. Others	78,350.0	81,349.0	86,842.0	92,386.0	98,585.0	104,646.0	112,798.0	123,545.0	136,063.0	147,658.0	159,472.0	7.4
Bangkok Metropolis	41,894.0	43,569.0	46,818.0	51,322.0	55,105.0	59,270.0	65,603.0	72,316.0	79,226.0	90,133.0	96,277.0	8.7
1. Agriculture	418.0	418.0	370.0	373.0	409.0	396.0	458.0	563.0	443.0	553.0	636.0	4.3
2. Manufacturing	11,729.0	12,577.0	13.912.0	16,158.0	17,205.0	18,578.0	22,436.0	25,231.0	27,956.0	30,718.0	31,223.0	10.3
3. Others	29,747.0	30,574.0	32,536.0	34,791.0	37,491.0	40,296.0	42,709.0	46,522.0	50,827.0	58,862.0	64,418.0	8.0
Central	42,412.0	46,294.0	49,859.0	54,006.0	56,252.0	57,923.0	64,505.0	71,302.0	77,635.0	76,898.0	82,658.0	6.9
1. Agriculture	16,188.0	17,239.0	17,863.0	19,658.0	19,986.0	20,729.0	23,324.0	24,236.0	26,568.0	23,054.0	24,109.0	4.1
2. Manufacturing	8,029.0	9,177.0	10,306.0	11,532.0	12,511.0	13,496.0	14,991.0	17,591.0	18,681.0	20,397.0	21,960.0	10.6
3. Others	18,195.0	19,878.0	21,690.0	22,616.0	23,755.0	23,698.0	26,190.0	29,475.0	32,386.0	33,447.0	36,589.0	7.2
North	25,838.0	25,706.0	24,720.0	27,569.0	29,624.0	31,721.0	33,701.0	33,022.0	37,770.0	38,735.0	39,705.0	4.4
1. Agriculture	12,979.0	13,261.0	12,005.0	13,910.0	14,790.0	15,087.0	15,591.0	14,285.0	16,635.0	16,747.0	16,711.0	2.6
2. Manufacturing	1,082.0	1,029.0	1,048.0	1,084.0	1,354.0	1,598.0	1,806.0	1,799.0	1,931.0	2,241.0	2,297.0	7.8
3. Others	11,777.0	11,416.0	11,667.0	12,575.0	13,480.0	15,306.0	16,304.0	16,938.0	19,204.0	19,747.0	20,697.0	5.8
Northeast	24,488.0	24,867.0	25,069.0	28,019.0	29,369.0	33,071.0	33,629.0	33,405.0	37,205.0	40,385.0	43,903.0	6.0
1. Agriculture	12,086.0	12,366.0	11,806.0	13,735.0	13,792.0	16,316.0	16,259.0	15,017.0	17,057.0	18,660.0	19,360.0	4.8
2. Manufacturing	1,635.0	1,567.0	1,684.0	1,821.0	2,246.0	2,066.0	2,175.0	2,244.0	2,544.0	2,988.0	3,339.0	7.4
3. Others	10,767.0	10,934.0	11,579.0	12,463.0	13,331.0	14,689.0	15,195.0	16,144.0	17,604.0	18,737.0	21,204.0	7.0
South	15,370.0	16,652.0	18,159.0	19,230.0	19,600.0	21,529.0	23,787.0	27,108.0	29,261.0	30,756.0	30,310.0	7.0
1. Agriculture	6,661.0	7,255.0	7,875.0	8,361.0	7,985.0	9,553.0	10,266.0	11,436.0	11,810.0	12,394.0	11,968.0	6.0
2. Manufacturing	845.0	850.0	914.0	928.0	1,087.0	1,049.0	1,121.0	1,206.0	1,409.0	1,497.0	1,778.0	7.7
3. Others	7,864.0	8,547.0	9,370.0	9,941.0	10,528.0	10,927.0	12,400.0	14,466.0	16,042.0	16,865.0	16,564.0	7.7

Source : Regional Planning Division, NESDB

Table 1.2 STRUCTURE OF ECONOMY OF STUDY AREA 1/

Unit : %

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Whole Kingdom	100	100	100	100	100	100	100	100	100	100	100
South	10.2	10.6	11.0	10.7	10.3	10.6	10.8	11.4	11.2	11.1	10.3
Study Area	3.1	3.3	3.4	3.2	3.1	2.9	2.8	3.0	3.2	3.3	3.1
	100	100	100	100	100	100	100	100	100	100	100
Surat Thani	47.9	45.1	43.5	41.9	40.6	42.6	40.8	37.1	37.6	35.5	35.8
Phuket	19.4	17.8	17.3	17.4	18.8	19.4	20.4	19.8	18.1	20.1	20.9
Phangnga	23.0	25.3	26.4	26.6	25.9	24.4	26.8	30.1	31.5	34.7	33.6
Krabi	9.7	11.8	12.8	14.1	14.7	13.6	12.0	13.0	12.8	9.7	9.7

Source : NESDB, Gross Provincial Products of Thailand

Note 1/ : Figures adjusted by Regional Planning Division, NESDB and based on Constant 1972 prices.

the share of 35.8%, Phuket has the share of about 20% and Krabi has the share of 9.7% in 1980.

During 1970s the economy of the study area expanded very rapidly at the real growth rate of 7.9% per annum, which is higher than the average of the whole Kingdom and slightly less than the growth rate of Bangkok. Although during the first half of 1970s, GDP growth rate is lower than the national average, but latter half of 1970s growth rate hiked to 11.6%. This rapid increase in GDP can be explained by the following reasons:

1. sharp increase in tin mining production in Phangnga;

2. also sharp increase in manufacturing in Phuket namely tin smelting which directly induced by increase in tin mining;

3. other sectors including services increased even higher than mining and manufacturing sectors.

On the other hand, agriculture has shown relatively slow growth of average 4.2% throughout 1970s. Among all the agricultural sectors rice growing sector showed most sluggish growth while rubber and fisheries production have grown in the modest rate. Therefore Surat Thani which has the largest rice growing field in the study area has shown stagnated performance throughout 1970s. The most distinct feature was the sudden decrease of forestry production in Krabi and Phuket, this is due to the unplanned over cutting of forestry and deforestation.

Since real GDP growth rate indicates real term growth rate which neglects the change in price, therefore, real growth rate hides the change in inter-regional terms of trade and does not reflect real income change. To assess the change in real income level, the conventional approach was taken into account. There is no data available which reflects the cost of living in the study area, it is assumed that regional consumer price index reflects the cost of living index in the study area, then the change of real income level was calculated by nominal GDP growth minus change in consumer price index. As the result, all the changwats in the study area, real income level increased slightly slower than real GDP growth rate during 1970 to 1976, however real income level increased twice as high as real GDP growth rate during 1976 to 1980 (See Table 1.3). Especially, changwat Phangnga grew 46.8% per annum in nominal production and 36.4% per annum in real income base.

As the consequence of these changes, in 1980 per capita GDP in Phangnga reached 65,827 bahts, that is more than four times higher than the level of national average. And per capita GDP of the study area also increased to 24,680 bahts in 1980.

However this high income level did not reflect in the level of economic activities in these area. The capital city of Phangnga

TABLE 1.3 MAJOR INDICATORS FOR ECONOMIC GROWTH IN THE STUDY AREA

Unit : % per annum

	GDP Growth Rate		Real Growth Rate		Change in consumer price index		Change in real income		GDP (Bahts)
	70-76	76-80	70-76	76-80	70-76	76-80	70-76	76-80	Per Capita 1980
Whole Kingdom	16.4	19.3	6.7	7.3	8.8	11.2	7.6	8.1	14,744
South	15.5	21.5	7.6	6.4	9.5	10.4	6.0	11.1	13,745
Study Area	14.0	29.9	5.1	10.4	9.5	10.4	4.5	19.5	24,680
Krabi	18.1	20.5	9.7	6.0	9.5	10.4	8.6	10.1	10,518
Phangnga	14.6	46.8	8.2	17.4	9.5	10.4	4.1	36.4	65,827
Phuket	13.7	28.8	6.0	11.0	9.5	10.4	4.2	18.4	42,245
Surat Thani	12.7	19.2	2.3	6.9	9.5	10.4	3.2	8.8	13,831

Source : NESDB, Gross Provincial Products of Thailand

has the smallest economic activities among the capitals of study area. It seems that most of the profits and income flows out to Bangkok Metropolitan Region and does not reinvest in these areas. Table 1.4 supports the facts of this relationships. Amount of deposits always exceeds the amount of loans in the study area. Deposits-loan ratio is 2.5 in 1980 and 6.1 in 1976.

1.2.3 Sectoral Composition and Recent Growth Trends

Regional economy of the study area is dominated by the primary economic activities such as agriculture and mining which shares 32.5% and 15.0% of the regional GDP respectively in 1980. The two sectors altogether accounted for 50% of the gross regional product in 1980. The major commodities in agricultural sector are rubber and fisheries. The manufacturing share is only 7.7%, however, including mining and manufacturing altogether shares 22.7% in 1980. The sectorial distribution of the GDP is shown in Table 1.5.

Between 1970 and 1975 GDP in the study area grew at the rate of 5.1% per annum and 10.2% per annum during 1976 to 1980. The agricultural sector still contributed most to the growth of GDP. The second contribution to GDP growth came from mining.

In terms of growth rates, during 1970s tertiary sector grew fastest at the rate of 11.8%, and manufacturing, mining, and agricultural grew 8.9%, 7.5%, and 3.9% respectively. It is not surprising that the growth rate of the tertiary sector is relatively high since subsectors such as banking and insurance, services and public administration showed rapid increase at the early stage of development.

Agriculture

Agriculture is the main sector of the regional economy. Small holders dominate the agricultural sector. Rubber is the most important of all, though other crops such as coconuts and oil palm as well as coffee and fruit trees are grown in this area.

In the study area it is estimated that most of agricultural land are used to grow rubber and some of the rubber holdings also grow upland rice for home consumption. It is also likely that the household will grow a small area of some other crops such as coconuts as well as fruits. There does not exist big rubber estate in Thailand, holding of land in the study area is rather small, compared to Malaysia, varies 10 - 20 to 100 - 200 rai with the mode of 30 rai.

In comparison with the rest of the country, the magnitude and the nature of the recent change in the agricultural sector in the South is relatively small. Rice yields have stagnated and the planted area under rice per household have declined.

TABLE 1.4 DEPOSITS AND LOANS OF COMMERCIAL BANKS

Units : Million

		1970	1976	GROWTH RATE 1970 - 1976	1980	GROWTH RATE 1976 - 1980
DEPOSIT :	WHOLE KINGDOM	31,985.1	106,110.8	22.1	214,121.3	19.2
	BANGKOK	22,500.1	65,930.8	19.6	128,909.7	18.2
	SOUTH	1,931.2	6,904.8	23.7	14,366.7	20.1
	STUDY AREA	638.1	1,985.7	20.8	4,297.2	21.3
	KRABI	-	-	-	-	-
	PHANGNGA	-	354.1	-	1,186.8	35.3
	PHUKET	452.5	935.1	12.9	1,603.3	14.4
	SURAT THANI	185.6	696.5	24.7	1,507.1	21.3
LOANS :	WHOLE KINGDOM	28,007.9	95,859.2	22.8	218,809.8	22.9
	BANGKOK	23,711.9	75,296.2	21.2	162,196.8	21.1
	SOUTH	1,018.8	3,500.0	22.8	9,829.3	29.5
	STUDY AREA	240.4	901.5	24.6	2,709.9	31.7
	KRABI	-	-	-	-	-
	PHANGNGA	-	58.1	-	477.7	69.3
	PHUKET	171.5	586.6	22.7	1,480.8	26.0
	SURAT THANI	68.9	256.8	24.5	751.4	30.8
DEPOSIT / LOAN RATIO						
	WHOLE KINGDOM	1.1	1.1		1.0	
	BANGKOK	0.9	0.9		0.8	
	SOUTH	1.9	2.0		1.5	
	STUDY AREA	2.7	2.2		1.6	
	KRABI	-	-		-	
	PHANGNGA	-	6.1		2.5	
	PHUKET	2.6	1.6		1.1	
	SURAT THANI	2.7	2.7		2.0	

TABLE 1.5 SHARE OF REAL GPP BY INDUSTRY

Unit : %

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
SOUTH											
1. AGRICULTURE	43.3	43.6	43.4	43.5	40.7	44.4	43.2	42.2	40.4	40.3	39.5
2. MINING	7.2	7.5	7.3	6.3	6.4	4.7	5.0	5.4	6.2	5.9	6.2
3. MANUFACTURING	5.5	5.1	5.0	4.8	5.5	4.9	4.7	4.4	4.8	4.9	5.9
4. OTHERS	30.6	43.8	44.3	45.4	47.4	46.0	47.1	48.0	48.6	48.9	48.4
STUDY AREA											
1. AGRICULTURE	46.0	41.2	43.0	41.9	43.6	43.2	36.6	34.7	33.7	32.7	32.5
2. MINING	13.9	12.7	12.0	11.2	11.0	8.9	10.9	11.6	12.7	13.4	15.0
3. MANUFACTURING	4.8	4.8	4.7	4.7	5.6	5.4	5.7	5.4	5.5	5.3	7.7
4. OTHERS	35.3	41.3	40.3	42.2	39.8	42.5	46.8	48.3	48.1	48.6	44.8
KRABI											
1. AGRICULTURE	49.8	52.7	56.6	54.3	56.4	54.3	44.6	48.2	52.4	44.8	39.1
2. MINING	2.2	2.8	2.4	2.8	2.5	3.5	5.4	3.9	3.1	6.0	4.5
3. MANUFACTURING	5.3	4.2	4.0	3.7	3.8	4.0	4.7	3.8	3.3	3.2	4.5
4. OTHERS	42.7	40.3	37.0	39.2	37.3	38.2	45.3	44.1	41.2	46.0	51.9
PHANGNGA											
1. AGRICULTURE	32.3	26.9	32.7	35.7	45.5	43.8	31.5	28.6	25.0	25.4	30.3
2. MINING	28.4	22.4	21.8	19.6	20.0	13.4	22.0	24.6	29.1	29.6	32.6
3. MANUFACTURING	1.6	1.4	1.3	1.3	1.4	1.5	1.4	1.2	1.1	1.1	1.0
4. OTHERS	37.7	49.3	44.2	43.4	33.1	41.3	45.1	45.6	44.8	43.9	36.1
PHUKET											
1. AGRICULTURE	11.5	13.1	13.8	13.6	11.8	13.3	15.1	14.4	12.6	13.5	12.6
2. MINING	28.6	28.1	25.6	21.9	18.8	19.1	13.8	12.0	9.7	8.7	10.5
3. MANUFACTURING	9.8	10.5	10.5	10.8	12.0	10.1	11.2	11.8	13.3	12.4	22.4
4. OTHERS	50.1	48.3	50.1	53.7	57.4	57.5	59.9	61.8	64.4	65.4	54.5
SURAT THANI											
1. AGRICULTURE	65.8	57.4	56.8	53.5	52.5	52.8	48.4	45.7	44.7	47.5	44.6
2. MINING	3.5	3.8	3.5	4.3	4.8	3.4	3.7	3.5	3.7	2.3	4.0
3. MANUFACTURING	4.3	4.5	4.6	4.6	6.0	5.9	6.0	5.9	6.2	5.9	6.3
4. OTHERS	26.4	34.3	35.1	37.6	36.7	37.9	41.9	44.9	45.4	44.3	45.1

Meanwhile the area under rubber has been expanding but at a modest rate.

A typical household in this area grow both rubber and other upland crops. In the Southern Region, rice production is more than sufficient for home consumption. However in the study area rice production is far less than self sufficiency.

The holdings have been planting rubber and clearing marginal rice land. In most cases it is probable that household planting of rubber has been using local seedings rather than high yielding varieties. For planting the high yielding varieties of rubber, Office of Rubber Replanting Aid Fund has been subsidizing the replantation cost of the farmers.

Fisheries is also an important sector of economic activities in the study area, though with the decline in the yield of catching the fishes. Nevertheless the fishing sector supports a substantial fish processing part of the sector in the Southern Region.

Apart from the fish processing industry, other manufacturing activities are little developed. Beyond simple processing of rubber into rubber sheets, there is virtually no manufacturing activities except tin refining. However, vast opportunities exist for processing industries using the local resources.

Mining

In 1980, minerals export shared 11% in the total exports of 113,307 million bahts in Thailand. Among all kinds of minerals produced, the most important mineral is tin. Up till now most production has come from offshore dredging and gravel pump mines. Takua Pa, the west coast districts of changwat Phangnga has been the dominant suppliers which accounted for 60% of the national total tin production in 1980. The production trend was increasing gradually in the first half of 1970s and accelerated in latter half of 1970s, the annual growth rate of production reached 7.2% during the 1970s. However, volume and value of export fluctuate from time to time according to the world economic conditions.

Some other minerals are available in the lesser extent and being used in industries, such as lignite from west coast for the Krabi Power Plant, limestone for the cement industry in Thung Song. Apart from the above mentioned minerals, in the Gulf of Thailand and Andaman Sea coast, there are the recently discovered supplies of natural gas which is planned to be used in the Eastern Seaboard.

Manufacturing

The manufacturing sector contributes only 7.7% of gross regional product of the study area. There is no significant manufacturing activities except few resource based industries such as tin

refining, rubber smoking, and fish processing.

There is one tin refining in Thailand which is a joint venture with Shell Company and Thai. All producers of tin have been legally required to sell their output to the Thailand Smelting and Refining Company (Thaisarco) in Phuket since it opened in 1965. But there are illegal mines, the reported figures are likely to understate the actual condition.

Rubber smoking industry is rather small in scale and is scattered in the Southern Region. Some of the rubber smallholders also have rubber smoking processes. There is no further rubber processing activities in this area such as making tires or rubber processed goods.

Fish processing industries are one of the rapidly growing and newly emerging manufacturing industries during 1970s. Fish processing activities are located at the fishing ports and most of the activities are grouping fish and freezing. These resource based industries are still in primary phase as in the industrialization, however, possibilities for further development in processing activities and forward linkage in industrial activities are limited.

1.2.4 Employment and Productivity

The South has labor force totalled 2,475,000 workers in 1980. Of these 99.3% are employed, leaving only 0.7% unemployed. In comparison with the rest of the country, the South has the least labor outmigrations. Because the Southern Region is rather independent of the rest of the country in the sense of geographical location, race and religion. However, it is well known that there exists a huge number of disguised unemployment and inadequate employment in rural areas. "Labor Force Survey" reported that about 20% of employed labor were under utilized in Thailand. Of these who were inadequately utilized, 0.9% were unemployed, 1.8% were under utilized by means of hours of work, and 16.9% were under utilized by means of income level.

It is very striking that the Southern Region has rather low underemployment ratio around 17% while Bangkok Metropolitan Region has the highest underemployment ratio at 40%. This is due to the fact that there are less employment opportunities other than Bangkok Metropolitan Region, and job seekers concentrate on Bangkok.

The minimum wage applied to the South differs changwat to changwat. As from September 1981, the minimum wage rate applicable to unskilled labor was set at 60 bahts/day for Phangnga, Phuket, and Ranong. For the rest of the Southern Regions, the minimum wage rate was lower than 52 bahts/day.

In practice, wages tend to differ from the minimum wage rates. This is due to the availability of the agricultural workers such as rubber tapping, as well as temporary employment in the mining industry. Such employment is seasonal, so actual wages vary in accordance with the seasonally varying demands.

The study area has total labor force of 512,727 personsin 1980, of which 358,000 (70%) work for agriculture, 112,000 (22%) in tertiary sector, 23,000 (4%) in manufacturing and 20,000 (4%) in mining sector (See Table 1.6).

In the study area Surat Thani holds the largest labor which accounted 56% of total employment, followed by 19% of Krabi, 14% of Phangnga and 10% of Phuket.

The labor productivity indicated by GDP per worker differs greatly among sectors and changwats. GDP per worker in the study area grew from 12,849 bahts in 1970 to 17,753 bahts in 1980, while the GDP per worker in the whole Kingdom changed 9,008 bahts to 13,002 bahts at the same period. The labor productivity in the study area is higher than the national average and is close to the level of the central regions which has the second highest productivity following to the Bangkok Metropolitan Region. This high labor productivity in the study area is achieved by the high productivity in mining, and agriculture sectors and to lesser extent by manufacturing sector.

Labor productivities by sector in the study area are shown in Figure 1.1. Labor productivity in mining sector showed the highest of nearly 7,000 bahts. On the other hand, agricultural sector has the lowest productivity among all sectors, although agricultural productivity in this area is twice as high as that of the national average. Figure 1.1 shows the productivity change during 1970s in the study area. Productivity in mining sector jumped to the level of 7,000 bahts in 1980 after declined to 3,000 bahts in 1976. It is interesting to see that mining sector did not absorb employment while this sector has the highest productivity. Nevertheless agriculture sector has the lowest productivity, however, absorbed 125,000 labors which accounts two third of labor force increased in this area during 1970s. The tertialy sector is another major sector which absorbed 60,000 labor force.

The following points can be concluded from the discussions above:

1. Difference in inter-sectoral productivity does not seem to be decreasing.

2. Difference in inter-changwat productivity seems to be increasing.

3. There have been no labor absorption in mining sector which has the highest labor productivity and the major contribution

TABLE 1.6 PRODUCTION, EMPLOYMENT AND PRODUCTIVITY OF THE STUDY AREA

Unit : Million Bahts, Person, Baht

	1970			1976			1980		
	GPP	EMPLOYED	PRODUCTIVITY	GPP.	EMPLOYED	PRODUCTIVITY	GPP.	EMPLOYED	PRODUCTIVITY
STUDY AREA	4,596.0	357,704	12,848.6	6,170.3	405,054	15,233.3	9,102.7	512,727	17,753.5
1. AGRICULTURE	2,114.4	277,090	7,630.7	2,259.1	297,500	7,593.6	2,963.0	358,434	8,266.5
2. MINING	640.4	15,263	41,957.7	671.2	21,383	31,389.4	1,367.4	19,617	69,704.8
3. MANUFACTURING	222.7	12,208	18,242.1	349.8	11,457	30,531.6	701.7	22,914	30,623.2
4. OTHERS	1,618.5	53,143	30,455.6	2,890.2	84,939	34,026.8	4,070.6	111,762	36,422.0
KRABI	448.8	65,704	6,830.6	742.0	76,286	9,726.6	886.2	96,564	9,177.3
1. AGRICULTURE	223.6	57,886	3,862.8	330.7	63,742	5,188.1	346.6	76,798	4,513.1
2. MINING	9.9	108	91,666.7	40.1	591	67,851.1	40.2	542	74,169.7
3. MANUFACTURING	23.6	1,127	20,940.6	35.1	1,627	21,573.4	39.5	3,253	12,142.6
4. OTHERS	191.7	6,583	29,120.5	336.1	12,138	27,689.9	459.9	15,971	28,795.9
PHANGNGA	1,056.7	54,836	19,270.2	1,653.1	57,187	28,906.2	3,056.2	72,389	42,219.1
1. AGRICULTURE	341.3	36,085	9,458.2	520.4	31,394	16,576.4	926.7	37,824	24,500.3
2. MINING	299.9	7,379	40,642.4	364.4	12,075	30,178.1	997.4	11,078	90,034.3
3. MANUFACTURING	16.7	1,968	8,485.8	23.6	1,968	11,991.9	31.3	3,396	9,216.7
4. OTHERS	398.8	9,404	42,407.5	744.7	15,269	48,772.0	1,100.8	20,091	54,790.7
PHUKET	890.1	36,866	24,144.2	1,260.3	44,284	28,459.5	1,905.3	56,056	33,989.2
1. AGRICULTURE	102.1	15,523	6,577.3	190.3	13,739	13,851.1	239.7	16,553	14,480.8
2. MINING	254.4	5,902	43,104.0	173.9	7,074	24,583.0	200.0	6,490	30,816.6
3. MANUFACTURING	87.5	2,774	31,542.9	141.1	2,944	47,928.0	426.4	5,888	72,418.5
4. OTHERS	446.1	12,667	35,217.5	755.0	20,615	36,623.8	1,039.2	27,125	38,311.5
SURAT THANI	2,200.4	200,299	10,985.6	2,514.9	227,297	11,064.4	3,255.0	287,718	11,313.2
1. AGRICULTURE	1,447.4	167,596	8,636.2	1,217.7	188,625	6,455.7	1,450.0	227,259	6,380.4
2. MINING	76.2	11,874	6,417.4	92.8	1,643	56,482.0	129.8	1,507	86,131.4
3. MANUFACTURING	94.9	6,339	14,970.8	150.0	5,189	28,907.3	204.5	10,377	19,707.0
4. OTHERS	581.9	24,430	23,819.1	1,054.4	36,917	28,561.4	1,470.7	48,575	30,276.9

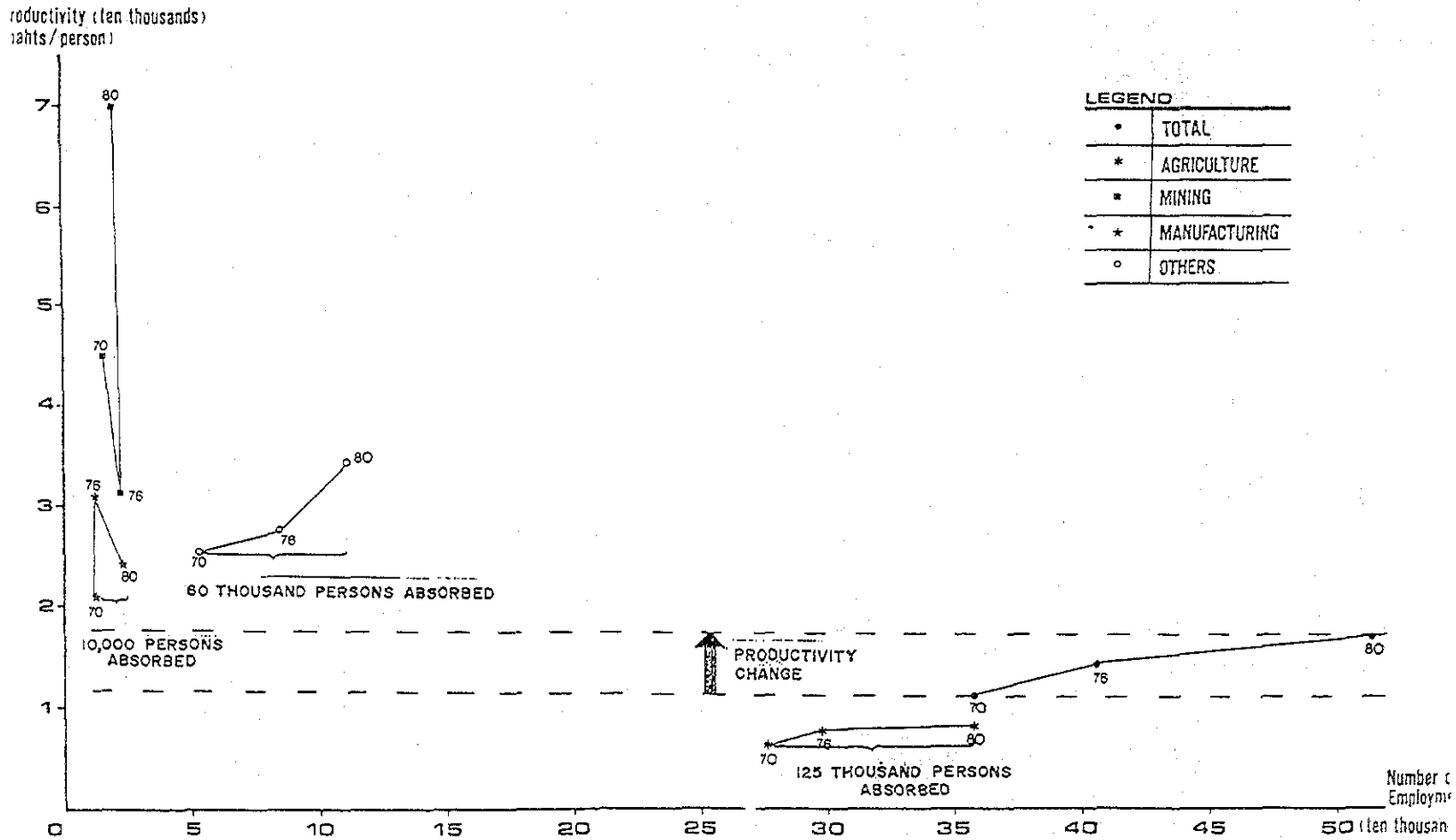
Source : GPP: Gross Provincial Products at 1972 prices, adjusted by Regional Planning Division, NESDB

Employment, NSO, Population Census 1970 & 1980

Employment data for 1978 was estimated by TUSP Team.

FIGURE 1.1 PRODUCTIVITY AND EMPLOYMENT

STUDY AREA



to the economic growth in this area.

4. Agricultural sector in the Surat Thani, which has the lowest productivity among all absorbed most of the labor force.

1.2.5 Exports and International Linkage

In the past decade both import and export value grew very rapidly in Thailand. Nevertheless exports substantially outperformed imports growth in volume terms, the current accounts deficits worsened drastically. This is caused by deterioration in terms of trade since oil crisis. During the 1970s exports of goods recorded 11.7% per annum average volume increase, higher than GDP growth rate of 7.0% and import growth of 5.8%. Thailand's impressive export growth performance is reflected in the fact that there exists continuous stable and strong demand for traditional exports and in addition Thailand penetrated into new market with resource based primary processed exporting goods. Among all, tapioca, rubber sheets, tin ingots and fish products showed substantial increase during the last decade. In 1980, rubber is the third largest exporting commodities which accounted 12,350 mil. bahts, followed by tin 11,347 mil. bahts and shrimp 2,169 mil. bahts respectively.

The South is the major region which produces tin, rubber and fisheries. There is only one tin refinery in the whole Kingdom located in Phuket where all the shipping to foreign countries are taking place. Also most of the tin mines concentrated in Phangnga and other upper South Region. In 1980, more than 40% of tin was exported to Netherland, 38% to U.S.A. and 8% to Japan.

Except the minor production in Eastern Region, most of the rubber production has been taking place in the Southern Region 60% out of total production are produced in the study area. Two third of rubber exports destined to Japan, 10% destined to Singapore and U.S.A. respectively.

The Southern Region has the longest coastal line and fishing fields in the Indo-China Sea to the Andaman Sea. Amount of fishery catching grew very rapidly with improving fish catching technology and also strong demand in Japan. Two third of shrimp exported to Japan, 12% to U.S.A., 10% to Hong Kong.

Shares of above three export commodities in total exports was 12% in 1975, increased to 19% in 1980. According to the lack of the data it is assumed that exports of the Southern Region is equal to the amount of above three commodities exports. Exports to GDP ratio of Southern Region increased 16.8% in 1975 (which is less than the national average of 19%) to 32% in 1980 (which is higher than the national average of 22%). These figures suggest international linkage of the Southern Region has been increasing during the late 1970s, and international linkage of the South is far higher than that of other regions in the country.

The major commodities produced in the study area are exportable goods, such as tin, rubber, fisheries productions destined to foreign countries. Because of the absence of export data in the study area, the discussion is based on export figure of whole Kingdom. Two leading export commodities in the study area are rubber and tin which accounted 10,841 mil. bahts and 9,115 mil. bahts respectively. In terms of volume, rubber export grew 5.5% during 1970s while tin export grew 3.3%. However export prices of rubber and tin have increased four-fold during 1970,in value term rubber and tin exports grew 15 to 18% per annum. In other words relative price increase was the major contribution of the rapid increase in these exporting goods.

Since the most of the commodity production in the study area are exported to the industrialized countries, the economy of the study area are heavily affected by the world economic conditions. The price elasticities of these commodities are known to be low, weak demand in the world market resulted sharp price falls in slow growth in production.

In addition to the heavy dependence upon export oriented primary products, the Southern Region has a relative lack of integration within the national economy. Those factors resulted production trends in the study area are relatively independent of their performance at the national level.

The above analysis and discussion can be summarized as followings:

1. Although the Southern Region and the study area have common characteristics in economic structure, the economy of the four changwats in the study area differs tremendously and not homogeneous.

2. Sustainable growth in agricultural sector is fundamental to economic development of the study area, but maximum growth rate of agricultural sector will be less than 5%, therefore agricultural sector itself cannot be the leading growth sector of the economy.

3. Low productivity of agricultural sector caused by under-employment situation will be improved by migration of surplus labor from agricultural sector to other sectors especialy manufacturing. Therefore it is desired that increase in productivity in the agricultural sector by out-migrating labor forces and in manufacturing sector increase the level of production with absorbing labors from agricultural sector.

4. According to the present economic situation, industrialization process should start with resource based industries which the study area has comparative advantages.

5. These industries such as rubber and food processing industries will contribute to export and foreign exchange earnings. Also demand for agro-based industries is more stable than that of minerals.

6. There are already existing close trade relationships through the export of primary processed commodities. There exists the possibilities that the foreign private enterprises seek the investment opportunities to attain high quality and stable supplies. That will help growing internationally competitive business without direct intervention of the government. This also contributes to improve balance of payments through increasing exports and decreasing government expenditures.

7. Increasing investment opportunities in manufacturing sector in the study area changes money flow pattern and decelerate the leakage of financial resources and incomes.

2. GOVERNMENT FINANCE AND REGIONAL DEVELOPMENT

2.1 STRUCTURE OF PUBLIC FINANCE IN THAILAND

The consolidated public sector in Thailand can be divided into three categories :

1. The central government comprises the ministries and agencies which cover national budget to finance "The Five Year Development Plans".

2. The local government consists of the Bangkok Metropolitan Administration, Pattaya City, 72 changwats Administrations and 834 Municipalities and Sanitary Districts under the authorities of the Ministry of Interior, but each with separate budgets.

3. The state enterprises consist of 76 individual public and publicly owned and managed firms, each with its own budgetary autonomy.

Fiscal year in Thailand starts Oct. 1st of the previous year and ends Sep. 30th of the year in question (For example FY 83 starts Oct. 1st of 1982 and ends Sep. 30th of 83). The preparation of the central government's budget is regulated by the Budgetary Procedure Act (BE 2502). The organizations involve in the budgeting process are various offices of the Ministry of Finance (MOF), the National Economic and Social Development Board (NESDB), the Bureau of the Budget (BOB), and the Bank of Thailand (BOT).

The main functions of MOF are the setting/executing of policies concerning taxation and public debt management in cooperation with the BOT in case of domestic debt, and with the Foreign Loan Sub-Committee of NESDB in case of foreign debt under the auspices of Council of Ministers.

The responsibilities for allocation of funds are spread among the various ministries and organizations including BOB, Foreign Loan Sub-Committee of NESDB, which attached to the Prime Minister's Office. The BOB is responsible only for budgetary allocations, it is not involved neither in the revenue side nor foreign loans. Allocation of foreign aids are handled by NESDB. And the control of foreign loans taken by the central government and government's organizations including local governments and public enterprises is handled by Foreign Loans Sub-Committee of NESDB and the Fiscal Policy Office of the MOF.

2.1.1 Structure of Government Revenues

The structure of fiscal system in Thailand is highly centralized. Most of the taxes are collected by the central government and allocated to ministries located in Bangkok through budgetary system. In every province, there are one or more central

government tax offices and all revenues flow into its budgets. Then central government allocates budgets to each ministry which appropriates money into the sectors and regions according to its policies and programs. The local governments have very little taxational power and depend almost entirely on transfers from central government's grants.

There are six major categories of public revenues of the general government which are income taxes, business and excise taxes, trade taxes, other taxes, nontax revenue, and local government revenue. First three categories of tax revenues amount nearly 80% of total revenue and the local government revenue remains only 6% as shown in Table 2.1.

In 1982, total public revenues were 145,980 million bahts, of which 20% originated from income taxes, 40% from business and excise taxes, 18% from trade taxes. Personal income tax was accounted only 9% of total revenue which is very low even among the developing countries.

As can be seen from Table 2.1 , several features of the public revenues in Thailand are followings :

1. Indirect taxes are still the major sources of public revenues.

2. Income taxes especially corporate income taxes had increased but still plays a minor role.

3. The proportion of import tax to total revenues declined substantially, on the other hand business tax to total revenues increased.

4. Rice premium (or export tax) has fallen substantially and it is no longer the source of public revenues.

5. Excise tax increased mainly due to the increase in fuel and other energy consumption.

2.1.2 Structure of Government Expenditures

During 1977-81, 25% of total budget are classified into capital account and 75% classified into recurrent expenditures. In this period average public expenditures amounted to 177.7 billion bahts, of which expenditures on defences, general administration and other services amounted to 44%, followed by transport and communication (18%), energy (16%) and agriculture and industry (12.9%) (See Table 2.2).

It should be noted that the role of the government sector in the whole economy is rather small compared to other developing countries. The shares of total revenues to GDP in the last 10 years stays around 13%, whereas the shares of total expenditures to GDP ranges 18 to 20%.

Table 2.1 Structure of General Government Revenue

Unit: Million Bahts, %

	Fiscal Years 1970	1982
Income Taxes	11	20
Personal	(7)	(9)
Corporate	(5)	(11)
Business and Excise Taxes	32	40
Trade Taxes	32	18
Imports	(27)	(17)
Exports	(5)	(1)
Other Taxes	10	6
Nontax Revenue	9	9
Total Central Government Revenue	94	94
Local Government Revenue	6	6
Total General Government Revenue	100	100
	23,670 mil. ฿	145,980 mil. ฿

Source: Bank of Thailand

Table 2.2 Structure of Public Expenditure

Unit: Million Bahts, %

	Fiscal Years 1977	1978	1979	1980	1981	1982	Average 77-81
Consolidated Public Expenditure In current prices (bil. ฿)	107.0	136.1	158.0	223.2	264.4	315.2	177.7
Distribution by Object (in %)							
Recurrent expenditure	74.7	73.7	76.8	72.9	76.2	77.9	74.9
Capital expenditure	25.3	26.3	23.2	27.1	23.8	22.1	25.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Distribution by Function (in %)							
Defense and administration	21.3	22.7	23.7	21.0	19.9	19.2	21.7
Agriculture	6.5	6.0	6.2	5.5	5.4	5.3	5.9
Industry and mining	8.5	7.2	6.7	6.3	6.5	6.4	7.0
Transport and communication	17.5	17.5	18.6	18.8	17.5	17.6	18.0
Energy	12.5	14.4	12.6	18.9	22.1	22.4	16.1
Education	6.2	5.8	5.9	5.2	9.7	9.6	6.6
Health	2.5	2.3	2.4	2.0	1.8	1.8	2.2
Other (include debt services)	25.0	24.2	23.9	22.4	17.0	17.5	22.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Bank of Thailand

2.1.3 Structure of Local Government Finance

Total local government (Bangkok, Pattaya, CAO, Municipalities and Sanitary Districts) expenditure amounts only 7.4% of the total central government expenditures during Fourth Five Year Plan, that indicates the role of the local government is insignificant. Moreover among the local governments Bangkok Metropolis alone shares nearly 50% of total local government budgets, and CAO (comprising 72 changwats) plays minor role which accounts 20% of total local government budget during the Fourth Five Year Plan (See Table 2.3).

Local governments do not have their own tax revenues, most of their tax levied on top of the central government excise taxes. Another main public resources come from the transfer from central government.

Aside from national development plan, "Changwat Development Plans" started since 1979. The outline of Changwat Development Plans is summarized as follows. When a changwat economic and social development plan is approved by the Central Committee for Provincial Development (CCPD), BOB allocates the budget to meet the plan for the particular province. The appropriation of the budget in support of provincial development plans is divided into two categories, which are the regular budget and grant-in-aid-budget. To implement provincial economic and social development plans, in addition to the use of regular budget, grant-in-aid-budget is taken into consideration.

However up to the present, activities under Changwat Development Plan are limited to the area of health and social welfare and there are no substantial activities for economic development.

2.2 TRENDS IN PUBLIC FINANCE AND FINANCING REGIONAL DEVELOPMENT

2.2.1 Overall Trends in Public Finance

The role of central government in Thailand has increased rapidly during the last two decades. The public expenditures as a share of GDP rose 13.4% in 1974 to 20% in 1981. On the other hand, the public revenues remained 13 to 14% to the GDP throughout the 1970s. This has given rise to great concern about economic management and debt servicing problems.

From the point of view of longer historical perspective, Thailand has relatively smaller and rather balance budget structure in public sector in 1960s. However after the oil crises, GDP growth slackened and private investment growth slowed down as the result of a decline in investment activities from abroad. The public investment had to be increased to support economy which was in downward trend as a counter cyclical economic policy. Thai Government has also accelerated industrialization policy in the latter half of 1970s.

Table 2.3 Local Government Finance During 4th and 5th Plan

Unit: Million Bahts

	4th Plan	5th Plan
Revenues	25,394	44,383
Subsidies	8,408	14,268
Loans	261	750
Transfers from Reserves	1,125	650
Total Revenues = Expenditures	35,187	67,111
As a Percentage of Central Government Budget	7.4%	6.7%

Source: NESDB

Despite increasing role of the public sector, scant attention has been paid to the planning and managing of public sector budgets. There is no fiscal planning in the past "Five Year Plans" and none of the ministries is responsible for planning and programming of the national budget as consolidated manner. However recently, as a part of government's structural adjustment program which is under the financial support from World Bank, the authorities now begin to develop comprehensive and consistent fiscal planning with the public resource mobilization program.

The deteriorating public sector's balance of budgets in the latter half of the 1970s has been due to the followings :

1. Continuous drop in public savings caused by gradual increase in public consumption without strong efforts for domestic resource mobilization.

2. Steady increase in the public investments during the latter half of 1970s, then substantially higher public investments since 1980.

Gradual increase in the public consumption is a part of reflection of expanding role of public sector in the Thai economy. Public sector in Thai economy has been relatively small compared to that of other developing countries. It is inevitable that consumption for the administrative expenditures gradually increases when the role of public sector has been increasing. Also it should be noted that increase in public consumption throughout the 1970s is not significant, public consumption to GDP ratio was 11.5% in 1970 and 21.1% in 1981. The importance of public resource mobilization should be stressed in accordance with the trend of widening public savings deterioration.

Thus the public sector resource mobilization and public investment policies have been increasing concern for recent years in Thai economy. Increasing public expenditures without matching domestic resource mobilization was the cause of higher external borrowings during the latter half of 1970s to early 1980s. Moreover this heavy external borrowings have been coincident with expansion of Euro-Market and rapidly rising international interest rate resulted heavy burden for external debt services.

There are two ways of financing rapidly increasing public investments which also arouse economic problems.

1. Financing investment through loans from the Bank of Thailand creates increasing money supply and causes higher inflationary pressures.

2. Financing investment through banking system by expanding transfers from private sector will draw out private investment opportunities and results less dynamic economic activities in private sector.

The problem which Thailand now faces is that the public sector's increasing reliance on foreign resources and on the domestic financing system since the latter half of 1970s. Present pattern of financing cannot be continued indefinitely without endangering the external credit-worthiness or without imposing inflationary pressures or lowering economic opportunities in private sectors.

2.2.2 Trends in Public Revenues

The sources to finance public sector expenditures in Thailand are tax revenues, non-tax revenues and government borrowings. Tax revenues including tax on income, consumption and international trades, are main sources of revenues for central and local governments. Non-tax revenues which include service changes and fees, traditionally the most of which came from state enterprises. Importance of foreign and domestic borrowings have been increasing as a source for central government and state enterprises.

Although tax revenue accounted only for 14% of GDP in 1980, it still is the most important sources for central and local governments. The tax/GDP ratio in Thailand increased in the 1960s, from 12% in 1960 to nearly 14% in 1971, and remained around 14% throughout 1970s. The general pattern in developing countries shows that tax/GDP ratio increases rapidly in the early stage of the development, then slows down and remains constant as economic development takes place.

This relationship is verified in Figure 2.1 using cross country data for Asian developing countries in 1981. The asymptotic curve $t = 20.45 \frac{(y - 85)}{(y + 1)}$ in Figure 2.1 shows average pattern of tax/GDP ratio for Asian developing countries in relationship with increasing in per capita GDP (y). In the same manner, the overtime pattern of tax/GDP ratio for Thailand using time series data can be seen in Figure 2.2.

The pattern of tax/GDP ratio for Thailand in overtime draws the asymptotic curve $t = 14.60 \frac{(y - 32.0)}{(y + 1)}$. These figures clearly indicate that tax/GDP ratio for Thailand locate far below the average of Asian developing countries and ultimate taxation ratio to GDP in Thailand is also far below the international average. This suggests that in Thailand tax ratio to GDP (14% at present) will remain unchanged unless tax resource mobilization efforts and reform in taxation systems take place.

Cause of stagnation in tax revenues are followings :

1. Taxes on international trade declined steadily to less than 20% of total public revenues from more than 50% in early 1960s. The decline in tax on international trade was caused by reduction in the reliance on commodity export taxes (especially rice premiums) and reduced average rate of import duties associated with export promotion policies and tax exemptions granted by the Board of Investments.

Figure 2.1 Tax/GDP Ratio In Asian Developing Countries

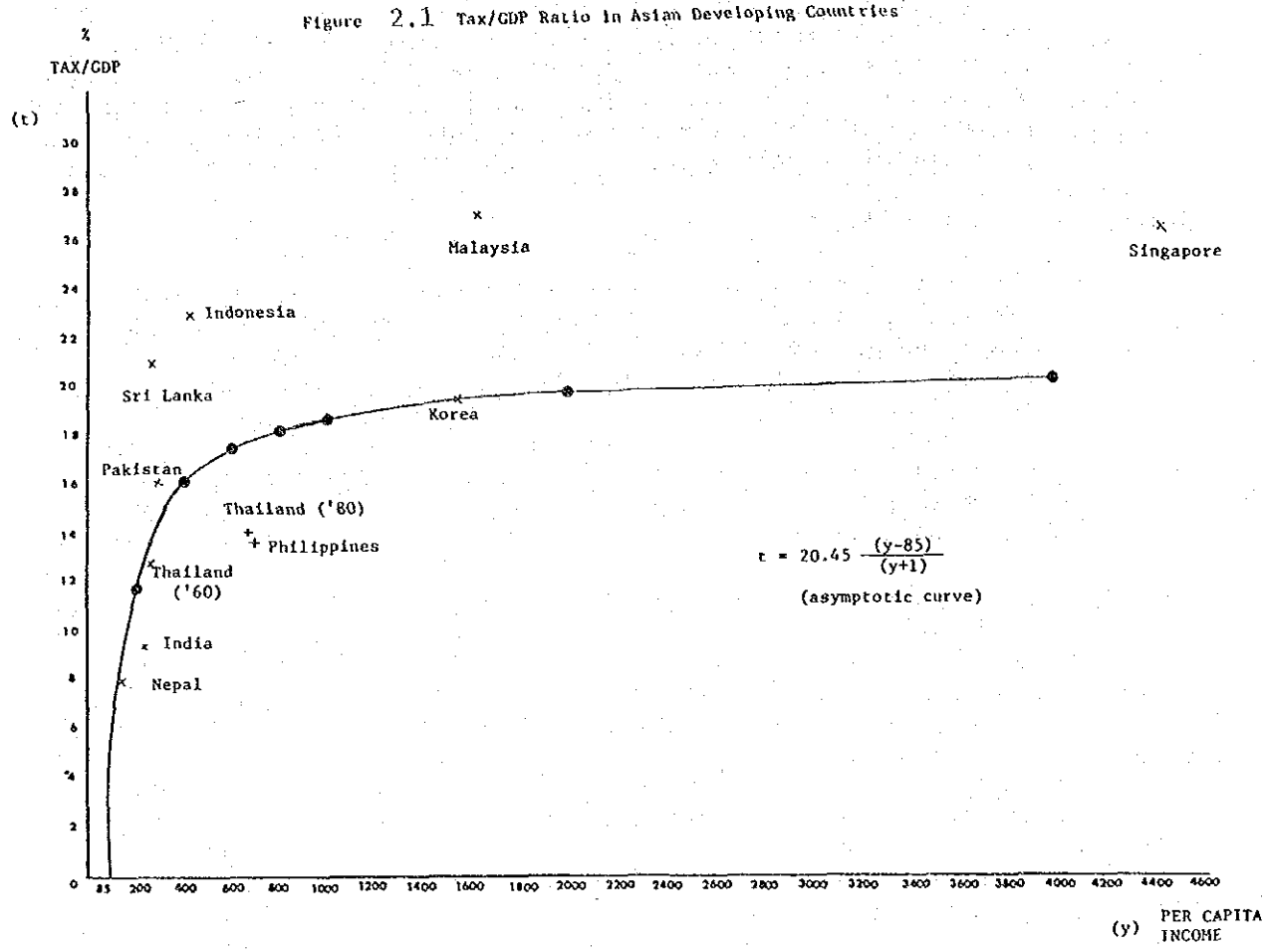
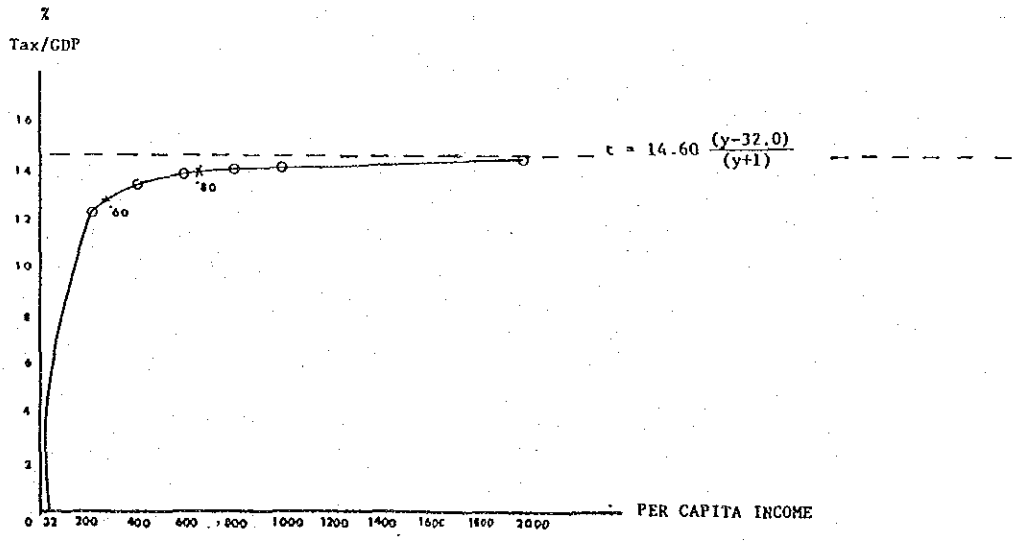


Figure 2.2 TAX/GDP RATIO IN THAILAND



2. Tax on income increased rapidly from 1.6% of GDP in 1970 to 2.9% of GDP in 1982, however it still remains relatively small share.

3. Taxation in Thailand now less heavily relies on international trade tax but more heavily depends on business and excise taxes, as a result indirect domestic taxes still plays dominant role in public revenues. Because of this continuous heavy reliance on indirect taxes, tax incidence in Thailand are regressive. As the consequence, taxation ratio stagnates as per capita income increases.

2.2.3 Trends in Public Expenditures

Public expenditures in Thailand grew at a rapid pace, it expanded more than 5 times in nominal rate and around 3 times in real rate during 1970s. Public expenditures as a share of GDP fluctuates, however in the longer perspective the ratio increased from 12.7% in 1960 to more than 20% in early 1980s. With the exception of the first oil crisis period when government curtailed expenditure (especially investment expenditure) in order to control inflationary pressures, expenditure/GDP ratio was rather constant at around 19% during 1970 to 1978, then started increasing rapidly since 1979.

During the 1970s the consolidated expenditures grew faster than that of central government and in addition to that the share of capital investment account expanded in consolidated expenditures while the capital investment share decreased in central government expenditures.

This difference in expenditure patterns is directly associated with shifts in the public expenditures between central government and state enterprises. The shifts in sector wise functional distribution of consolidated public expenditures took place during the 1970s. General expenditures on industry and mining, power and energy increased its share, while the public spendings on agriculture and health are stagnated.

Trends in capital spendings of consolidated public expenditures show simillar changes with general expenditures. Increase in capital expenditures is significant in the energy sector as the consequence of oil crisis. Investments in irrigation and highways, traditonally were major sectors contributing capital expenditures, have been stagnated during the 1970s.

2.2.4 Financing Regional Development

The public sector in Thailand is dominated by the central government both revenue and expenditure sides as it was explained in previous sections. Most of the development programs and projects including "The Five Year Development Plans" are financed by the central government budgets.

The major development projects in the study area are planned and financed by the central government. The role of the local government such as CAO, Municipalities and Sanitary Districts are limited in the sense of planning and financial capacities. The central government is the primary and only the sector responsible to draw the plan and supply resources for the economic development of the study area. Therefore this section focuses on the following points :

1. The central government resource allocation for the development of the study area.

2. Overall trends and problems of the central government budget.

Even the analysis is limited to the central government activities, there still remains great difficulties to compile consistent data to show the structure of resource allocation in the study area. Therefore all the statistics in the following analyses are considered to be in accuracy of order of magnitudes. Even though not all the central government expenditures can be identified as the allocation to each changwat, the regional allocation of budget is measured according to the amount spent through changwat treasurers. These spendings can be considered to bring benefits for the changwats. In fiscal year 1983 all spendings through changwat treasurers shared 30% of the total expenditures of the central government and the rest of 70% was spent directly through the ministries in Bangkok. Benefits of spendings directly through ministries in Bangkok are scattered over the whole country, therefore it is impossible to identify the benefitiaries.

Table 2.4 are based on MOF controllers data which shows spendings through the changwat treasurers and total central government expenditures during 1978 to 1982. During these periods the central government expenditures allocated to the study area increased annual average of 23.6% while total central government expenditures increased annual average of 19.8%.

Among four changwats in the study area Surat Thani has been allocated the largest amount which shares 50% of the total study area, Phuket and Krabi received 17% respectively and 15% for Phangnga. These allocations somewhat reflect the distribution of the population among the changwats.

The total amount allocated to the study area increased from 732,397 thousand bahts in 1978 to 1,710,739 thousand bahts in 1982, which shares 2.9% in 1978 and 3.3% in 1982 respectively in total resources allocated to the 72 changwats. Population and GDP in the study area throughout the period shares 2.4% and 3.0% of whole Kingdom respectively. It can be concluded that the study area has been provided relatively more financial resources compared to the population and GDP shares.

Table 2.4 Central Government Expenditure Allocated to the Study Area

Unit: 1,000 Bahts

	Fiscal Years				
	1978	1979	1980	1981	1982
Phuket	132,069	167,706	216,459	228,752	297,773
Krabi	142,602	157,595	213,044	223,410	293,583
Surat Thani	335,558	432,308	581,868	664,791	860,185
Phangnga	81,337	93,606	127,538	140,994	175,871
Takuapa	40,831	46,126	56,532	62,997	83,327
Study Area	732,397	897,341	1,195,441	1,320,944	1,710,739
Total Allocated to 72 Changwats	24,572,107	30,320,462	38,494,793	43,201,212	52,831,820
Share of Study Area	2.9%	3.0%	3.1%	3.1%	3.3%

Source: MOF, Controller

Note : Share of population in the study area in the whole Kingdom is 2.4% throughout sample period.

Sector wise expenditures allocation of central government budget to the study area is available only in the fiscal year 1983. And it should be noted that these figures are based on BOB and not continuous to the figures shown in Table A 1.10.

In the fiscal year 1983, the study area shares 3.34% of total budget allocation to 72 changwats, however development expenditures shares only 3% and non-development expenditures shares 3.9% (See Table 2.5).

Among the non-development expenditures, sectors of defence, education and public services receive high portion of budget allocation and non-development expenditures to these sectors raised the relative share of budget allocation to the study area. This is confirmed that development expenditures to economic services sector to the study area shows relatively low shares of 2.87%. Thus development outlays to the study area share (3.04%) nearly equal to the GDP share (3.0%) and greater than the population (2.4%).

Financial resources available for the future development in the study area can be mobilized from various sources of private and public, although the financial resources invested in the study area in the past and present have been rather limited. It can be said that there are rather potentially plenty of investment resources in the study area. In the private sector deposit/loan ratio in the commercial banking sector is far above 1.0 and commercial banks have been looking for higher return and sound investment opportunities. In the public sector, public revenues collected in this area always surpassed public expenditures allocated to the study area by the central government, because of highly concentrated activities in tin production and tourist (See Table 2.6).

Therefore government policies to introduce industries in this area and policy guidelines to promote investments will mobilize potential resources and change the financial flow both in private and public.

On the other hand, central government development expenditures that lead and promote private investments seems to be limited in the past. Total development outlays in the study area estimated only 1 billion bahts (of which 0.5 billion bahts estimated to allocate economic development including agriculture, industries, transportation and communication) in the fiscal year 1982.

It is obvious that financial resources required for the future development will be far more than what is allocated in the past and present.

During the 1980s government development investment is concentrated to the Eastern Seaboard Plans (ESB) which requires around 5 billion bahts of government investments per year in constant 1981 prices. This will be the heavy burden to the central government budget.

Table 2.5 Ratio of Economic Classification of Government Expenditure (F.Y. 1983)

Unit: %

	Study Area / Whole Kingdom		
	Develop	Non-develop	Total
1. Economic Services	2.87	2.93	2.89
2. Education	2.86	6.72	2.88
3. Public Health	3.46	4.76	3.47
4. Public Services	4.13	5.01	4.44
5. Defence	0	5.22	5.22
6. Internal Security	0	3.97	3.97
7. General Administration	5.50	5.01	5.03
8. -			
9. -			
10. Total	3.04	3.90	3.34

Table 2.6 Total Revenue and Expenditure of Changwat (1981)

Unit: Million Bahts

	Revenue	Expenditure	Surplus or Deficit
Krabi	40.36	223.41	-183.05
Phangnga	1,793.35	203.99	1,589.36
Phuket	2,022.81	228.75	1,794.06
Surat Thani	227.64	664.79	-437.15
Total Study Area	4,084.16	1,320.94	
Whole Kingdom	110,486.00	128,503.20	

Source: MOF, Controllers Office

Above discussion can be summarized as follows. Figure 2.3 shows actual figures for central government revenues and expenditures in fiscal year 1980 (year previous to ESB program started). Central government revenues amounts 92 billion, of which 78 billion are spent for government consumption. Government investments 46 billion is financed by current account surplus 14 billion and government borrowing 32 billion. Government borrowings accounted 35% of total government revenues.

Additional investment of ESB (5 billion ฿) is taken into account in Figure 2.4. In this case government investments of 51 billion are financed by current account surplus 14 billion and government borrowings 37 billion. Ratio of government borrowings to total government revenues increased to 40%. Additional investment to the study area coincide with ESB program will raise government borrowings to the critical level.

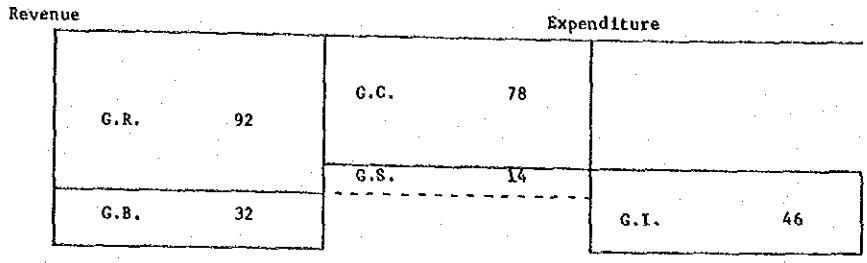
Figure 2.5 (domestic resource mobilization effort is taken into account) illustrates when taxation ratio to GDP is raised to the international average of 17.8% (See previous section) the consequence of government revenues increase to 122 billion, ratio of government borrowings to total government revenues decreased drastically to 5.7%. This indicates that there is a room for new investments if additional tax efforts are taken place.

Figure 2.3 Central Government's Revenues and Expenditures

-Summary-

Unit; Billion Bahts

Fiscal Year 1980



G.B./G.R. = 35%

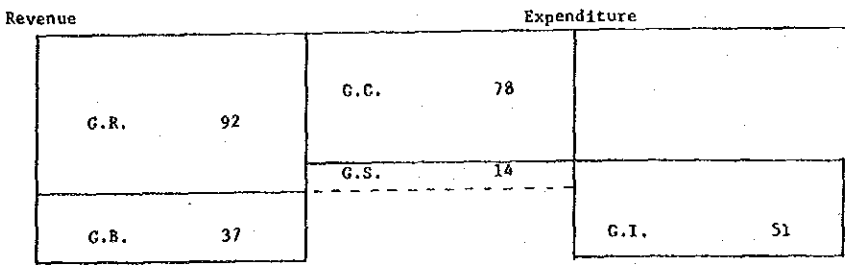
Note: G.R. Government Revenues
G.C. Government Consumptions
G.B. Government Borrowings
G.S. Government Current Account Surpluses
G.I. Government Investments

Figure 2.4 Central Government's Revenues and Expenditures

-Summary-

Unit; Billion Bahts

Fiscal Year 1980 Plus Additional 5 Billion Bahts Investment



G.B./G.R. =.40%

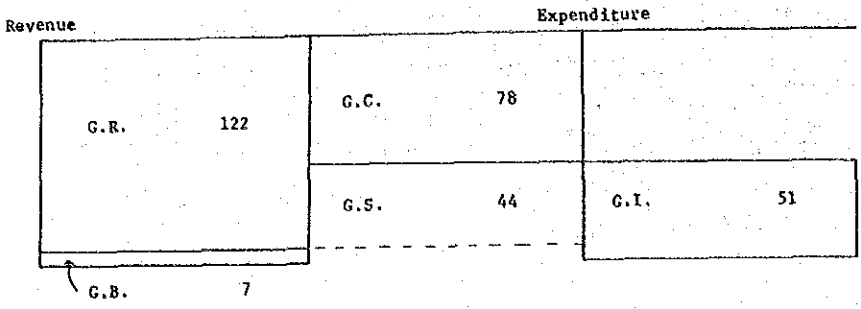
Note: G.R. Government Revenues
G.C. Government Consumptions
G.B. Government Borrowings
G.S. Government Current Account Surpluses
G.I. Government Investments

Figure 2.5 Central Government's Revenues and Expenditures

-Summary-

Unit; Billion Bahts

Fiscal Year 1980 Plus Additional 5 Billion Bahts Investment with Tax Efforts



G.B./G.R. = 5.7%

Note: G.R. Government Revenues
G.C. Government Consumptions
G.B. Government Borrowings
G.S. Government Current Account Surpluses
G.I. Government Investments

3. DEVELOPMENT FRAME

3.1 TOP-DOWN AND BOTTOM-UP APPROACHES

An attempt has been made to reflect in development frame building the top-down and bottom-up approaches.

The top-down approach derives itself from the conception that what the Study Area can do for the national intention in regional development. Since growing national intention is to disperse the activities of Bangkok and promote industrialization, the major target of the top-down approach is to establish a growth pole area to meet the Bangkok decentialization and industrialization.The Fifth National Economic and Social Development Plan stipulates that Surat Thani and Phuket be developed as second-generation urban growth centers in the national urbanization policy. In more concrete term, the Study Area is expected to attract more economic activities and population through establishing strong industrial/urban bases, strengthening the link between eastern and western coastal areas thereby contributing to the national spatial integration and creating bases for accelerating industrial export based on the Area's locational advantage. To this end, a priority will be given to intensive inputs of capitals and technologies from outside the Study Area to stimulate and reorganize the existing regional economy.

On the other hand, the bottom-up approach derives itself from the conception that what the Study Area should do to meet the needs of existing economy and people. The needs expressed by local government officials are summarized in Table 3.1. Most of changwat strongly feel the need of ensuring the water necessary for development in future, inducing large-scale investments for industrialization, accelerating tourism promotion and controling flood, while specific changwat strongly feel their own need. Surat Thani expresses the need of attaining more efficient/effective agricultural production based on fertilizer,mechanization and irrigation, while Phuket expresses the need of modernizing fishing technologies, developing fish farming and reinforcing the east-west linkage. We understand that the need of the Study Area is to stabilize its economy through diversification and efficiency improvement, to induce industrial and tourism investments and to manage basic resources, water in particular, and thus to attain a steady increase in people's income and welfare. To meet these needs, a priority will be given to foster a self-supporting economic base mainly through effective utilization of the capitals and technologies available in the Study Area so that impact of external investments will be infiltrated into all sections of the Study Area.

In development frame building, the top-down and bottom-up approaches are combined taking into account the maximum possible targets of economic growth and population absorption, and the major constraining factors within the time horizon at the year 2000 and beyond.

TABLE 3.1 MAJOR PLANNING ISSUES IDENTIFIED IN A SERIES OF MEETING WITH PROVINCIAL AND MUNICIPAL GOVERNMENTS

	Surat Thani	Phang-Nga	Krabi	Phuket	Trang
A. Industrial Development					
1) Promotion of rubber plantation	x	x	x	x	x
2) Promotion of agro-processing industries	xx	x	x	xx	xx
3) Diversificaiton of agricultural activities	xx	xx	xx	x	x
4) Expansion of export market	xx	x	x	xx	xx
5) More efficient/effective agricultural production based on fertilizer, mechanizaiton and irrigation	xxx	x	xx	x	x
6) Development of fish farming	x	xx	x	xxx	
7) Modernization of fishing technologies	x	xx	xx	xxx	
8) Promotion of mining exploration	xx	xx	x	x	
9) Rehabilitation of the tin excavated land		xx		x	
10) Accelerated tourism promotion	xx	xx	xx	xxx	
11) Inducement of large-scale investment for industrialization	xx	xx	xx	xx	xx
12) Development of skilled manpower	x	x	x	xx	x
13) Development of new industries activities using wastes such as rubber trees and mangrove	x	xx	x	x	

(cont'd)

(cont'd)

	Surat Thani	Phang-Nga	Krabi	Phuket	Trang
B. Infrastructure Development					
1) Rationalization/modernization of market system	xx	x	x	xx	x
2) Development of sea transport system	xx		x	xx	xx
3) Reinforcement of the east-west linkage	xx	x		xxx	
4) Reinforcement of the linkage with Bangkok	xx	x	x	x	
5) Ensuring water necessary for future development	x	xx	xx	xxx	xx
6) Improvement of regional road network	x	x	x	x	x
7) Ensuring stable electric power supply	xx	x	x	x	x
C. Environment					
1) Protection of forest		x	x		xx
2) Preservation of natural resources	x	xx	x	xx	x
3) Conservation of water-shed	x	xx	xx	x	xx
4) Flood protection and drainage development	x	xx	xx	xx	xx

Notes : The number of x indicates the degree of stress expressed by provincial/municipal officials.

3.2 PROJECTIONS

We made projections of GDP by major sector, employment by major sector and population by urban and rural, with an emphasis on the following points :

(1) GDP, employment and population are not projected individually but interdependence among these are taken into account to the extent that available data allow.

(2) Everyone knows the lack of adequate statistical data at the provincial level. Many data are available only in two temporal points or just one point. However, we tried to look into interrelations between sectors, regions and different variables not through statistical fitting test which data do not allow but through introducing planning assumptions.

(3) Region is a part of the country. This understanding seems important especially in the Study Area for which development is discussed in the interregional context to a large extent. It has been necessary to project in some case the space and economy of the country in the year 2000 just for the sake of this Study in the absence of authorized projection figures at the target year 2000.

(4) Trend projection is made as a reference run first and then target projection is made by injecting alternative targets set from the point of interregional as well as intraregional view. The most realistic projection is selected from among alternative target projections in view of some salient constraints to sector development programs such as limit in farm land expansion, manageable limit in the spead of urbanization, availability of water and investment ceiling.

3.2.1 Perspective into Possible Trends

Trend Projection

Although the Study Area maintained a high level of economic growth of 7.9 percent per annum during the 1970s thanks mainly to booming mining production, such trend will not continue with a result that the growth rate will go down to the level of more or less 5.5 percent which is as high as national average set for the period of Fifth Five-Year Plan. In other words, the Study Area will grow to the extent that it can sustain its GDP share attained in the year 1980.

Production performance of agricultural and manufacturing sectors will be more or less same as in the past decade while that of mining will become stagnant. The growth of the service sector will also taper off, accordingly.

Population increase will slow down as NESDB predicts a declining birth rate. However, the Study Area will increase its population at a rate higher than national or southern regional average as was the case in the past, reflecting its larger capacity to absorb population with a vast unused cultivable land and substantially improved transportation system.

In spite of declining rate of population increase, adult population will keep increasing as a consequence of high birth rate in the past, with a result in a substantial increase in the labor supply from 46 percent of total population to 57 percent in the year 2000.

While labor supply will increase rather fast, labor demand will not catch up fully with it under a sort of competition among regions in pulling the labor available in the country. In the year 2000, labor demand will be smaller than supply by about 12% or 120,000 persons, of which 6% or 60,000 is assumed to be unemployed while the rest be absorbed in labor market in one way or another.

There will be little improvement in employment coefficient in terms of incremental employment output ratio.

Urbanization will be decelerated as a result of declining rate of both population increase and economic growth. However, propotion of urban population will slightly increase from 11.5 to 12.2 percent during the period 1980 to 2000 reflecting the differential in employment absorptive capacity between agricultural and non-agricultural sectors.

Target Projection

A broad objective for the Study Area to take a key part in the decentralization of Bangkok and the integration of the national space, and to maintain a steady expansion and diversification of its regional economy would lead us to set the targets from the viewpoint of (1) population decentralization and urbanization and (2) increase in level of income.

Level of urbanization is very low in the Study Area. In view of attaining national decentralization, one can think of accelerating the urbanization to the extent that propotion of urban to total population will increase from 11.5 to 29 percent, which is national average predicted for the year 2000, during the period 1980 to 2000. Population of municipalities Surat Thani and Phuket will, then, increase, from more or less 40,000 to 120,000. This will lead the total population of the Study Area to increase up to 1,833,000 compared with 1,649,000 under the trend projection. This would be a modest target in terms of population.

Further, the Study Area needs to be urbanized much faster if it is to contribute to the deceleration of Bangkok growth substantially. A modest projection suggests that, in 2000, population in Bangkok will reach almost 13,700,000, which will be 22 percent of the national total population or 74 percent of the national urban population. Hopefully, population expansion of Bangkok needs to be limited to more or less 10 percent, or about 6.4 million, of the national population as are the cases with capital cities of many other countries in order to

attain a balanced spatial structure of the country, but this target seems almost impossible to attain for rapidly expanding Bangkok. A more plausible target, though still being beyond the reach of existing policy instruments, would be to limit the growth of Bangkok population within 50 percent of the national urban population with a consequence that Bangkok will have population of about 9,380,000 in the year 2000. If the population which otherwise would be concentrated on Bangkok is to be absorbed in the rest of the country, in propotion to the size of urban population in each part of the region, the Study Area has to increase its urban population up to the level of 33 percent of the total population in the year 2000. This would be a more ambitious population target under which size of Surat Thani and Phuket will reach more or less 230,000 and total population will be 2,166,000.

Since per capita income of the Study Area will increse without targets, at a rate of only 3.4 percent with stagnating mining and forestry industry, the Study Area needs to increase productivities in all possible sectors and accelerate industrial development in order to sustain the speed of income growth experienced during the 1970s. Thus, a target, which is rather moderate, would be to keep the per capita income growth rate of the level of 4.8 percent as in the 1970s.

Even if this target is attained, the income disparity within the Study Area will make the lowest income changwat, which is Krabi, to have the income level 26 percent lower than average national level as of the year 2000. Thus another target, which is more ambitious, would be, to enable the lowest income changwat to attain the income level of national average in the year 2000. This requires average rate of per capita income increase of 6.9 percent in the Study Area, assuming that the national GDP will keep increasing at the rate of 5.5 percent.

Under these targets, manufacturing and service sectors will absorb additional employment. Although increment in service employment compared with manufacturing employment is very large in the present Study Area (1 to 2.9), additional non-agricultural employment will consist of manufacturing employment of a larger proportion and service employment of a smaller proportion. This trend will be the same with the case of sectoral allocation of GDP, while productivity of manufacturing sector will be considerably higher in the additional industrial activities than the present level which is now 68 percent lower than national average.

Accordingly, four cases can be considered for target projection :

Case A.
Sustaining per capita income increase rate of 4.8 percent per annum and attaining the national average level of urbanization.

Case B.
Sustaining per capita income increase rate of 4.8 percent per annum and accelerating urbanization so as to contribute to limiting the growth of Bangkok population within 50 percent of the national urban population.

Case C.
Attaining the income level at which the lowest income changwat will reach the national average of per capita income and attaining the national average level of urbanization.

Case D.
Attaining the income level at which the lowest income changwat will reach the national average of per capita income and accelerating urbanization so as to contribute to limiting the growth of Bangkok population within 50 percent of the national urban population.

3.2.2 Structure of Projection Model

Structure of projection model is illustrated in the Figures 3.1 and 3.2. The structure comprises of GDP projection, employment projection and population projection. In the trend projection, past trends in sectoral GDP of agriculture, mining, manufacturing and the services are extrapolated subject to the assumed national economic growth and regional share of the Study Area. Past trend of population increase in both the Study Area and the rest of the southern region is extrapolated subject to the NESDB population projection for the southern region. Labor demand in the Study Area is derived from projected GDP increase in the Study Area and the rest of the country subject to the national labor supply estimated based on the NESDB projection of population age-structure. At the same time, labor supply in the Study Area is derived form the population age-structure of the Study Area in future. The total employment which is assumed to be an average of labor demand and supply is broken down into sectoral employment based on the past trend of the Study Area in marginal productivity increase by sector. Urban and rural population are derived from non-agricultural and agricultural employment, respectively based on the past correlations and subject to the total population in the future.

The target projection more or less follows the same logic applied in the trend projection except that per capita income and urban population are predetermined as targets. Target income level is assumed to be attained by the additional industries which, with national average industrial productivities in the year 2000, are supposed to absorb targeted urban population together with induced service activities[1/]. The overall increase in productivities of other sectors are assumed to increase their productivities to offset a gap

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1/ Multiplier effect of industrial over service sectors are assumed to be same as the national average in both GDP and employment term, although the growth of the service sector is much higher than that of industrial sector in the present Study Area.

Fig. 3.1 STRUCTURE OF PROJECTION MODEL

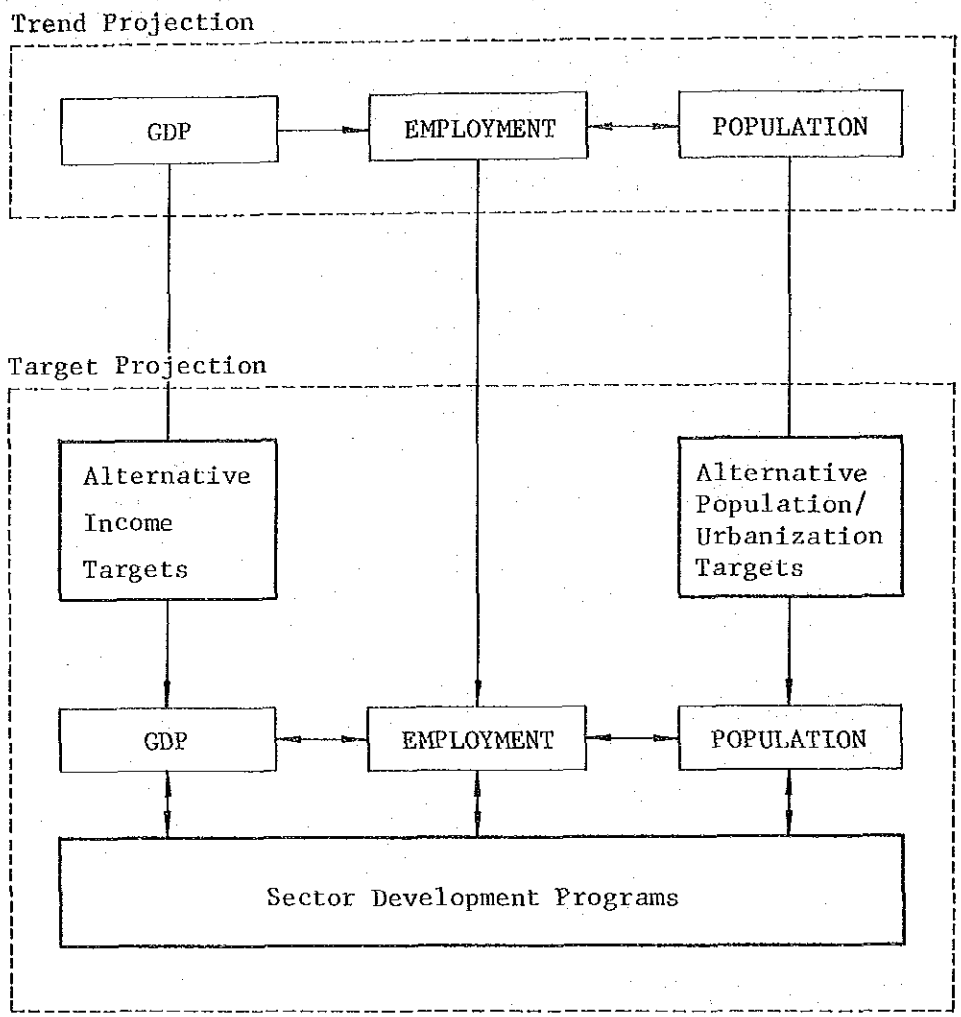


Fig. 3.2 (1) STRUCTURE OF PROJECTION MODEL : TREND PROJECTION

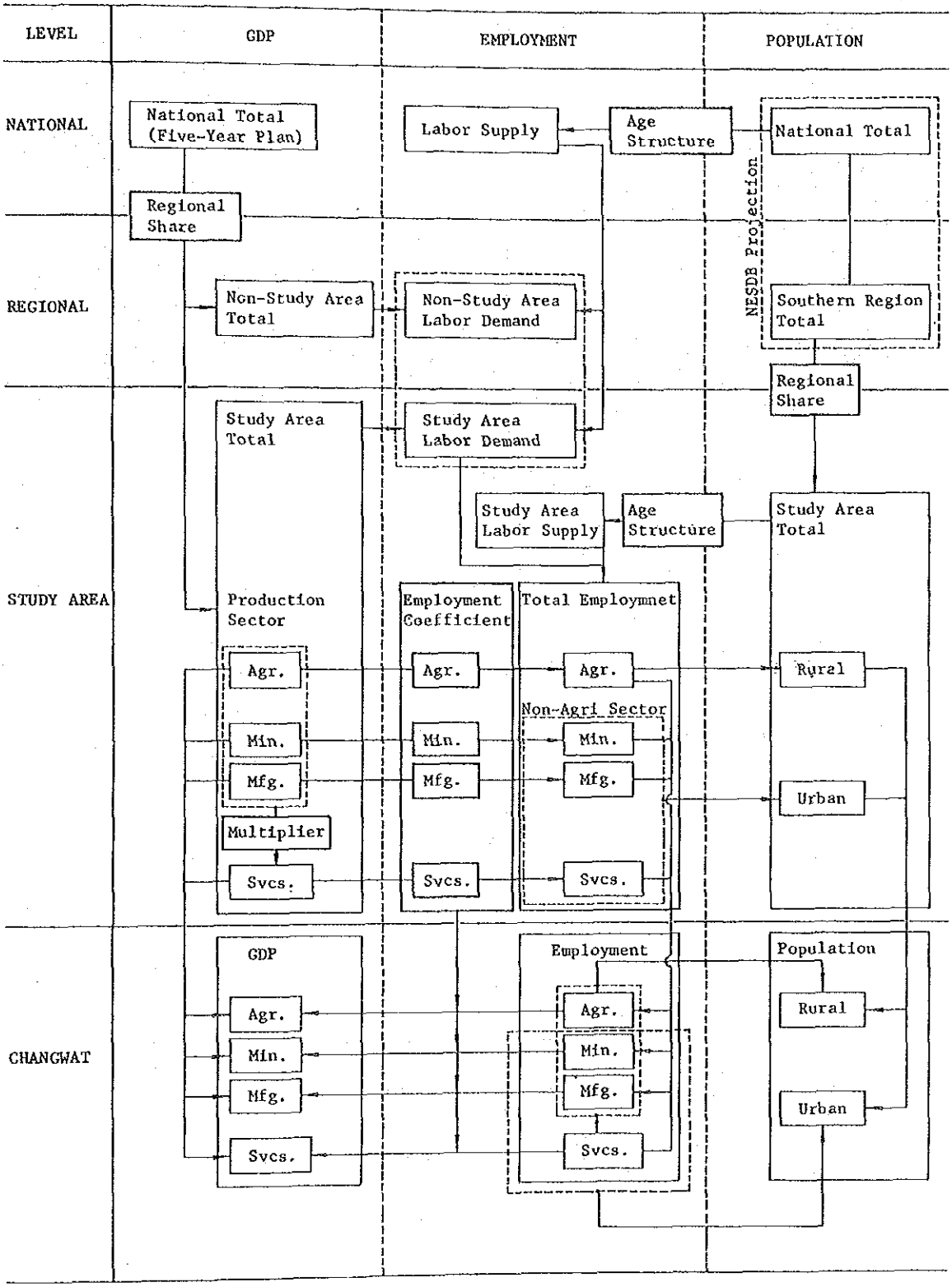
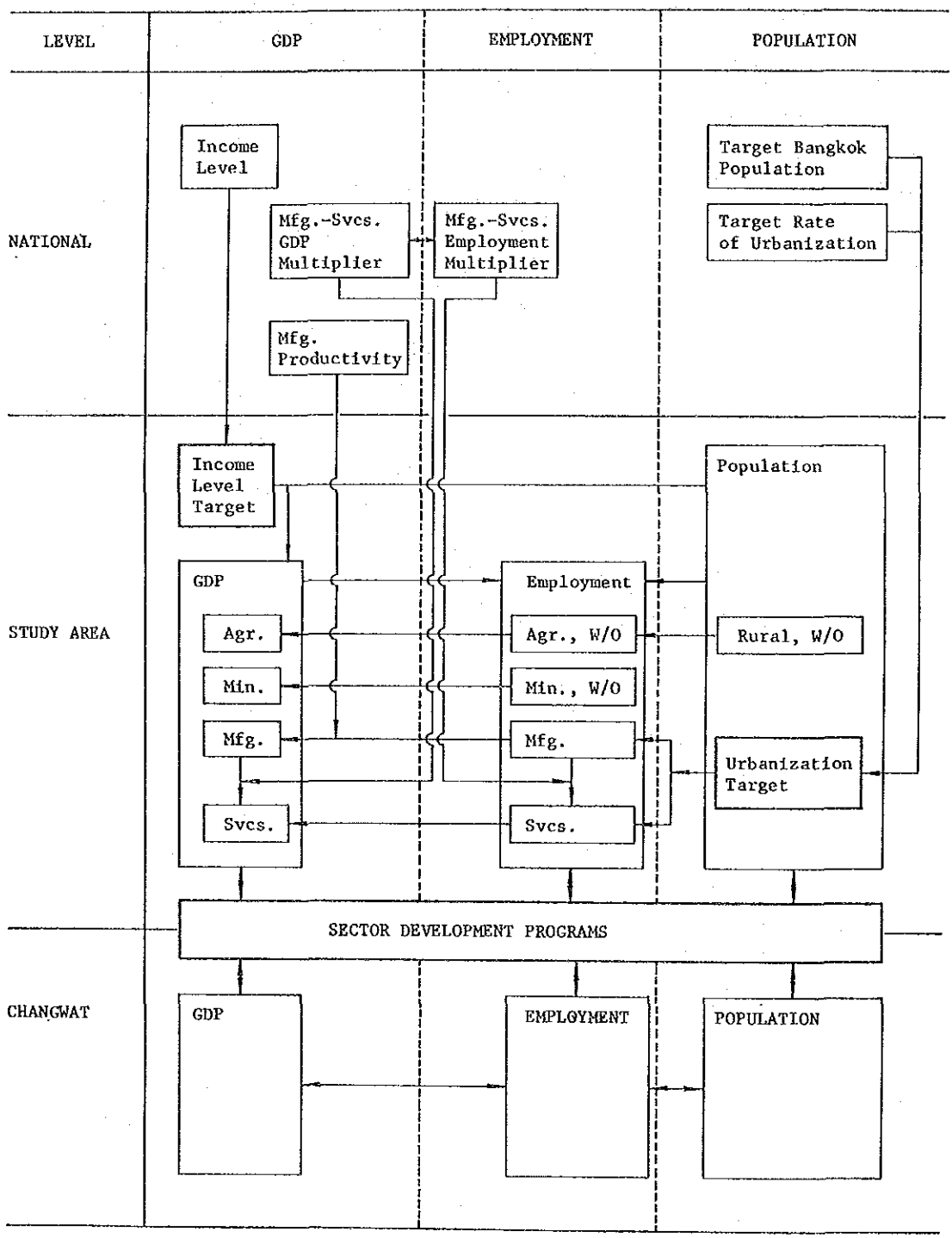


Fig. 3.2 (2) STRUCTURE OF PROJECTION MODEL : TARGET PROJECTION



between the target per capita income and the per capita income attained through the additional industries together with their multiplier effect. Total population comprises the target urban population and the rural population estimated by the trend projection.

3.2.3 Results of Projection and Examination

The results (see Table 3.2 of the main volume) show that case D of the target projection is the highest one followed by case B, Case C, Case A and the trend projection. GDP will grow at the annual rate of 9.7 in case D. 8.8 in case B, 8.4 in case C, 7.1 in case A and 5.5 percent in the trend projection whereas the rate was 7.9 percent during the period 1970-80. The relative magnitude of the manufacturing GDP in the year 2000 will be 24 percent in case D, 22 in case B, 20 in case C, 17 in case A and 10 in trend projection whereas it was 6.4 percent in 1980 when the percentage was 19.6 percent on the national average.

Population in the year 2000 will be 2,166 thousand in cases D and B, 1,833 thousand in cases C and A and 1,649 thousand in the trend projection while it was 1,106 thousand in 1980. The per capita income will rise from 24,668 in 1980 to 80 thousand in case D, 75 thousand in Case C , 68 thousand in case B, 63 thousand in case A and 48 thousand in the trend projection. Rate of urban population in the year 2000 will be 33 percent in cases D and B, 21 percent in cases C and A and 12 percent in the trend projections whereas it was 12 percent in the Study Area and 17 percent in the country. Employment will increase at the annual rate of 5.1 percent in case D, 4.7 percent in case B, 4.1 percent in case C, 3.7 percent in case A and 2.7 percent in the trend projection while it increased at the rate of 3.7 percent during the 1970s. Percent agricultural employment which is 70 percent in 1980 will decline to 38 in case D, 41 in case B, 47 in case C, 50 in case A and 60 percent in the trend projection. These results are examined from the viewpoint of constraints in order to choose the most plausible alternative among these projections. Our conclusion is that case A of the target projection is to be chosen.

Looking at a limit in farm land expansion, the Study Area has 9151 Km^2 of land suitable for paddy, rubber, oil palm, coconut and fruit production while the actual area of land used by these five crops is 5,146 Km^2 in 1980. If half of the land which is not yet used but suitable for these crops is converted into the actual farm land, annual rate of farm land expansion will be as high as 1.7 percent. This rate seems to be a maximum acceptable one taking into account that the annual rate of increase in the national total area of farm holdings was 2.0 percent during the period 1963-1978 and the government tries to reduce the

rate of farm land expansion, that the Study Area is, however, a few area where a massive potential cultivable land is remained and that the non-primary forest area expanded at a rate of 3.4 percent in the Study Area during the period 1973 to 1977 causing the fast expansion of low intensive landuse area.

Meanwhile, annual rate of yield increase is estimated at 6.6 percent per annum in rubber production, 3.4 percent in rice production, 0.4 percent in oil palm production and 1.6 percent in coconut production according to our agricultural sector study. The average rate of yield increase weighted by production amount of the crops in the year 2000 will come to 3.6 percent. Thus 4.5 percent would be a sort of maximum sustainable increase in crop production. If the livestock, fishery and forestry all of which recently showed declining trends in production are assumed to recover these production in view of the national target rate of increase of 4.2, 5.4 and 0.3 percent per year given in the Fifth Five-Year Plan, the maximum possible rate of increase in the total agricultural production will come up with more or less 5.3 percent. From the viewpoint of agriculture, therefore, the most plausible projection is supposed to be either case A or trend projection.

Looking at a manageable speed of urbanization, annual rate of urban population increase was 6.6 percent in Bangkok and 3.6 percent in other cities during the period 1970-1980. If a longer period from 1960 to 1980 is taken, the rate is 5.2 percent in Bangkok and 3.2 percent in other cities. In the southern region, the rate is 4.1 percent during the period 1970-1980 and 3.6 percent during the period 1960-1980. From these figures, it is judged that 6 percent is a maximum manageable speed of urbanization. From this viewpoint, case A is supposed to be the most plausible projection.

As for water resource availability, the area except Phuket could potentially supply water for any of five projections. Problem is Phuket. It is expected that Phuket needs either to develop a considerable number of reservoirs in the small island or to introduce water from Phangnga through pipeline even for meeting with the urbanization and income increase under the case A projection. Therefore, the case A is to be chosen as far as the water availability in Phuket is concerned.

Looking into investment capacity,a focus is put on interregional allocation of investments. In order to work out regional share of the public and private investment which the Study Area will require under different cases of projections, the following steps have been taken:

(1) To estimate the cumulative amount of public and private investments of the country during the period 1980-2000 on the assumption that the national economy will grow at an annual rate of 5.5 percent and that public and private investments will increase in accordance with the correlations[1/] observed between investment and GDP during the period 1970 to 1980.

(2) To assume the share of public investment in GDP to be 7 percent and that of private to be 15 percent in the Study Area taking into account that, at the national level, public and private investments were 7 to 8 percent and 15 to 20 percent of GDP during the past decade and that in the Study Area, public investment is estimated at 6.9 percent of GDP by assuming percentage allocation of public investment to the Study Area to be the same as the percentage allocation of the central government expenditures through changwat treasurers.

(3) To estimate cumulative amount of public and private investments in the Study Area during the period 1980-2000 based on the assumption made in (2).

The results are shown under (Table 3.2)

Table 3.2 SHARE OF STUDY AREA IN NATIONAL TOTAL INVESTMENT: 1981-2000

in percent

	Investment		
	Total	Public	Private
Trend Projection	3.0	2.7	3.2
Target Projection			
Case A	4.4	3.9	4.6
Case B	5.3	4.6	5.5
Case C	4.9	4.4	5.2
Case D	5.8	5.2	6.2

From the viewpoint of interregional balance of public investments, the share of 3.9 percent under case A seems the most acceptable, nevertheless it is not impossible to allocate 5.2 percent of the national public investments to the Study Area from the strategic point of view. It should be noted, however, the ratio of 3.9 percent of GDP in the year 2000 means the scale and content of investments which are quite different from those meant by the same ratio at present. Even under case A projection, public

Note 1/ : $Y = 0.097IG - 6.444$ (R=0.8460)
$Y = 0.165IP + 0.441$ (R=0.9275)
where Y is GDP, IG is public and IP is private investment.

investment in the Study Area will amount to 8 billion baht (1980 constant prices) in the year 2000 and this amount exceeds the annual average amount of 5 billion baht required for the Eastern Seaboard development.

These examinations above lead us to choose the case A of the projection, in which it is aimed to sustain the rate of per capita income increase at 4.8 percent by diversifying the existing economy which otherwise will decline due to depletion of the primary resources and to contribute to national decentralization through increasing the level of urbanization to reach the national overage level in the year 2000.

ANNEX II SEMINAR PRESENTATION BY STUDY TEAM

The National Seminar on the Upper South Development Policies and Programs was held in Surat Thani on January 25 and 26, 1985. The seminar was attended by about 250 distinguished participants, including H.E. Mr. Bichai Rattakul, Deputy Prime Minister and H.E. Mr. Masatada Tachibana the Ambassador of Japan. The following is a record of the presentations by the study team.

1. OVERALL DEVELOPMENT POLICIES AND STRATEGIES OF THE UPPER SOUTH TOWARDS THE YEAR 2000 PRESENTED BY DR. MASAHIKO HONJO, STUDY TEAM LEADER

Your Excellencies Deputy Prime Minister, Mr. Bichai and the Ambassador of Japan, Mr. Tachibana, honorable guests,ladies and gentlemen, it is our great honor to present the result of our study to the group of distinguished participants who are to play the key role in the development of this subregion.

I would like to state first of all that this is the product of our joint effort together with the government of Thailand. We did enjoy a wonderful collaboration as partners with NESDB staff under the strong leadership of Dr. Snoh and Dr. Phisit, and through them we could establish good contacts with the central and local government offices and public and private bodies concerned. To all of them, I would like to thank for their very kind collaboration and contribution.

I would also like to refer to the past achievements in the study of development of this subregion which provided us with good background in starting our work. They include those prepared through international collaboration of governments and international agencies. As one of them, "South Thailand Regional Planning Study", which was contributed by the British Government in 1973 was particularly useful, since it was a preceding study which led to the initiation of this project.

Just now Dr. Phisit presented the content of our work, which I believe, gave the total picture of our study in a very vivid manner, and I have to thank him for this nice presentation on behalf of our team. I am afraid that what I am going to present now would be duplicating his statement as well as my statement at the previous seminar at Phuket. However, as I understand that there are many of you who attend such meeting for the first time, I would like to take this opportunity to present the gist of the master plan with particular reference to the spatial aspects, and how the ten projects for prefeasibility studies have been selected. Following this session, my collegues will present you the content of the prefeasibility studies in accordance with their specialities.

The master plan intends to draw out the future activities of the subregion and to present the way the total land and resources can best be utilized to sustain such activities. It should be comprehensive to cover diversified activities of development, and at the same time should be well coordinated so that future path of development can be made clear. The objectives and scenarios of the plan are the guidelines showing the orientation of such coordination. These are already presented by Dr. Phisit and here, very briefly, I would like to mention that:

1) This plan is taken up in response to the new stage of development of Thailand in which industrialization and internationalization are getting momentum and the seaboard areas are brought under the footlight.

2) The basic strategies of the plan are:

   (1) To develop Phuket as the center at the western gateway of Thailand,

   (2) To develop Surat Thani as the center at the crossroads of east-west and north-south links,

   (3) To strengthen link between those two centers by east-west link, and

   (4) To develop its rich, underutilized resources in the hinterland.

Under this broad orientation the master plan is worked out as the blue print for the future development as follows:

1) As the assumptions to start with, a macro-economic framework is worked out to assess the magnitude of economic activities of the subregion. We assumed that toward the year 2000 per capita income of the subregion will grow at a rate same as the national average during the 1970s, and that population will grow from 1.1 million in 1980 to 1.8 million in the year 2000. Compounding above assumptions the scale of the economy of the subregion can be calculated to be four times as large as the present. In order to achieve this, agricultural production will be increased by three times, considering the past trend of the development in this sector, while industry has to be increased by 11 times during the period 1980 to 2000.

2) We analyzed the present land use and land capability to make the future landuse plan for agricultural development. Wide arable land exists between the north-eastern coast facing the Gulf of Thailand and the southern coast facing the Andaman Sea (see Figure 1, a color map of the master plan 2000 which opens this final report). Dark yellow portion is rubber area and pink area is rice area. There is a vast area of low intensity landuse (strong yellow portion) totaling 6,400 square kilometers, of which southern parts are most suitable for oil palm plantation. Candidate sites of plantation, including ongoing ones, are shown in the map by the green circle with a red dot in the middle (showing the site of oil extraction plant). The target for agricultural production can be met mostly by the increase in production of these cashcrops and rice.

3) Next we analyzed the settlement pattern of this subregion. Surat Thani and Phuket are the main centers of this subregion. Under this, a set of hierarchical relationship can be identified among the centers, namely those at changwat level or equivalent (Krabi, Phangnga, Takua Pa) and those at amphoe and tambon levels. Each of them plays an important role to cater for the needs and activities of the people within the specific areas of their influence, and in return, grow in accordance with the development in their areas. On the top of such hierarchy Surat Thani and Phuket will grow to the population size of 170,000 and 150,000 by the year 2000.

4) About the location of industries, basically industries of the subregion consisted of those for processing local raw materials such as tin and rubber. They needed industries to cater for their operation such as maintenance and repair, and to produce necessary facilities such as machines and ships. As they grow in scale, regional market will be generated for intermediate goods to meet the demand of industrial raw materials, as well as for consumer goods to meet the rising income of the people, thus promoting the development of these industries. Another type of possible industries are those for export purposes based on raw materials mostly imported from foreign countries - a new type of industries to be found in "Export Processing Zones"for instance.

The location of these industries will be determined according to their types. Local resource processing industries are located near the production site of raw materials in a scattered manner. Industries to serve for the processing are located at local centers in districts of production such as tambon and changwat centers. Industries to meet the demand of regional market would be located at the regional centers such as Surat Thani and Phuket where the goods are distributed and/or consumers are concentrated. And lastly, the industries related to international trade will be located at the international contact point with harbor and airport such as Phuket.

5) Regarding tourism, it is perhaps the most promising sector in this subregion. Total number of tourists is estimated at 1.8 millions or five times larger than that in 1980. Phuket being the core of Phangnga Bay Area has the largest potential as the tourism center, followed by Surat Thani being the core of Ban Don Bay and Ko Samui Area. Futher development can be ensured primarily by the promotional effort of the private sector, but the role of the public sector should also be important in providing basic infrastructure such as transportation and flood control especially in the above core cities.

6) Regarding transportation, volume of cargo is expected to reach 10,000 tons or 6.5 times as much as that in 1980. Trunk roads in the subregion are north-south highway linking the Central Region and the Southern Region through Surat Thani Area, and east-west highway linking Surat Thani and Phuket via Phanom and Aoluk. This latter route is already completed in prototype form. Both of them have / will have parallel railroad link. Asian Highway serves as the traditional north-south route along the eastern coast. Under this major framework, settlements in the subregion will be liked to each other by the roads of different classes in accordance with their position in the hierachical system.

Ports for ocean going vessels will be developed on both of the west and east coasts of the subregion: Phuket on the coast of the Andaman Sea and Khanom on the coast of the Gulf of Thailand. The most important reason for the choice of Khanom is its good natural conditions for deep seaport. From the national viewpoint, it

should be mentioned that Phuket and Khanom will form a good system of ports along the sea-front of Thailand together with those of Songkhla, Bangkok, and Eastern Sea Board, in parallel with major ports which are distributed at roughly 300 kilometers apart from each other on the Malaya Peninsula, namely Trenganu, Kuantan, Singapore, Kelang and Penang.

7) Regarding energy, given the hydropower of Chiew Larn Dam under construction and thermal power at Krabi and Khanom, the Upper South will become the energy center for the South. Future demand for the energy is estimated to grow by four times as much as the present. In order to improve the production/distribution system of oil, which comes from the Middle East countries, a refinery is proposed at Krabi.

This, in brief, is the blue print of this subregion in spatial terms. To sumup the location of productive activities are related to the distribution of settlements in hierarchical order, and linked together with the system of transportation network. The map of the master plan is produced by overlapping such various aspects within the given space of the Upper South, and thus represents the process we have followed for coordination.

Particular emphasis is placed on the east-west/north-south link and the major urban centers, Surat Thani and Phuket in particular. However, this does not mean that we intend to neglect the hinterland. The development of this subregion depends heavily upon the utilization of its untapped natural resources which can be materialized by the intensive effort of people at the grass root. Therefore, utmost attention should be paid to improve their living and productive environment. In this regard the lower order centers at the bottom of the hierarchy of settlements have a very important role in sustaining their livelihood. The local governments, as the direct agent to deal with the people, should be given full responsibility in carrying out this task. With this in mind, central government should strengthen and encourage the local government in both institutional and financial terms to cope with this task, while on its own part, it should play the role of developing basic framework to sustain the whole of above activities.

We have selected ten projects from such a point of view. They should be the national projects having impact not only on the local economy but also on regional and national economies at large. At the same time, they should be large in scale, need a long span of time to complete, and can only be financed by national and/or international sources. The content of the 10 projects and their affordability have already been explained by Dr. Phisit. Necessary investment by the public sector alone is estimated at 24 billion baht during the planning period until the year 2000. We estimate that if the growth rate of Thai economy is not as rapid as in the 1960s, the allocation of this amount will be difficult unless the government takes special measures, such as the increase of total public investment resources of the nation and the allocation of more of its share to this subregion.

In fact the whole of our study aims at justifying the priority to be given to this subregion in the national context, however we also observe that there will be many competing demands such as those for the local governments, to ensure their service at the grass root, and for completing ongoing projects in other areas like the Eastern Seaboard Hence we should consider that the public investment of about 24 billion baht could be financed through rather a narrow budgetary circumstances. I would therefore stress the importance of careful phasing in implementing the projects. Priority between the programs and projects should be seriously considered so that maximum effect can be achieved even within the limitation of the fund.

I would also like to touch upon the role of the private sector and the people themselves in achieving the goal of the development. There is a tremendous capacity within them in responding to new development opportunities. The dynamic growth of production of tin, fishery, etc, during the past decade is an example. Rubber production was faster than what was envisaged by the above mentioned South Thailand Regional Planning Study in 1973. There is a good knowledge within the people about how to do the job. There is also a tradition of good entrepreneurship within the business community of this subregion. The question is how such capacity can be drawn out. For this, I believe that the best way is to make them realize that they are participating in the task of development and are duly rewarded. A reasonable way to provide basis for such participation should be sought. As an example, we made proposal for the development of oil palm plantation by involving individual farmers existent in the area. They will be grouped together as a community with a farming lot ensured to each of them. Plantation creates the plant and employs minimum number of workers to sustain its operation. It can also depend upon the individual farmers for supply of bunch, who in return can get cash income for their product as well as technical know-how from the plantation. Such relation to promote mutual benefit should be incorporated in the development process.

Lastly, regarding industrial development, seen in the national context, there has been a tremendous progress in this sector. Not only has the industrial output been increased, but its international competitiveness has grown very much when the 1960s and the 1970s are compared. In particular Thai international trade with Asian neighbours has increased to such an extent that its total volume exceeds those with the old customers like U.S. and Japan, and is showing balance of payment in favour of Thailand in most cases. Export items include many manufactured products, not only of consumers goods but also of intermediate goods of labour intensive type. Such trend may suggest the possibility of the development of new economic region encompassing South-East Asia. Although the dominance of Bangkok in this picture cannot be denied at present, the increasing role of the South can be envisaged in view of its proximity to the Asian neighbours particularly in ASEAN and South-Asian Countries. The Upper South with abundant land, food, water and other resources, together with security and above-mentioned human resources, will have a tremendous opportunity of activating international relation through development toward the future.

As a conclusion, we would like to stress that the willingness of people in the Upper South to develop takes precedence over all others. Second, the central government support is indispensable for this subregion which has been relatively underdeveloped in spite of its locational and resource potential for the national development. Third, the Upper South development deserves international cooperation for its particular contribution to the international economy. We have undertaken this study on these understandings and we do hope that our study will provide a better way to the development of Thailand and the promotion of international cooperation.

2 POLICIES AND PROGRAMS FOR TRANSPORTATION DEVELOPMENT PRESENTED BY MR. NOBUHIRO KOYAMA, TRANSPORTATION PLANNER

Thank you Mr. Chairman Your Excellencies, honorable guests, ladies and gentlemen, it is my great honor to participate in this seminar to present you the outline of transportation planning of the Upper South. In my part, I will present five topics. They are (1) Major findings (2) Transportation development scenario, (3) East-West Link, (4) Khanom Deep Seaport, and (5) Telecommunication.

Now, I begin with the first topic; Major findings.

Port system was the first transportation means introduced to the area. The existing system consists of Khlong Tachin Port in Phuket, Kantang Port, and New Krabi Port on the Andaman Sea Coast, and Tha Thong Port on the Gulf of Thailand Coast.

The Southern Railway Line was established at the beginning of this century and played a great role in land transportation. This line connects Surat Thani with Bangkok to the north and Hat Yai to the south. A spur line is extended to Khiri Ratthanikhom to the west of Phun Phin.

Highway constructions were started from the beginning of the 1960s. Route 4 and Route 41 are north-south links connecting the Upper South with Bangkok to the north and Hat Yai to the south. Route 401 and Route 4035 are existing east-west links connecting the western and eastern sides of the subregion. Concentrated investment on highways has attained the superiority of road transport to railway and ship transport.

Air transport system was introduced since the 1970s. There are three airports of Phuket International Airport, Surat Thani Domestic Airport and Krabi Temporary Airport. Number of air passengers has increased by about 10 times in recent 10 years.

The existing transportation network of the Upper South is well-developed and maintained so far as the present economic activities are concerned. In the context of the subregional development, however, the most important issue will be how to promote further utilizaion of these transportation infrastructures, coupled with new investment. Future transportation demand of the Upper South is expected to increase by 3.4 times for cargo transportation, and by 2.4 times for passenger transportation, by the year 2000. Thus, the transportation development scenario for the Upper South needs to be planned from the viewpoint of the overall development strategy of the Upper South, the expected future transportation demand, and the intermodal coordination among transportation means. By the end of the Fifth Five-Year Plan period, transportation infrastructure is scheduled to be developed and improved further. It is very necessary to make best use of the existing and programed transportation infranstructure to the most extent.

Now, I will discuss the second topic; Transportation development scenario. There are seven components in this development strategy. The first component is Phuket Deep Seaport. Phuket Deep Seaport is expected to stimulate the economy of the Southern Region as well as to provide an alternative gateway directing to the western situated countries. Future internationalization of the country will partly depend on the successful operation of this port. It is an important issue to develop good inland access to the port from the immediate hinterland as well as from Bangkok.

The second component is East-West Link. East-West Link is planned to put the Phuket and Andaman coastal economy more closely with the mainstay of the national economy being in Bangkok, and to unity the economies at western and eastern sides of the Upper South. I will highlight this topic later, in some more detail.

The third component is Khanom Deep Seaport. Surat Thani is to be developed into a subregional center of industry, distribution and urban functions, based on its locational advantage as well as resource potentials. International port is deemed indispensable to attract industries to the area, especially in the tide of internationalization. South Khanom is endowed with deep water level as well as vast plain land for the seaboard industrial development along the Gulf of Thailand in the long perspective. I will discuss this topic later, again.

The fourth component is Krabi-Surat Thani Link. This link is proposed firstly, to connect Krabi economy closely with Surat Thani economy, secondly, to facilitate Krabi to export resources to the eastern situated countries, and thirdly, to promote the development of the Central Lowland particularly for oil palm plantation, by providing easy access to extraction plant and market.

The fifth component is Ferry Link between Phuket and Krabi. Roles of this link are, firstly, to alleviate the locational constraint of Phuket Island, secondly, to activate socio-economic interactions between Phuket and Krabi/the Lower South, and thirdly, to provide tourists with diversified destinations along the Phangnga Bay.

The sixth component is Coastal Shipping Network between Phuket and Krabi/Kantang for better accessibility to international market from both provinces.

The seventh component is Phuket International Airport. This airport should be improved step by step so as to accommodate increasing visitors to the island as well as to facilitate to export of manufactured products to be produced in the neighboring Phuket Airport Industrial Estate.

These seven components will support the integrated development of the Upper South. Phuket Deep Seaport, East-West Link and Khanom Deep Seaport are most strategic projects among others. Phuket Deep Seaport is an already committed project in the Fifth Five-Year Plan, so I will highlight East-West Link and Khanom Deep Seaport.

Now, the third topic is East-West Link. This link connects the Phuket and Andaman coastal economy with the mainstay of the national economy, and unifies the economies at western and eastern sides of the Upper South. We propose to establish East-West Link, firstly by Road Link and later by Rail Link. Road Link and Rail Link follow almost the same alignment; from Surat Thani - Khiri Ratthanikhom - Phanom - Thap Put - Phangnga - Phuket New Bridge - west side of Phuket City and to Phuket Deep Seaprt.

Total length of Road Link is 224 kilometers, in which new construction section is 88 kilometers and improvement section is 136 kilometers. New construction sections are Surat Thani - Route 41, Route 41 - Phanom via Khiri Ratthanikhom, and Phuket New Bridge. This Road Link is designed based on the standard of primary national highway, and the construction cost of this two lane highway is estimated at about 1.4 billion baht.

The total length of Rail Link is 201 kilometers from the junction near Phun Phin to Phuket Deep Seaport. The existing spur line of 31 kilometers is to be improved, and the remaining 170 kilometers is for new construction. This Rail Link is designed based on the standard applied to Chachoengsao-Sattahip Railway Line, and investment cost including rolling stocks is 2.7 billion baht.

Roles and functions of Road Link are firstly, to improve the accessibility to Phuket Deep Seaport from the immediate hinterland, secondly, to connect Phuket with Surat Thani in less travelling time, and thirdly, to provide additional traffic capacity.

Cargo transportation demand in the year 2000 on this Road Link will amount to 2.5 million tons, of which about 80 percent is transportation demand in the subregion, and the remaining 20 percent is transportation to and from Bangkok. Passenger transportation will amount to 7.6 million passengers, of which 95 percent is transportation demand in the subregion, and the remaining five percent is transportation to and from Bangkok.

If East-West Road Link is not developed, problems will appear. Firstly, it becomes necessary to reconstruct the existing Sarasin Bridge in the coming 15 years. Secondly, 10 wheel trucks to and from Phuket Deep Seaport will find difficulties in negotiating steep gradient and sharp curves and will be forced to detour in some part. This will decelerate the utilization of Phuket Deep Seaport. Thirdly, it will take more time to travel between Surat Thani and Phuket in accordance with the future increasing traffics.

Roles and functions of Rail Link are firstly, to provide efficient access to Phuket Deep Seaport from Bangkok and other regions, and secondly, to reduce long haul transportation costs between the Upper South and Bangkok, including the damages on highways caused by 10 wheel trucks. It is necessary to consider that coastal shipping is not efficient transportation means between the Andaman Sea Coast and Bangkok due to the long roundabout of the Malay Peninsula. This means railway is the only one alternative transportation means for long haul transportation between Phuket and Bangkok.

Cargo transportation demand in the year 2000 on this Rail Link will amount to 1.4 million tons, of which 30 percent is transportation demand between the Upper South and Bangkok, 30 percent is cement transportation from Thung Song to Phangnga and Phuket, and the remaining 40 percent is export cargoes from Bangkok and other regions through Phuket Deep Seaport. Passenger transportation will amount to 1.2 million passengers, in which 20 percent is transportation demand in the subregion, and the remaining 80 percent is transportation to and from Bangkok.

If East-West Rail Link is not developed, problems will appear. Firstly, it will become necessary to provide additional highway capacity to the whole stretch from Bangkok to Surat Thani, coupled with the increasing traffics between the Lower South and Bangkok. Secondly, most of the export cargoes from Bangkok and other regions to the western situated countries will be sent to Bangkok or Leam Chabang Ports, instead. This will result in the decelerated utilization of Phuket Deep Seaport. Thirdly, passengers to and from Bangkok are forced to choose either time-saving but expensive air transport or time-consuming and less confortable bus transport.

Economic internal rate of return of East-West Link is calculated at 18.4 percent. Even if the estimated benefit is reduced by 20 percent, the internal rate of return would remain at 15.6 percent.

We propose to develop East-West Link in a phased manner, involving the first phase to develop two lane highway based on the prototype East-West Link, the second phase to construct Phuket New Bridge, and the third phase to extend East-West Rail Link from Khiri Ratthanikhom to Phuket Deep Seaport.

In order to develop East-West Rail Link, however, it is necessary to allocate a government subsidy for the construction cost of 1.4 billion baht. Financial internal rate of return for this Rail Link is calculated at 11.7 percent, taking the subsidy into consideration. Rail Link is expected to introduce additional export cargoes to Phuket Deep Seaport from Bangkok and other regions. These cargoes will invite increased ship calls to the port, which, in turn, will attract more shippers to use this port. To materialize this favourable circle, it is necessary to reconsider the cost allocation system between the government and the State Railway of Thailand.

Now, I will move to the fourth topic, Khanom Deep Seaport. We understand that decentralization from Bangkok can be achieved successfully in the area with high potentials for internationalization and industrialization. As presented in the preceeding session, the Upper South, particularly Surat Thani Area, is blessed with these potentials. However, transportation development is the fundamental requirement to make these potentials really work. International port is the most important infrastructure in Surat Thani Area in this regard.

Throughout the period of our study, we tried to find the best candidate site for a deep seaport in Surat Thani Area. There are two critical factors for deep seaport; one is a deep water level sufficient to accept ocean going vessels, and the other is urban agglomerations to support functions of the port. Of the seven candidate sites from North Ban Tha Crachai to South Khanom, three sites were selected, namely, Tha Thong, Don Sak and South Khanom. Although Tha Thong Area is situated close to the urban agglomerations of Surat Thani, investment cost would be tremendously high due to the shallowness of the Ban Don Bay. Don Sak and South Khanom are located at about 80 kilometers away from Surat Thani City while they have better accessibility to the international shipping route than Tha Thong. Through the comparative study on these sites, South Khanom is concluded the best, because of firstly, the better manuverability of ocean going vessels to the port with minimum dredging, secondly, the availability of a vast land for future seaboard industrial development at immediate surrounding of the port site in relation with Eastern Seaboard, and thirdly, the less environmental impact over the neighboring areas.

This port will also contribute to saving the cost of inland transportation of resource based products in the hinterland such as rubber, gypsum and fishery products. Khanom Deep Seaport is very important from the viewpoint of the subregional development. Cargo handling volume in the year 2000 is estimated at 820 thousand tons. Major facilities required to the port are the four berths for ocean going vessels, the one berth for promoting industrial relationship with Eastern Seaboard as well as Songkhla, and the navigation channel of 2.4 kilometers. The construction cost including floating craft and cargo handling equipment is estimated at 1.0 billion baht.

Khanom Deep Seaport and Songkhla Deep Seaport would be partly competitive and partly complementary each other. They are competitive in that some part of resource based products from the hinterland will be exported through Khanom Deep Seaport, while they are complementary in that the seaboard industrial development along the Gulf of Thailand will gradually be formulated with its development cores, including Eastern Seaboard, Khanom Deep Seaport and Songkhla Deep Seaport.

At the end of this topic, I would like to touch on the necessity of restructuring port administration system, particularly in view of integrated development of port and industry. There are four points to be taken into consideration; (1) To establish a port authority solely responsible for a specified port area, (2) To integrate port construction and operation functions into the authority, (3) To expand the port area under the jurisdiction of the authority, including the adjacent industrial area, and (4) To encourage marketing activities by the authority.

Now, ladies and gentlemen, in concluding my presentation on the transportation planning of the Upper South, I would like to re-emphasize the strategic importance of Phuket Deep Seaport, East-West Link, and Khanom Deep Seaport in the context of the subregional development. We propose you to proceed to feasibility study on the two projects of East-West Link and Khanom Deep Seaport. As I explained already, East-West Link consists of Road Link and Rail Link. These two links should be studied separately, keeping the different roles and functions in mind. Khanom Deep Seaport should be studied further in close relationship with industrial development study.

The last topic I will discuss is telecommunication system. The availability of easy access to domestic as well as international information sources is one of the most important factors to attract industrial investment, to promote tourism business, and to induce people to settle down in the area.

The present telephone line capacity is 6,200 lines in the Upper South. This capacity meets about half of the telephone demand in the service zone. The line capacity is scheduled to be increased to 44,500 lines by the year 1988 through the Economic Development Project of Telephone Organization of Thailand, 1984-88. By that time, the line capacity will be seven times as much as that of present, or the rate of increase is about 40 percent per annum. Then, the coverage zone of telephone service will be extended to all amphoes by the year 1988, though it is limited to only nine amphoes at present.

Aside from further requirements in the long run, it is the key issue to improve the telephone service of the Upper South just in accordance with the stipulated program.

Now, ladies and gentlemen, I have finished whole of my presentation. I will appreciate your candid comments on my presentation, later. Thank you for your attention.

3. POLICIES AND PROGRAMS FOR URBAN DEVELOPMENT PRESENTED BY MR. KATSUHIDE NAGAYAMA, URBAN AND HUMAN SETTLEMENT PLANNER

Thank you Mr. Chairman. Your Excellencies, ladies and gentlemen, it is my great pleasure to present my idea at this seminar. I suppose that you already have in your mind an image of the basic regional structure which we are aiming at in the Upper South, through the Mr. Koyama's presentation on transportation. Now, I would like to concentrate myself on explaining another important issue of the urban activities to support the major infrastructure such as East-West Link and ports, as well as to support agricultural hinterland activities. My presentation will consist of two issues; (1) The urban projects of high priority together with urban structure plans, and (2) The institutional arrangements necessary for implementation.

Now, let me start with the first issue regarding urban development projects requirement. Our basic physical planning concept is to form a regional structure which enables the local economic integration centering on the potential cities and then to relate this integrated southern economy more closely with those of Bangkok and other countries. For this purpose, it is very necessary to encourage the potential cities to maximize their endowments. In the South, three major cities of Phuket and Surat Thani together with Songkhla/Hat Yai, which has predominant administrative and business functions, are viable enough to perform their roles of leading cities, and Nakhon Si Thammarat, Thung Song and Trang will follow these three leading cities. In the context of this regional structure, I would like to put my focus particularly on Phuket and Surat Thani Urban Developments, which are an urgent need to meet with accelerating urbanization.

For Surat Thani Urban Development, a strategic emphasis is placed on maximizing its locational advantages of being at the midpoint between Bangkok and the South, and at the same time, at another pole of the East-West. On the other hand, an emphasis of Phuket Urban Development is placed on the upgrading of urbanity and attractiveness as an international city to induce new trade and business investments. In other words, the development goals are the Industrial/Goods Distribution Center for Surat Thani and the International City for Phuket.

In order to achieve these goals, key projects are Industrial Promotion and Distribution Center/Truck Terminal Developments in Surat Thani, while they are Deep Seaport Supporting Zone Development and Tourism Development in Phuket.

Regarding the urban infrastructure development, there are crucial, indispensable and urgent projects to satisfy the minimum requirements for city. They are the city water supply system development in both cities, the flood control system development especially in Phuket and the intensive telecommunication system development especially in Surat Thani.