

14. ENERGY

14.1 Energy Consumption Outlook

The UCR is an energy intensive region. Compared to the national consumption which depends 80% on the petroleum products, the UCR has a diversified energy structure, in which lignite and coal play significant role due to the concentration of cement industries (84% of the national total cement production capacity exist in the UCR). Table 14.1 shows a contrast between the UCR and overall national picture. Traditional energy such as charcoal, rice husks, bagasse and firewoods are widely used in both households and industries, agro-industries especially. The traditional energy is supposed to represent about 40% of the total final energy consumption (The share of the traditional energy is 30% of the national level in 1988).

Table 14.1 Final Commercial Energy Supply-Demand Structure

	Unit: 000 TOE,%	
	1988	1988
TOTAL NATION		
Petroleum Products	12,747	79.3%
Lignite	568	3.5%
Imported Coal	240	1.5%
Natural Gas	60	0.4%
Direct Fossil Fuel	13,615	
Electricity	2,459	15.3%
Total Final Energy	16,074	100.0%
UCR		
Petroleum Products	674	45.9%
Lignite	390	26.6%
Imported Coal	223	15.3%
Natural Gas	18	1.2%
Direct Fossil Fuel	1,306	
Electricity	162	11.0%
Total Final Energy	1,468	100.0%

In Thailand, energy consumption increased rapidly at an annual rate of 10% during the recent several years due to industrialization, but in the UCR it increased even faster at a rate of 14% in term of both petroleum products and electricity. Seventy per cent of the energy consumption concentrates on Changwat Sara Buri and Ayutthaya. Toward the year 2010, the total commercial energy consumption will grow by 3.7 times and electricity consumption by 5.6 times in order to meet the economic expansion of the UCR. The total energy consumption of the UCR will account for 9% of the country in the year 2010.

An energy consumption pattern peculiar to the UCR is the use of natural gas for cement and ceramic industries with a natural gas pipeline. In Thailand, natural gas of 580 million standard cubic feet per day (MMSCFD) is consumed mainly for power generation in 1989. Out of this, the UCR consumes 7 MMSCFD at present although it consumed 20 MMSCFD in 1985 when relative price of the natural gas was competitive over other fuels such as lignite.

14.2 Issues and Strategies

There are three major issues in UCR development from the viewpoint of energy.

First issue is how the UCR can make use of its strategic location to be the gateway to Bangkok. In the national energy policy, an increasing emphasis will have to be placed not only on the energy production and import but the energy transportation and transmission management in order to realize stable, secure and efficient supply of energy. The UCR is situated at a strategic place to make use of this increased emphasis.

Fig. 14.1 shows existing and proposed energy infrastructures of the country. Among those in this figure, the UCR should make best use of the following three major national projects for its development especially of industrial activities of the UCR.

- 1) Petroleum products pipeline and distribution center to be developed in the UCR for the BMR, the northern and the northeastern region.
- 2) Onshore natural gas resource development in Khon Kaen and its pipeline system to connect it with the ESB.

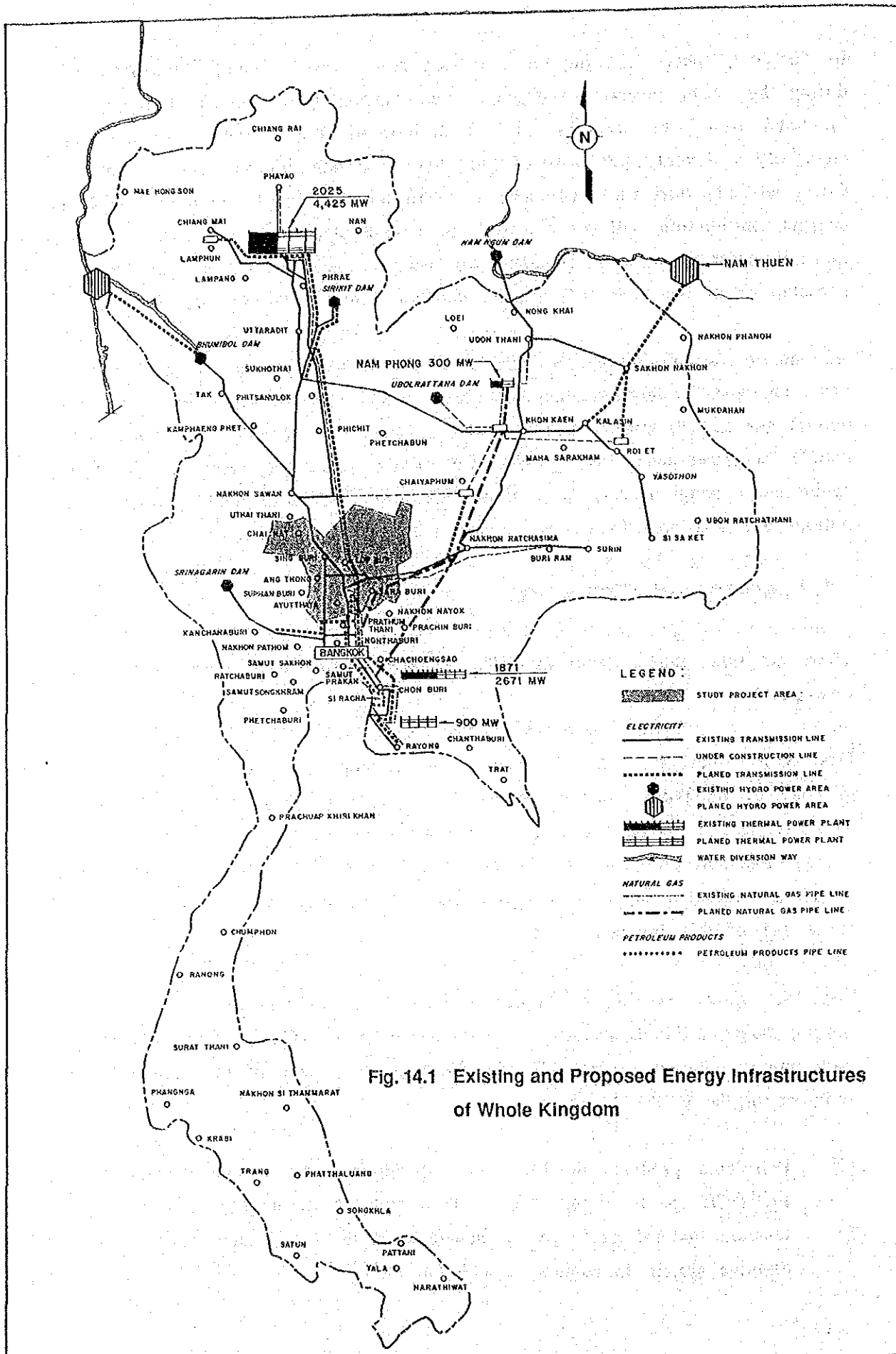


Fig. 14.1 Existing and Proposed Energy Infrastructures of Whole Kingdom

- 3) Ultra high voltage trunk transmission system development with domestic large thermal and international hydro power development.

Second issue, which is related to the first issue as well, is a possibility of utilizing more natural gas for energy intensive industries in the UCR. Although natural gas is used mostly for electricity generation in the country from the financial efficiency viewpoint of electricity generation, a more diversified use of the natural gas, as an energy source being domestically available, may have to be considered from the national economic efficiency viewpoint in the long run. A large dependence of cement industries on coal and lignite may not be so efficient if costs for their transportation and pollution control measures are taken into account. A proposed strategy is, therefore, to make use of the comparative advantages of the UCR in diversifying the use of natural gas, both onshore and offshore. The advantages are, of course, a combination of two factors; the geographical position of the UCR to be between the BMR/ESB and Khon Kaen offshore gas field, and the concentration of cement and ceramic industries, which have large gas absorptive capacity.

The third issue is a possible use of indigenous renewable energy, wastes from post-harvesting and agro-processing in particular. As Thai economy will be more industrialized, it will inevitably become more oil intensive. When international oil prices increase again at industrialized stage, the greatest priority will be placed in the efficiency of energy and material use. In line with a basic development concept for the UCR aiming at agro-industrial co-existence, we propose the promotion of recyclic use of agricultural wastes. The UCR could make best use of its comparative advantage to be the production and distribution center of a large volume of major crops including rice and agro-process.

14.3 Project Recommendation

14.3.1 Petroleum Product Pipeline

In view of an increasing oil demand in the BMR (56% of the national total in 1988 and 63% in 1990), and intensified traffic congestion in the BMR, the petroleum product pipeline from Siracha to the terminal in Sara Buri was studied by Petroleum Authority of Thailand (PTT) in 1989 to serve the northern,

northeastern regions and a part of the BMR. We strongly endorse this study outcome. The project will be useful from the viewpoint of industrializing the GSIC.

The project consists of the following six components with a cost estimate of 2,030 million baht in total,

- 1) The main 185Km trunk pipeline from Siracha pump station to Sara Buri terminal.
- 2) 20Km lateral pipeline from the trunk from the trunk line to East Bangkok Depot.
- 3) Siracha pump station.
- 4) Intermediate pump station 115Km away from Siracha.
- 5) East Bangkok Depot serving jet fuel for the airport as well.
- 6) Sara Buri terminal with rail and truck loading facilities, products storage tanks, pipeline receiving facilities, and pipeline control/maintenance center.

The PTT study proposes this project to be in operation in 1992.

14.3.2 Natural Gas Distribution System and Natural Gas Pipeline from Nam Phong

Nam Phong gas field in Changwat Khon Kaen is ready for production of 40 to 60 MMSCFD for EGAT to generate the electricity of 355 MW in a power plant now under construction at Nam Phong. In future the gas field will possibly attain a production capacity of 250 MMSCFD on the basis of proven reserve to warrant a gas pipeline to major gas absorbing market. It has been learnt that PTT has two alternative ideas of developing the gas pipeline: 1) direct pipeline between Nam Phong and Bang Pakong power plants and 2) pipeline between Nam Phong and the existing pipeline at Sara Buri with possible reverse flows of gas to Bangkok.

From the viewpoint of UCR development, which is expected to cause tripling energy requirement in 2010, it is recommended to set the pipeline route to be connected with the existing pipeline with distribution network system. This project will then open up new comparative advantage of the UCR with readily availability of pollution free, stable and easily controllable fuel source. If it is assumed that just little over 40% of petroleum products demand are converted to

natural gas in the UCR, the gas absorptive capacity will be 61 MMSCFD in 1996, 83 MMSCFD in 2001 and 126 MMSCFD in 2010. The gas absorptive capacity would further increase to 170 MMSCFD in respective years if all of the cement industrial required fuel were converted to natural gas.

In view of these prospects, feasibility study should be conducted on the natural gas pipeline from Nam Phong to the existing system and the natural gas distribution system for the GSIC. This is important for the UCR not only from the energy efficiency viewpoint at the national level but also from the environmental viewpoint.

In addition to the industrial fuel use of natural gas, the city gas possibility in the UCR, especially Sara Buri or Ayutthaya area, should gather due attention. In view of the future LPG market in the nation, this city gas will work complementary to it.

The LPG consumption showed a remarkable growth at 15.5% per annum during the period 1982-1988. In meeting this rapid growth, the country now relies 20% of LPG consumption on imported sources and this trend will continue. If LPG unit price is compared to that of natural gas on the basis of fuel oil equivalent thermal value, natural gas is 60% cheaper than LPG. A strong logic to support the use of natural gas for city gas system exists here. In the UCR, the GSIC and Ayutthaya especially, the demand for city gas would be as large as 3.2 MMSCFD in the year 2010.

14.3.3 Rice Husk Utilization

In the UCR, rice husk is potentially available for power generation. Currently 2.1 million tons of paddy are produced in the UCR. With intensification and diversification programs of the agriculture sector plan, it is expected that 2.3 million tons of paddy are harvested in the UCR in 2010. This volume will provide annually about 469,000 tons of rice husks which is equivalent to 147,000 tons of crude in terms of thermal value. This available biomass resource, if utilized 100%, contributes 1% of total petroleum product consumption in the UCR and if converted to electricity, it will contribute 7% of total electricity consumption in the UCR.

As for the utilization of residues from rice mill, not only the rice husks but also rice brawn is a promising material. The oil from rice brawn can dissolve cholesterol and this oil is traded at a price three times as much as the regular vegetable oils. With the paddy production of 2.3 million tons, about 33,000 tons of rice brawn oil is possibly produced in the UCR. Electricity generation from rice husks will harness these down stream industrial activities.

Simultaneously with power generation by rice husks, it is possible to obtain carbonized rice husks (CRH), by not burning the husks completely. This will further add opportunities to strengthen the resource recycling utilization scheme. CRH effectively works as soil reformer and soil for seed-beds in agriculture and in industrial area it works as heat insulation material, deodorizer/purifier, and materials for bricks. We propose a pilot project to be undertaken.

With readily available rice husk, projects for rice husk utilization can be categorized into two types. One is 100% power generation and the other is produce power as well as producing carbonized rice husks (CRH) for soil reformer. Representative cases for the both alternatives are shown on the table below with assumption of i) 24,000 tons per year rice husk availability and ii) 8,000 hours per year operation.

	Alternative A (Power and CRH)	Alternative B (Power only)
Boiler capacity	6,600 kg/h	10,500 kg/h
Turbine Generator	600 kw	1,550 kw
Husk carbonizer	3 Ton/h	-
CRH Production	4,800 Ton/year	-
Power production	450 kw	900 kw
Energy production	3.6 Gwh/year	7.2 Gwh/year

Private participation is encouraged in this project. The amendment of power sector regulation was initiated in 1989, but this is hoped to actually be applied to possible cases like this proposed project. Rice mill factory or agricultural cooperative could be the project executor. The business incubator system proposed in this industrial plan should fully be utilized to look into the feasibility.

14.3.4 Power System Expansion

In meeting with a rapid growth of electricity consumption in the UCR, EGAT and PEA have a systematic program to expand power system during the 7th Five-Year Plan. We think that our proposal for regional development is in line with this power expansion program and that it should be implemented as scheduled. Major components of the program are as follows:

- 1) Strengthening of power supply for industrial estates in Ayutthaya and Bang Pa-In (EGAT classification Subproject No.2).
- 2) Power supply for Ayutthaya and Sara Buri (EGAT Classification Subproject 3) to meet industrial demands in Thalan and Sara Buri by increasing reliability, improving voltage drop conditions and reducing system losses.
- 3) Power supply by PEA to planned industrial estates (7 in Ayutthaya and 3 in Sara Buri). PEA repays in terms of electricity sales over a period of not less than 3 years. Financing of substation in each estate is arranged by estate developer.
- 4) Transmission System and Substation Development Project: First Stage, aiming to increase of PEA service quality of industrial base.

15. TOURISM DEVELOPMENT

15.1 Current Tourism Activities

Thailand has enjoyed a rapid growth of tourism industry since 1986, and the tourism sector has been the largest foreign exchange earning sector. According to the latest tourism statistics, the international tourist arrivals reached about 4.8 million in 1989, or doubled since 1985. The average increase rate during the rapidly growing period between 1986 and 1989 was as high as 20% per annum as shown in Table 15.1 and Fig. 15.1.

As for the domestic tourist market, "Domestic Tourist Survey" conducted by TAT in 1986 shows that a total number of domestic tourists amounted to 45.8 million. Although current data are not available to know the growth trends of domestic tourists, it is estimated at more than 56 million as of 1989 in view of the growth of per capita national income. It is noted that 49% of the domestic tourists originate from Bangkok according to the survey.

In the UCR, Ayutthaya is the focal tourism spot. Popular nearby Changwat for tourists are Lop Buri, Sara Buri, Ang Thong and Sing Buri. Unlike the other representative resorts like Pattaya, Chiang Mai, and Phuket, the UCR is a destination for one-day trip from Bangkok, and it is a tourism area mainly for the domestic tourists. According to "Domestic Tourism Survey" conducted by TAT in 1987, a total of about 4.63 million people visited the UCR, out of which about 1.64 million people, or 35%, were the tourists who stayed at least one night in the UCR and the others were just travellers who did not stay in the UCR, as shown in Table 15.2. Majority of the tourists and travellers were Thai people who represent 97%. Foreigners are only 135 thousand, or 3% of the total. Out of the total number of foreigners, only 21 thousand, or 18%, stayed at least one night in the UCR.

Table 15.1 International Tourist Arrivals In Thailand by Nationality

	1984	1985	1986	1987	1988	1989
	Unit: thousand					
Asian NIEs 1)	875.3	872.8	1,063.8	1,332.8	1,505.3	1,588.9
Japan	221.9	221.5	259.4	341.9	449.1	547.0
Major ECs 2)	289.4	296.7	367.1	464.4	627.3	703.2
USA	155.3	171.2	196.4	235.9	257.6	282.9
Others	804.7	876.1	931.3	1,107.9	1,391.5	1,687.6
Total	2,346.7	2,438.3	2,818.1	3,483.0	4,230.7	4,809.5
Growth Rate to Previous Year	-	3.9%	15.6%	23.6%	21.5%	13.7%

Source:

Tourism Authority of Thailand

Notes:

1) includes Taiwan, Korea, Malaysia and Singapore

2) includes France, W.Germany and United Kingdom.

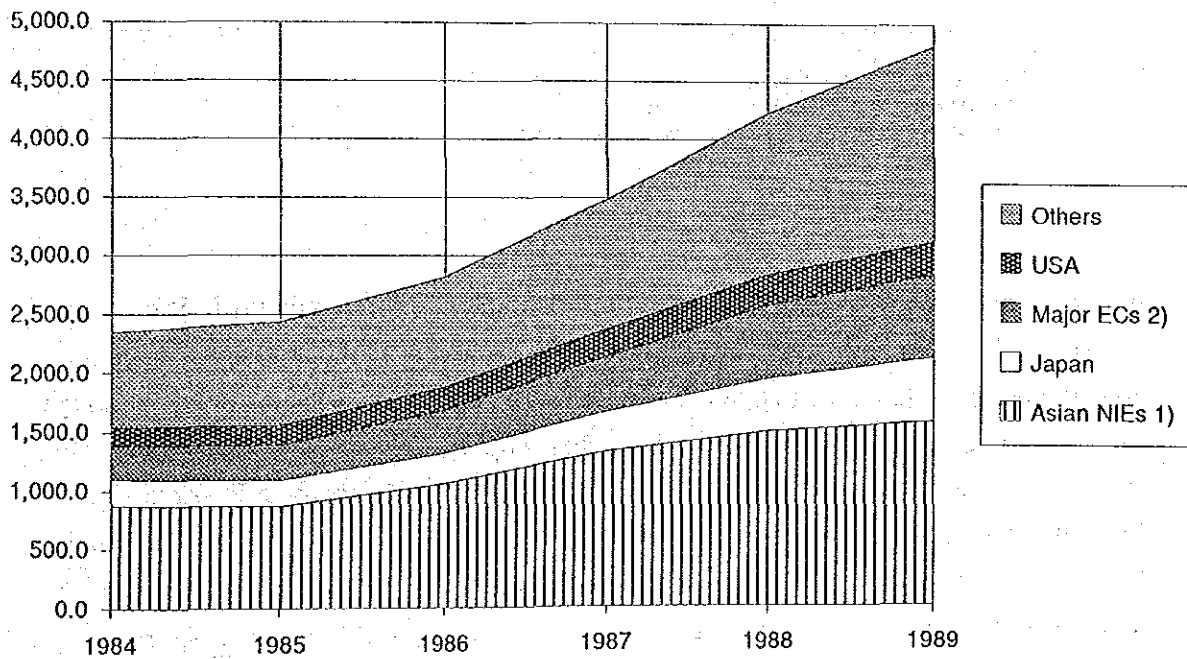


Fig. 15.1 International Tourist Arrivals in Thailand

Table 15.2 Number of Tourists and Travellers in the UCR in 1987

	UCR	Ayutthaya	Ang Thong	Sing Buri	Sara Buri	Lop Buri	Chai Nat
Total of Tourists and Travellers	4,630,524	1,353,808	280,395	506,855	1,234,574	839,179	415,713
Thai	4,495,739	1,225,229	280,395	506,855	1,232,905	834,727	415,628
Foreigner	134,785	128,579	0	0	1,669	4,452	85
Number of Tourists 1)	1,635,028	369,692	117,056	193,274	551,567	263,809	139,630
Thai	1,614,383	352,295	117,056	193,274	549,898	262,315	139,545
Foreign	20,645	17,397	0	0	1,669	1,494	85
Number of Travellers 2)	2,995,496	984,116	163,339	313,581	683,007	575,370	276,083
Thai	2,881,356	872,934	163,339	313,581	683,007	572,412	276,083
Foreigner	114,140	111,182	0	0	0	2,958	0
Share (%)							
Total of Tourists and Travellers	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Thai	97.1	90.5	100.0	100.0	99.9	99.5	100.0
Foreigner	2.9	9.5	0.0	0.0	0.1	0.5	0.0
Number of Tourists 1)	35.3	27.3	41.7	38.1	44.7	31.4	33.6
Thai	34.9	26.0	41.7	38.1	44.5	31.3	33.6
Foreign	0.4	1.3	0.0	0.0	0.1	0.2	0.0
Number of Travellers 2)	64.7	72.7	58.3	61.9	55.3	68.6	66.4
Thai	62.2	64.5	58.3	61.9	55.3	68.2	66.4
Foreigner	2.5	8.2	0.0	0.0	0.0	0.4	0.0

Source: Domestic Tourism Survey in 1987, Tourism Authority of Thailand (1988)

Notes: 1) Tourists who stayed at least one night in the province;

2) Travellers who did not stay or passed through the province

In terms of number of tourists, Sara Buri had the largest number of 552 thousand, followed by Ayutthaya having 370 thousand, and Lop Buri having 264 thousand. Foreign tourists were concentrated in Ayutthaya only, although some fractions were found in Sara Buri and Lop Buri.

General characteristics of tourism activities in the UCR can be identified from Table 15.3. As for transportation mode, it is noted that 28% of the tourists to Ayutthaya use tourist bus, and that for the tourists to Lop Buri, train is a major transportation mode. As for origins of tourists, 36% of the tourists in the UCR come from Bangkok. Ayutthaya attracts tourists from Bangkok at the highest rate, followed by Ang Thong. On the other hand, Chai Nat attracts 35% of tourists from the northern region.

Table 15.3 Characteristics of Tourism Activities in the UCR in 1987

	UCR	Ayutthaya	Ang Thong	Sing Buri	Sara Buri	Lop Buri	Chai Nat
Transportation Mode							
by train	10.4%	12.0%	0.0%	0.0%	4.1%	32.1%	0.0%
by bus	29.1%	28.4%	29.5%	17.4%	40.0%	21.8%	28.3%
by tourist bus	14.1%	27.6%	19.8%	20.7%	2.1%	11.2%	0.0%
by private car	46.3%	32.1%	50.7%	61.9%	53.8%	34.8%	71.7%
others	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Type of Accommodation							
Hotel	29.9%	21.5%	26.1%	29.9%	28.9%	45.7%	29.3%
Bungalow	1.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%
Guest House	0.5%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Others	68.5%	76.0%	73.9%	70.1%	68.1%	54.3%	70.7%
Origin (by region, %)							
North	12.1	6.9	5.5	16.7	6.8	16.5	35.1
Northeast	11.6	7.2	4.8	2.7	27.2	6.9	4.4
Central	23.7	22.4	33.9	42.3	16.9	23.1	19.1
West	6.3	6.4	5.0	8.2	4.7	6.4	9.1
East	7.5	11.4	9.3	5.9	5.9	5.8	4.2
South	2.5	2.2	1.4	0.6	1.4	3.6	7.2
Bangkok	36.3	43.5	40.1	23.6	37.1	37.8	20.9
Av. Length of Stay (days)	2.75	2.20	2.61	2.23	1.94	2.34	3.24
Av. Expenditure (Baht/person/day)							
Thai tourist	274	356	243	354	211	219	335
Foreigner	740	812	0	0	352	350	511

Source: Domestic Tourism Survey in 1987, Tourism Authority of Thailand (1988)

15.2 Tourism Market Potential

The future tourism demands for Ayutthaya is estimated based on "the Preliminary Study for Tourism Development of Ayutthaya and Nearby Provinces" by Tourism Authority of Thailand (TAT) in 1988.

We estimated the tourists demands based on the assumptions that the domestic tourism demands are likely to increase at a bit higher rate than that of per capita income growth, and that the demand for international tourists will be dependent upon the attractiveness of the destination, but would not decrease the present share even in future. The outcome shows that a total number of tourists visiting Ayutthaya will reach 1.3 million, as shown in Fig. 15.2.

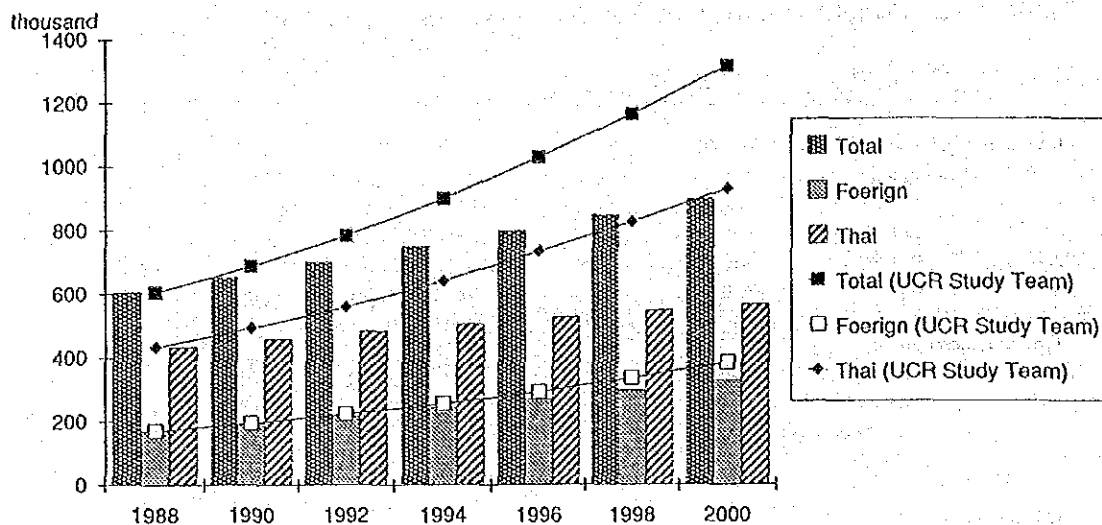


Fig.15.2 Tourist Demand Projection to Ayutthaya by Tourism Development Master Plan (1988, TAT) and the UCR Study Team

A total of the tourism demands in the UCR can be estimated, based on the above projection in Ayutthaya, that is, the UCR as a whole, is thought to attract about 3-4 times as many as the tourists in Ayutthaya. As a result, it is estimated that the tourism market potential in the UCR will be about 4.0 - 5.2 million in 2001, compared with that of 1.6 million as of 1987.

15.3 Tourism Resources

Table 15.4 shows the inventory of these tourism resources in the UCR and Fig. 15.3 illustrates the location of these resources. In this region, tourism resources of each Changwat are not various but rich in historical assets such as ancient monuments and religious/traditional monuments such as temples. Most of the existing historical sites and ancient monuments are located in town areas; the Ancient City Island of Ayutthaya and Lop Buri City. There also exist a number of historical and academically-valuable cultural assets, which have not been exposed for tourism, alongside both the Chao Phraya River and the Noi River. At present, Bang Pa-In Palace and Folk Arts and Crafts Center at Bang Sai are popular among international tourists.

Natural resources, represented by the Khao Yai National Park, are located in the eastern area in Sara Buri, extending over Changwat Sara Buri, Nakhon

Table 15.4 Tourism Resources in the UCR

	Historical and Religious Places	Natural Beauty Places	Religious, Culture, Custom, Life Style and Other
Chal Nat			Bird Ground and Straw Bird Procession.
Sing Buri	Kal Bang Rachan Park; the Intri-Buri National Museum; The Ancient Kiln at Pra Phrang Temple, Amphoe Bang Rachan.		The Reclining Buddha Wat Chak Sri Worawiharn; Wat Pikunlong, Amphoe Ta Chang.
Ang Thong	Kam Yard Residence, Amphoe Po Tong; Ancient City Ruins, Amphoe Sawaeng Ha	Rice-Field Birds, Amphoe Sawaeng Ha.	Wat Chalayo Worawiharn, Amphoe Chalayo; Wat Pamok Worawiharn, Amphoe Pamok; Wat Khun In Promood, Amphoe Po Tong; Wat Wiset Chal Charn, Amphoe Wiset Chal Charn; Mural Paint at Wat Kien, Amphoe Wiset Chal Charn; Miniature Boat Dolls Village of Bang Sadet, Amphoe Pamok; Drum Making Village of Ekkarat, Amphoe Pamok; Basketry Village of Bang Chao Cha; Amphoe Po Tong.
Ayutthaya	Ancient Palace, Wat Phra Sri Sanphet, Wat Phra Rama, Wat Phra Mahathat, Wat Rajaburana, Chedi Phu Khao Thong, Wat Yai Chal Mongkol, The Elephant Kraal, Chandra Kasem Palace, Foreigner Village, Bang Pa In Palace.		Viharn Pra Mongkol Bopit, Khun Phaen House, The Chao Sam Phraya National Museum, Wat Panan Choeng, Wat Nivet Thamprawat, Royal Folk Arts and Crafts Center at Bang Sai, Way of life along the Chao Phraya River.
Lop Buri	Phra Prang Sam Yot, Narai Raichanivet Palace, Wat Phra Sri Maha Thart, Vichayon House, Prang Khack, Wat San Paulo, Wat Sra Thong, The Hindu Shrine.		San Phra Karn, Wat Lai.
Sara Buri		Phra Buddha Baht Temple; Phra Buddha Chai Temple Kusuma Garden	Pra Pho Thi Sai Cave; Pra Thait Cave; Muak Lek Waterfall; Jod Sao Noi Waterfall National Park; Sam Lan Waterfall National Park.

Ratchasima, Prachinburi and Nakhon Nayok. These mountainous beauties are some of strong attractions around Bangkok, in contrast to the coastal tourism attractions such as Pattaya and Hua Hin. Khao Yai is potentially an attractive resort for not only Thai but international tourists.

15.4 Potentials and Constraints

Major attraction of Ayutthaya is located near the center of Bangkok (approximately 75 kms.) and is accessible by any of bus, train and boat. This relatively short distance is an advantage of Ayutthaya over other places of tourist attraction. The UCR is endowed with river boat access, which has tourism attractiveness in itself. Based on these endowments and transport conditions, TAT has promoted it as a tourism spot suitable for one-day sightseeing trip destination from Bangkok since the Fourth National Economic and Social Development Plan. In spite of these market and resource potentials, the UCR has not relatively been a major tourism area due to several interrelated constraints as follows:

First, the UCR is too close to Bangkok to be a tourism destination for overnight stay. Day trip tourists naturally spend much less amount of expenditure than overnight trip tourists with a result that substantial tourism investments have not been warranted. The lack of sufficient overnight trip tourists party

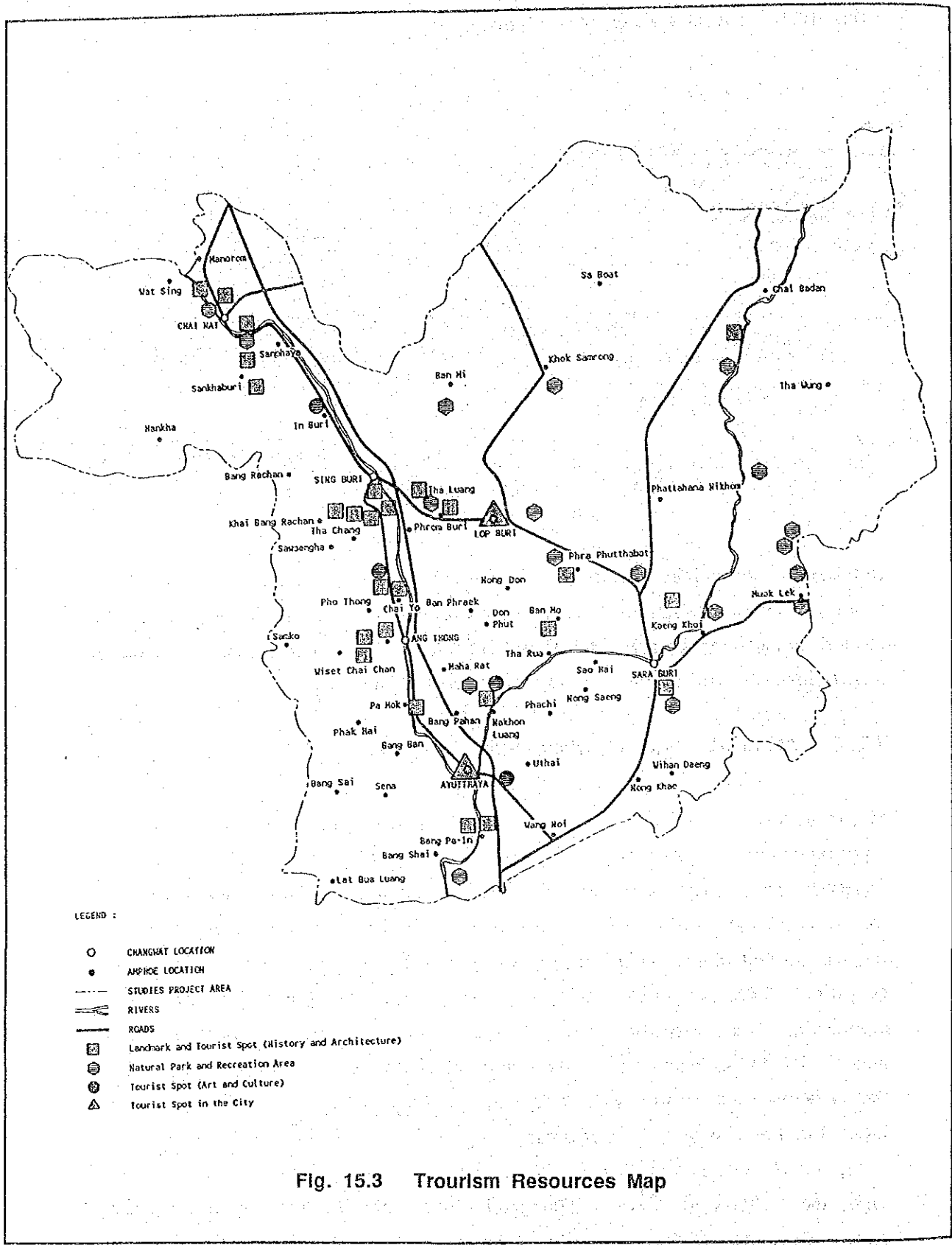


Fig. 15.3 Trourlism Resources Map

results in this lack of investments to make up historical and cultural assets as tourism attractions.

Second, in spite of a variety of the historical and cultural assets scattered over the region, they are all more or less similar in the eyes of tourists because these assets are not given with such man-made attractions that would add distinguished characteristics to different places.

Third, the UCR lacks the attractive cities where tourists can enjoy overnight stay with shopping and dining. Existing accommodations and entertainment service can serve only for local market. Most hotels are small and not up to a standard for international tourists. There are also a small number of restaurants and souvenir shops.

Fourth, although historical and cultural assets have fairly been restored with effort of the Department of Fine Arts, such effort has been confined to individual spots of historical and cultural building. Looking at these assets as a group to form tourism environment, however, sufficient effort has not been made to improve and conserve the environment with proper land use control.

15.5 Review of Development Directions in Previous Studies

Regarding UCR tourism, three preliminary studies and one master plan have been made by TAT and development directions and policies are elaborated in "Tourism Development Master Plan of Ayutthaya and Nearby Provinces (1988)" which provides useful insights and considerations for the UCR Study. This master plan is briefly reviewed as follows.

1) The plan has proposed a strategy for tourism development of Ayutthaya under a concept of promoting Ayutthaya as *the center for over-night visitors and international entrance stop* with attention to preservation of natural resources. The development guidelines for this end has been proposed as follows:

- (1) Marketing Promotion: It is proposed to create a new tourism image of Ayutthaya by emphasizing on the ancient city with long tradition with providing new activities for tourists who are interested in historical and cultural tours.

- (2) Tour Loop Arrangement: The master plan has proposed promotion of tourism loops from Ayutthaya to other nearby provinces. Ayutthaya is recommended to be *the tourist center of the region*. The tourism loops are:
- One-day trip: Ayutthaya - Sing Buri - Lop Buri - Sara Buri - Ayutthaya;
 - Half-day trip: Ayutthaya - Suphan Buri - Ang Thong - Sing Buri - Ayutthaya
 - 3/4 day trip: Ayutthaya - Bang Pa In - Bang Sai - Ayutthaya.
- (3) Transport Network and Public Services: The plan has proposed expansion of public utility services to cope with the growing market and an integrated transportation system combined with river cruise, train and coach from Bangkok to Ayutthaya and other Changwat. The plan also proposes development of networks of the second tourism resources groups such as Ancient City, Bang Pa In, Foreign Villages, Ancient Elephant Kraal, Ayutthaya, Nakhon Luang Palace and the southern and western riversides of the Ancient City Island.
- (4) Handicrafts Development: The plan recommends to revive the well-known ancient style handicrafts and improve these designs so as to fit for daily uses. The development of local handicraft will contribute to not only tourism promotion but also generation of local people's income.
- (5) Local Cultural Development: The proposed project are to revive and improve the arts and traditions in order to fascinate visitors with well planned programs being operational all year round.
- (6) Services and Facilities Development: The plan recommends to construct more standard tourist hotels and accommodations as well as more souvenir shops and restaurants. The plan also proposes a number of facilities for improvement of the tourism environment, that is, construction of tourist landmarks both on-land and riverside; *Ayutthaya Historical Study Center*, permanent

light and sound presentation; permanent elephant show at Ancient Elephant Kraal; great pond for fresh water fish and so on.

2) The master plan has proposed guidelines for tourism development in other Changwat as follows:

(1) Sara Buri: Based on domestic tourism demands, this region should be developed as a supplementary tourism destination to Ayutthaya with natural recreational resources together with historical and religious sites. Picnic or camping areas could be feasible by providing security measures and improved accessibility.

(2) Lop Buri: As the second royal city, the town tourism of Lop Buri should be more encouraged with improvement of presentation of ancient architectural monuments and valuable cultural assets. Promotion of joint tour programs with Ayutthaya and Lop Buri could be effective. The most important measures are proper restoration of a these cultural assets, land use regulation, resource use control for tourism, city cleaning service and provision of security system.

(3) Ang Thong and Sing Buri: Both areas endowed with the similar nature of resources should be developed as supplementary destination and should be involved in the tour loops centered on Ayutthaya. In Ang Thong, special emphasis may be placed on its handicrafts production and river tourism to attract international tourists who are interested in rural life in Thailand.

(4) Chai Nat: The master plan describes that Chai Nat is so far from the influence of tourism promotion of Ayutthaya, hence, that this area should be involved in development polices in the lower northern region.

15.6 Recommendations

15.6.1 Policies

Importance is a basic recognition that tourism development should be concordant with policies for regional economic and social development as well as natural and cultural resources conservation. Given proper policies for tourism promotion and development, tourism could be a stimulus to boost the regional economy and be a promising industry to quickly generate regional income and create more employment opportunities. A proper pace for growth is significant so that the region may keep up with social changes and the local authorities may manage the costs for eliminating the external diseconomies. A rapid growth of tourism should not necessarily be urged, but rather steady development should be engaged based on long term perspectives.

With potential market both domestically and internationally and distinct strength in the historical and cultural resources as well as in the inland natural beauties, the UCR is assessed to become one of the outstanding national and international tourism destinations in the long run. Development policies should be taken toward this goal, and may be divided into two phases: short- and medium-term (the 7th and 8th National Plan period:1992 - 2001) and long-term (beyond 2001).

In short- and medium-term, an emphasis should be given to the fullest utilization of major existing tourism resources, including Ayutthaya and Lop Buri, so that they may become major international tourism areas as a stop-over destination. In long-term, historical and cultural assets in the rest of the UCR should be integrated into loops of both international and domestic tourism with a base at Ayutthaya and improved urban services and amenities of other major cities, including Sara Buri, Ang Thong, Sing Buri and Chai Nut. These tourism developments with improved urban services and amenities will encourage to attract not only tourists but those engaged in urban service activities.

Regarding programs and projects, the proposals and recommendations presented by the master plan titled "Tourism Development Master Plan of Ayutthaya and Nearby Provinces (1988) ", which is reviewed in the preceding section, are appreciable enough to be considered. Keeping this in mind, more

emphasis should be placed on the local people's participation in tourism industry and activities.

15.6.2 Measures

The following measures need to be taken:

1) Ayutthaya should be shifted from an area for one-day sightseeing to that for new stop-over destination especially of international tourists. Target tourism resources for promotion will include:

- Historical sites of the Ancient Ayutthaya Island and the Ancient Elephant Kraal;
- Bang Pa-In - Bang Sai;
- The Ancient City Ruins of Lop Buri; and
- The Kai Bang Ra Chan Monument in Sing Buri.

In this regard, a greater effort should be made in promoting *river tour*, as a selling strategy, in which the traveling loops could be : Bangkok - Ayutthaya and Ayutthaya - Bang Pa In - Bang Sai or Ayutthaya - Ang Thong as well as short boat trips in Ayutthaya area. Also, *Public Relations and Campaign* should be employed to create new regional image. These can be managed through all kinds of media.

2) Khao Yai National Park is another resource attractive enough to both international and domestic tourism and recreational demands. It is recommended that TAT will put its development plan forward in collaboration with Department of National Parks, in a controlled manner with strong attention to the natural conservation. Excessive development by private sector should be avoided.

3) More investments should be made to enhance urban services and improve urban sanitary conditions in major cities. Urban amenities should be promoted in addition to the existing historical, cultural and natural assets. Special attention should be paid to the followings:

- (1) Improvement of public utilities, sewerage and garbage disposal in particular, in Ayutthaya, Lop Buri, and Sara Buri Cities.

- (2) Encouragement of the provision of hotels accommodations at an international standard.
 - (3) Upgrading of the main entrance to promote "Sense of Arrival" for visitors coming to Ayutthaya by boat. Fort Petch by Chao Phraya River is suggested as the landmark point. It is necessary to provide facilities to support the river tour such as piers at Bang Pa In, Ancient City and Handicraft Center of Ang Thong.
 - (4) Targets for new investments in added man-made attractions especially in Ayutthaya and its vicinities should include the projects proposed by the master plan (TAT) such as:
 - The Chedi of Wat Sam Pleum as the landmark point for visitors who travel by coach or passenger car.
 - Development of City Plaza of Ayutthaya Historical Parks to attract night spending tourists all year round.
 - Constructing of the Four Royal City and Ayutthaya Tower for the bird-eye view of Ayutthaya historical Parks.
 - Integrated improvement of landscaping, sign boards, direction signs, story boards and information center in specific target areas.
 - Sport facilities at international standard.
 - (5) Centered on Ayutthaya, tourism excursion loops named "*Explore the Origin of Thai Culture*" are recommended to be organized and promoted as proposed by the master plan (TAT). This kind of tours should be encouraged as educational tours for Thai school children.
 - (6) Within these loops, added attractions should be made by making full use of characteristics of existing local economic activities such as handicraft industries at Ayutthaya and Ang Thong.
- 4) Restoration of ancient ruins and their immediate environment especially in Khun Phan Residence of Ayutthaya and Ancient City of Lop Buri should be encouraged in the long run in collaboration with Department of Fine Arts and academic areas. Land use control and

building regulations to maintain the environment are strongly necessary in these areas.

- 5) Because of disadvantage of long distance from Bangkok and Ayutthaya, Chai Nat is hardly involved in the tourism zone centered on Ayutthaya. However, this province has maintained natural beauties, the typical feature of Thai rural life style and religious/cultural assets alongside the Chao Phraya River. Using these resources, Chai Nat is recommended to be developed as one of river cruising stations like "*Center for River-Side Exploration*" with a river-port pier, restaurants, information center, festival deck and so on. In order to overcome its location disadvantage, this project would need specially well-organized promotion activities supported by TAT.

15.6.3 Local Participation

In implementing the above measures, an essential need is local participation. We propose tourism development in the UCR as an important component to stimulate the local economy and urban service activities. Tourism development without local participation tends to result in the creation of tourism enclaves with very limited local economic impact, the imbalance between tourism investments and local environmental and infrastructure capacities and the deterioration of local spirit to maintain and enhance historical and cultural assets. This is particularly true in the tourism areas like the UCR where the tourism attractions such as historical and cultural assets coexist with local communities.

In the UCR, the local participation should be encouraged particularly in the following fields:

- 1) Enhancing local peoples awareness of historical and cultural assets through formal and nonformal education and locally initiated campaign.
- 2) Strengthening the role of Changwat Chamber of Commerce in the information exchanges between the hotel investors, both local and external, and the other local tourism-related industries such as shops,

restaurant, and the various potential local suppliers of food and other materials for hotels.

- 3) Supporting the traditional festivals and cultural shows involving local communities in coordination with tourism campaign of TAT.
- 4) Supporting local investors, local communities/groups and people's organizations to launch and manage new tourism projects and business.

Tourism related to local industries is another important way of local participation, and may provide direct benefits for local people with less economic externalities. Handicraft industries should be encouraged with a tourism purpose, improving quality and design of the products.

Agriculture-related tourism may be another facet of local participation. Making use of diversified agricultural activities, several ideas can be considered, e.g., "tourism ranch" where fresh milk, meat, primary processed agro-products, experience of live stock work can be provided; "fresh food park" where serves fresh fish and meals; and "fruits heaven" where tourists can experience harvesting of fruits and enjoy shopping of fresh fruits and more sophisticated fruit processed goods at low prices. Local people's attempts of this kind of business should be supported by TAT's promotion activities.

16. PROPOSED PROGRAMS AND PROJECTS WITH PHASING

16.1 Programs and Projects by Sector

Environment

Short-Term Projects/Programs

- Preparation of Guidelines for Land Use and Environment Control
- Comprehensive Environment Study of the Chao Phraya River basin
- Initial Organizational Arrangement for Environment and Water Management of Chao Phraya Basin

Human Resources

Short-Term Projects/Programs

- Trial Implementation of Compulsory Secondary Education

Medium-Term Projects/Programs

- Strengthening of Provincial Non-formal Education Center
- Audio-Visual System Development for People Education

Agriculture and Land Use

Short-Term Projects/Programs

- Preparation of Nation-wide Land Use Zoning System for Development and Conservation
- Agroforestry Program

Medium-Term Projects/Programs

- Upland Land Consolidation
- Dairy Promotion

Industry

Short-Term Projects/Programs

- Village Industry Promotion Centers
- Business Incubator

Medium-Term Projects/Programs

- Integrated Agro-Industrial Park
- Agro-Tech Center

Distribution and Marketing

Short-Term Projects/Programs

Fostering Farmer's Organization

Medium-Term Projects/Programs

Distribution Center

Distribution Complex

Agricultural Products Distribution Center

Urban and Human Settlement

Short-Term Projects/Programs

Organization of Inter-city Cooperation (Local Authorities Association)

Implementation of Development Master Plan Study for the GSIC

Preparation of Guidelines for Industrial Locations and Urban and Housing Development in both Ayutthaya and Saraburi Sub-Regions

Medium-Term Projects/Programs

Secondary Order Center Development

Sub-regional Center Basic Urban Needs Project

Strategic Regional Center Development (GSIC Project Package)

Urban and Environmental Development Fund

Implementation of Urban Utilities and Infrastructure Projects

Development of a Housing Complex by the Public Initiation with the Private Sector Involvement

Promotion of Redevelopment Projects in the Saraburi Central Business District

Development of Goods Distribution Terminal and Improvement of Food

Wholesale Market in Saraburi City

Preparation of Guidelines for Relocation of Bangkok-Based Facilities to the GSIC

Long-Term Projects/Programs

Strategic Regional Center Development (GSIC Project Package)

Inducement of Higher Metropolitan Functions (Higher Education and Medical Facilities)

Preparatory Work for a Rapid Transit System Development between Bangkok and Saraburi

Water Resources

Short-Term Projects/Programs

- Chao Phraya Irrigation Operation Improvement Project
- Preparation of Pasak Dam Project
- Pasak Small Water Resources Projects
- Pasak Medium Water Resources Projects
- Groundwater Potentials Study Project

Medium-Term Projects/Programs

- Chao Phraya On-farm Pond Development Project
- Chao Phraya Feeder Canal Rehabilitation Project
- Pasak On-farm Water Storage Project
- Pasak Dam Project
- Strengthening of Water User's Groups and Cooperatives
- Participation of Water User's Groups and Cooperatives in Crop Planning and Irrigation Water Allocation

Transportation

Short-Term Projects/Programs

- Tha Rua to Sara Buri Highway Project (East-West Link Highway)
- Suphan Buri to Tha Rua Highway Project (East-West Link Highway)
- Klong 19 - Kaeng Khoi Railway
- Bangkok Outer Ring Road
- Sara Buri By-pass

Medium-Term Projects/Programs

- Ayutthaya to Lop Buri Highway Project
- Pasak River Collector Roads
- Tha Rua to ESB Highway Project

Energy

Short-Term Projects/Programs

- Petroleum Product Pipeline
- Natural Gas Distribution System and Natural Gas Pipeline from Nam Phong

Medium-Term Projects/Programs

- Rice Husk Utilization
- Power System Expansion

Tourism Development

Short-Term Projects/Programs

Intensive investment to maintain and upgrade tourism assets and facilities at Ayutthaya

16.2 Project Packages

All the projects listed below are included in the "Programs and Projects by Sector" of the previous pages.

Integrated Pasak River Basin Development Package

Short-Term Projects/Programs

Preparation of Pasak Dam Project

Pasak Small and Medium Water Resource Development

Pasak Integrated Farming system Development
(Agroforestry Development)

Medium-Term Projects/Programs

Dairy Farm Promotion

Pasak Dam Development

Pasak Integrated Farming system Development
(Upland Land Consolidation and On-farm Storage Development)

Greater Saraburi Industrial Core Development Package

Short-Term Projects/Programs

Organization of Inter-city Cooperation
(Local Authorities Association)

Implementation of Development Master Plan Study for the GSIC

Preparation of Guidelines for Industrial Locations and Urban and Housing Development in both Ayutthaya and Saraburi Sub-Regions

Medium-Term Projects/Programs

Secondary Order Center Development

Sub-regional Center Basic Urban Needs Project

Strategic Regional Center Development (GSIC Project Package)

Urban and Environmental Development Fund

Implementation of Urban Utilities and Infrastructure Projects

Development of a Housing Complex by the Public Initiation with the Private Sector Involvement

Promotion of Redevelopment Projects in the Saraburi Central Business District

Development of Goods Distribution Terminal and Improvement of Food Wholesale Market in Saraburi City

Preparation of Guidelines for Relocation of Bangkok-Based Facilities to the GSIC

Long-Term Projects/Programs

Strategic Regional Center Development (GSIC Project Package)

Inducement of Higher Metropolitan Functions

(Higher Education and Medical Facilities)

Preparatory Work for a Rapid Transit System Development between Bangkok and Saraburi

Agro-Industrial Linkage Development Program Package

Short-Term Projects/Programs

Agricultural Cooperative Development

Medium-Term Projects/Programs

Agricultural Products Distribution Center

Distribution Center Complex and Agro-Industrial Park

Secondary Order Center Development

East-West Highway and Pasak River Collector Roads

Agro-Tech Center

Human Resources Development Package

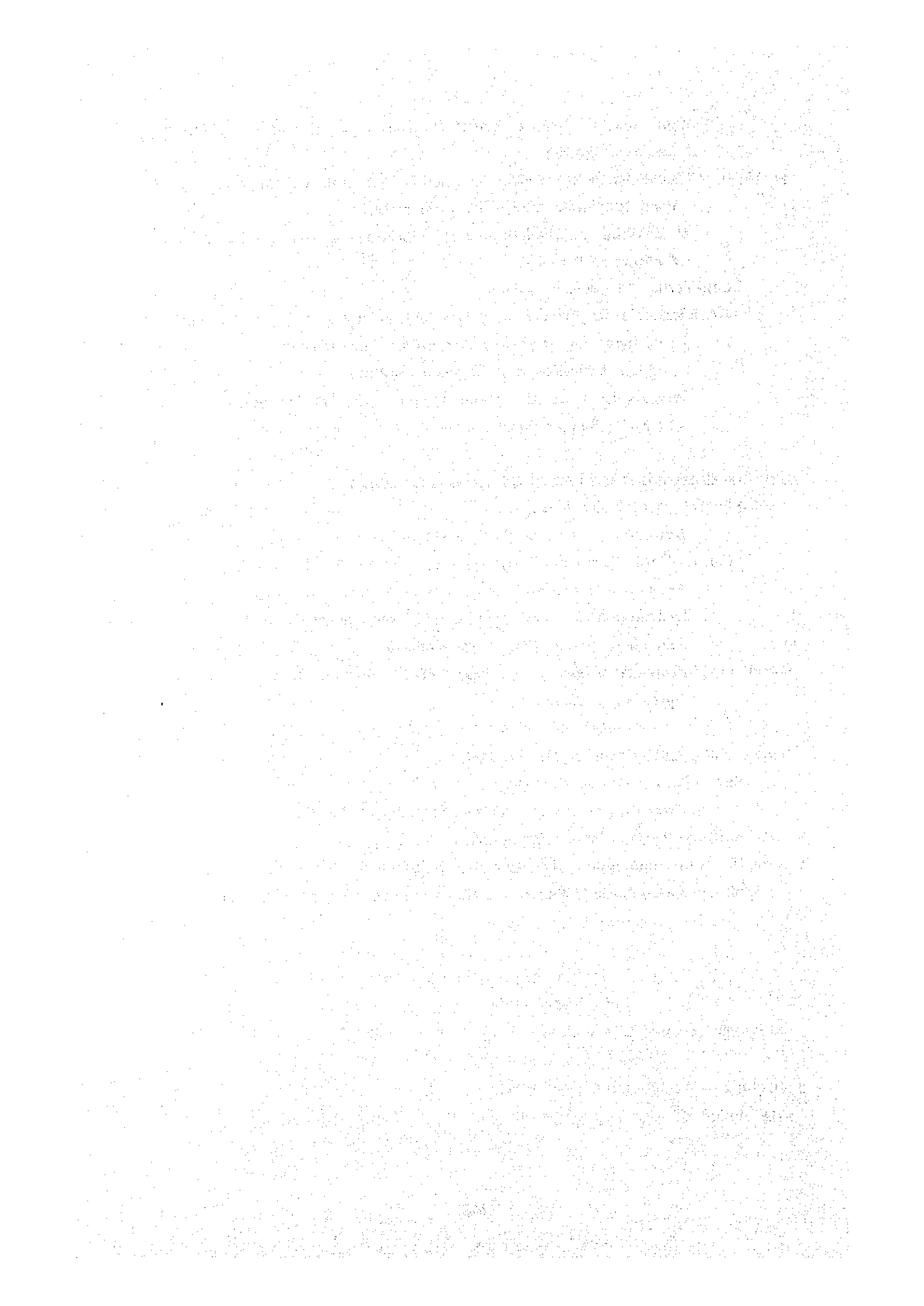
Short-Term Projects/Programs

Pilot Project of Compulsory Secondary Education

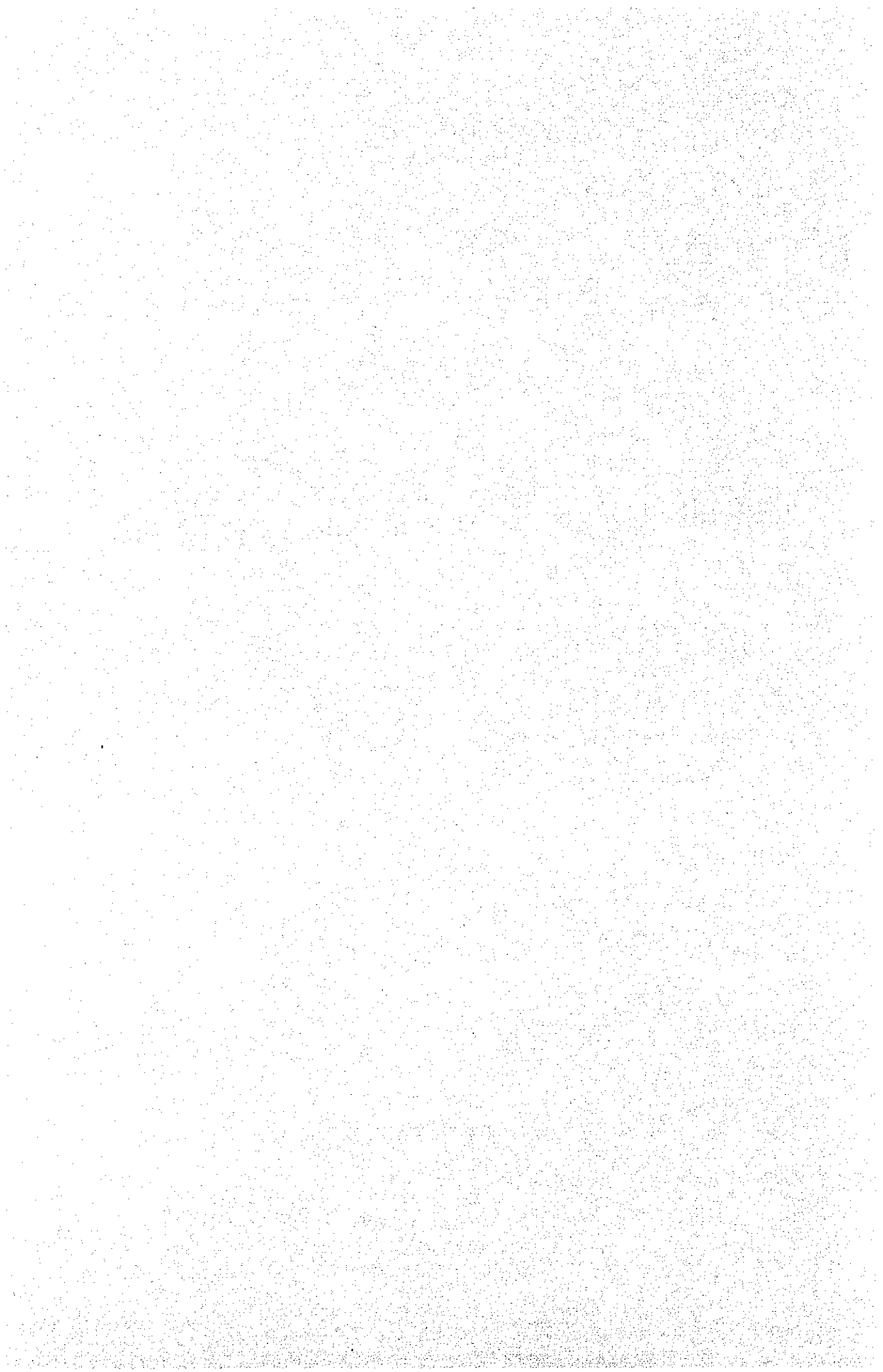
Medium-Term Projects/Programs

Strengthening of Provincial Non-formal Education Center

Audio-Visual System Development for People Education



APPENDIX 1. LIST OF STUDY REPORTS AND PAPERS



APPENDIX 1. LIST OF STUDY REPORTS AND PAPERS

1. REPORTS

Design for the Study

Inception Report

Inception Report: Amendment

Progress Report

Interim Report

Executive Summary

Master Plan Report

Technical Reports

- Vol. 1 Spatial Framework for Development
- Vol. 2 Environmental Management
- Vol. 3 Land Use and Agricultural Development
- Vol. 4 Industrial Development
- Vol. 5 Distribution
- Vol. 6 Water Resources Management
- Vol. 7 Transportation
- Vol. 8 Economic Environment
- Vol. 9 Local Government Finance
- Vol. 10 Energy
- Vol. 11 Landsat Analysis

Draft Final Report

Executive Summary

Master Plan Report

Sector Reports

- Vol. 1 Spatial Framework and Network for Development
- Vol. 2 Urban Management
- Vol. 3 Environmental Management
- Vol. 4 Water Resource Management, Agricultural Development and Land Use Management
- Vol. 5 Industrial Development
- Vol. 6 Distribution and Marketing
- Vol. 7 Energy
- Vol. 8 Social Development in Rural Economies
- Vol. 9 International and National Economic Environment
- Vol. 10 Human Resource Development
- Vol. 11 Landsat Analysis

Final Report

Executive Summary

Master Plan Report

Sector Reports

- Vol. 1 Spatial Framework and Network for Development
- Vol. 2 Urban Management
- Vol. 3 Environmental Management

- Vol. 4 Water Resource Management, Agricultural Development and Land Use Management
- Vol. 5 Industrial Development
- Vol. 6 Distribution and Marketing
- Vol. 7 Energy
- Vol. 8 Social Development in Rural Economies
- Vol. 9 International and National Economic Environment
- Vol. 10 Human Resource Development
- Vol. 11 Landsat Analysis

2. PAPERS

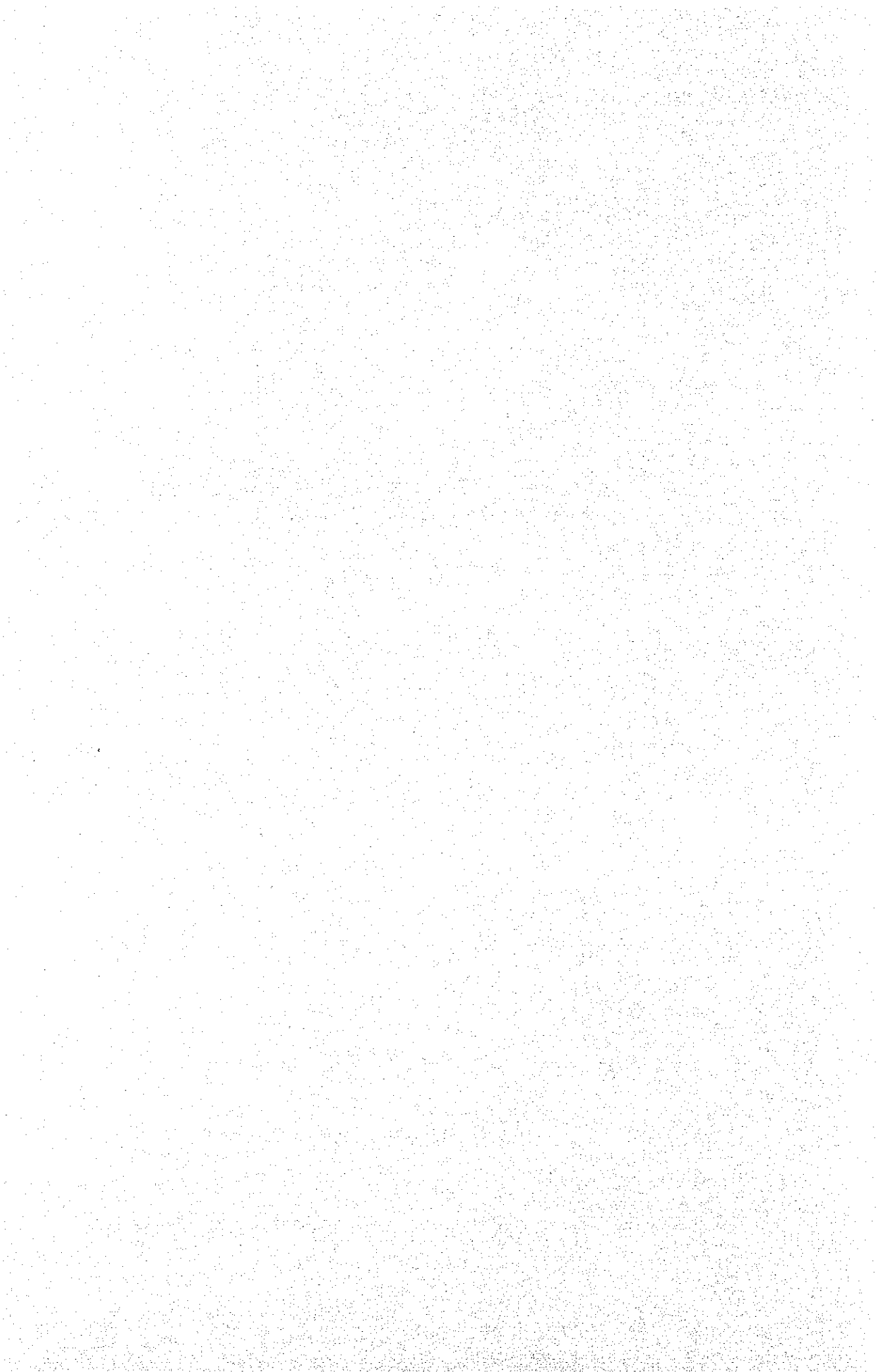
Papers for Seminar, Sara Buri, November 2-3, 1989

1. Development Framework, Strategies, and Production
2. Urban, Land Use and Infrastructure Development
3. Critical Issues for Development Management

Papers for Seminar, Pattaya, July 28-29, 1990

1. Agriculture and Water Resources: Policies and Programs
2. Industry and Energy: Policies and Programs
3. Urbanization and Infrastructure Facilities: Policies and Programs
4. Development Administration and Environmental Management: Policies and Programs

APPENDIX 2. STAFF INPUT



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CUSRI:	Chulalong Korn University Social Research Institute
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IDCJ:	International Development Center of Japan
PCI:	Pacific Consultants International
SOMC:	Shinko Overseas Management Consultant

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