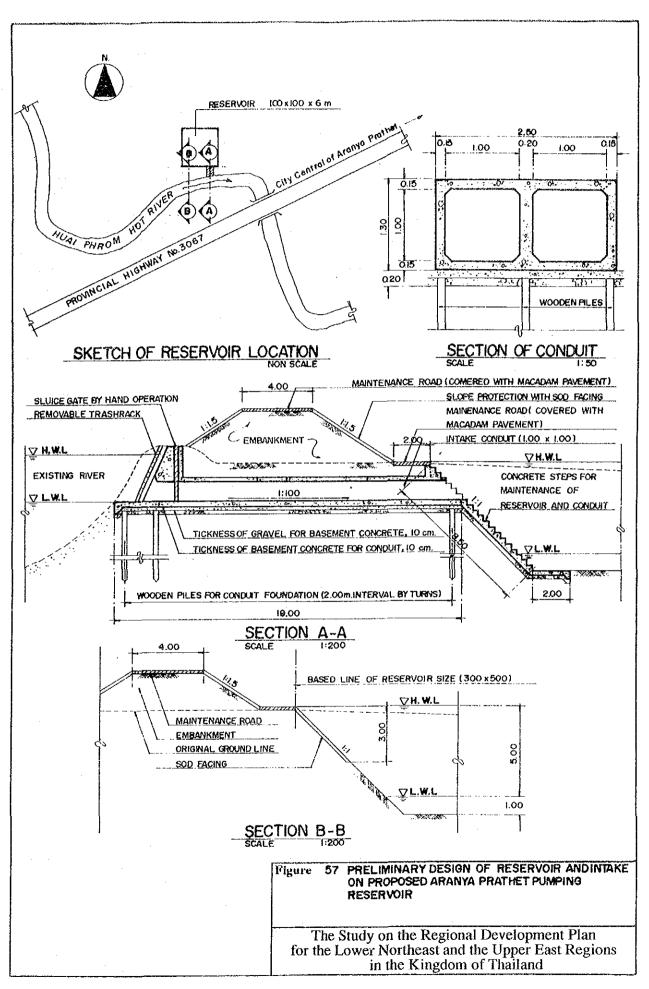
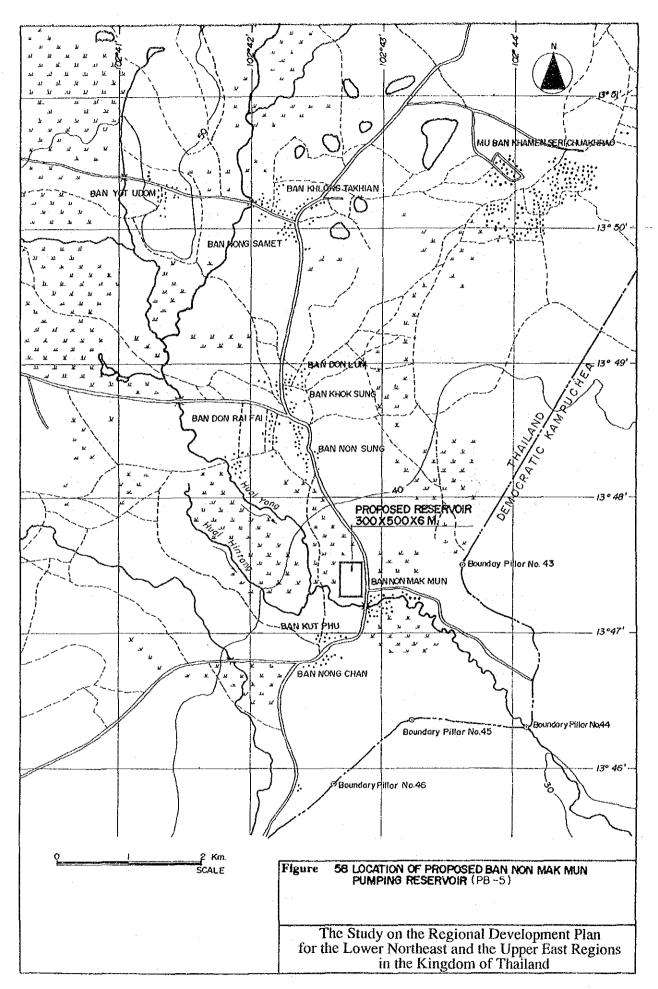
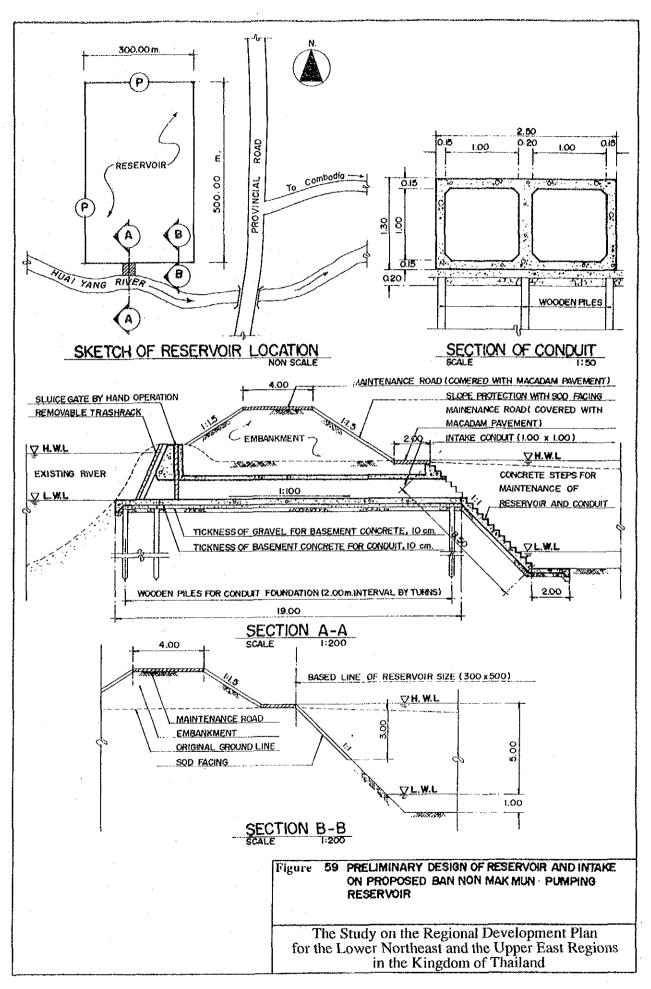
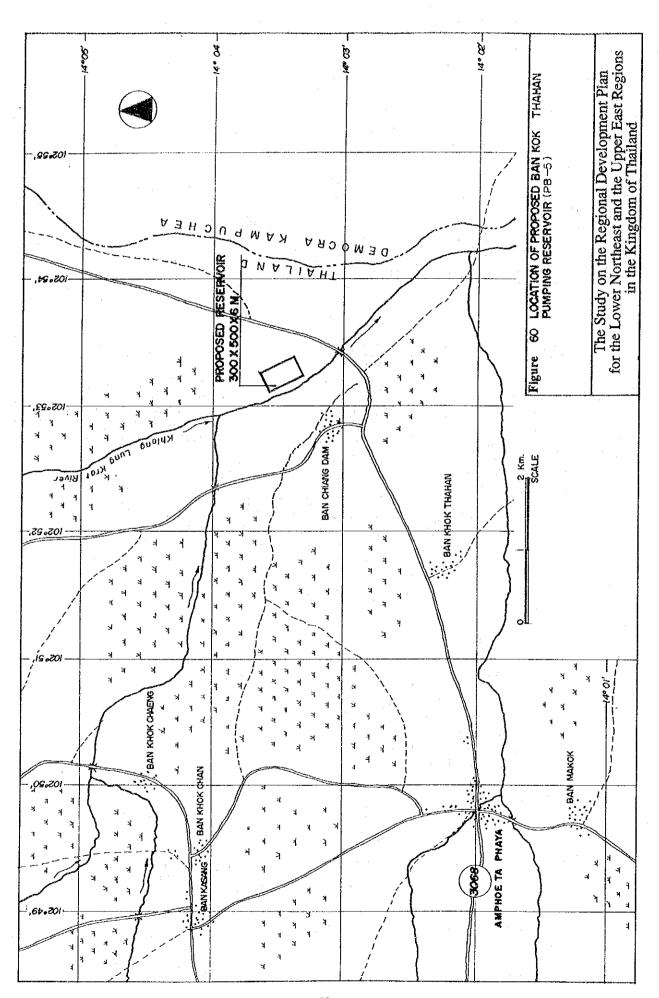


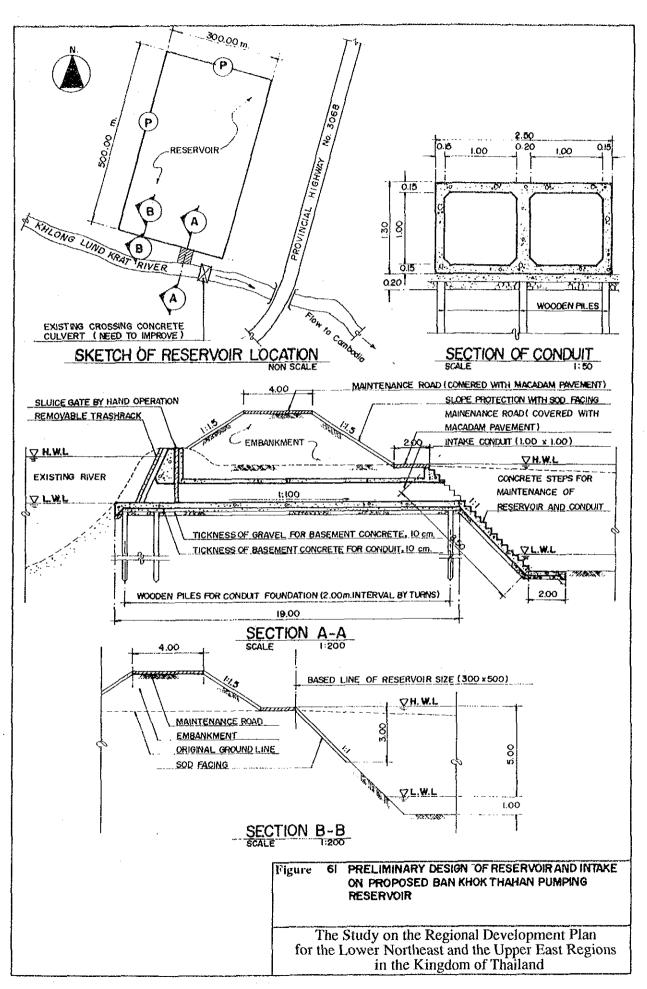
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3. Integrated Urban Development Program

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Integrated Urban Development (IUD) Programme

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Integrated Urban Development (IUD) Programme

1 Background

1.1 General Background to Urbanization in the LNE-UE Regions

The LNE-UE regions had a population of 9,909 thousand in 1990 accounting for 18.2% of the national population (54,532 thousand). The regions' population grew at 2.1% per year between 1980 and 1990, faster than that of the nation at 2.0% per year for the same period.

The level of urbanization in the LNE-UE regions is extremely low, reflecting very large contribution of agriculture in total employment in the region (83% in 1990). The proportion of population living in municipalities in the LNE-UE regions is about a one-third of the national average: 6.6% in 1990 compared with the national municipal population of 18.0% in 1990.

More than half of the urban population (54.7%) in the LNE-UE regions in 1992 was in two Muang municipalities of Nakhon Ratchasima and Ubon Ratchathani (the latter including Warin Chamrap). The rest was evenly distributed among 14 municipalities with an average population of 23,000 inhabitants. Nakhon Ratchasima city is the second largest, and Ubon Ratchathani city with Warin Chamrap is the third largest in the country in 1992.

1.2 Position of Nakhon Ratchasima City in LNE-UE

Nakhon Ratchasima city has been developing as a regional centre with multiple functions related to industry and trade activities in the LNE-UE regions, and is expected as a driving force for the regions' development. It is the location for labor-intensive, footloose industry and will be a centre for metal works and machinery. Nakhon Ratchasima has been and will continue to the one of the relocation places for the BMA-based industries.

The city's links with the BMA are being strengthened by the on-going expansion of route no.2 as well as upgrading the airport. Also the link with the ESB is being strengthened by widening of route no.304 and the new rail link bypassing the BMA.

The Suranaree University of Technology will be opened in 1993 at south-west side of Nakhon Ratchasima city, and function as the major center for higher-education for science and technology fields.

2. Integrated Urban Development Programme

2.1 Objectives of IUD Programme

This program combines measures not only for improving urban infrastructure and utilities, but also municipalities. Development funding and financial management will be important part of the latter. Objectives of the IUD Programme are as follows:

- (1) To update and upgrade existing land use plans (or to prepare them newly) for major urban centers in line with the LNE-UE Regional Development Master Plan,
- (2) To implement a package of urban infrastructure, utilities and other service facilities to be formulated on a mutually complementary manner for respective urban centers within the framework of the respective land use plans, and
- (3) To improve urban management for efficient implementation of the urban projects and better urbanization pattern.

2.2 Characteristics of IUD Programme

The IUD programme will allow continual implementation of urban projects in different urban centers. Its produce and methodologies for project development and implementation are common so that the practice for one urban center is replicable to other urban centers. Nakhon Ratchasima is selected for the first implementation.

3. General Description

3.1 Frameworks for Land use Planning and Project Formulation

3.1.1 Planning phase

Land use plans for major urban centers should be prepared following the phasing due to the Master Plan.

Phase I (1994 ~ 1996)

In this phase, land use plans for selected municipalities will be newly prepared or updated in line with the functional division among major urban centers established by the Master Plan.

Phase II (1997 ~ 2001)

Land use plans of other municipalities not covered during Phase I will be prepared or updated in this phase.

Phase III (2002 ~ 2010)

Land use plans for major urban centers will be prepared for advanced urban facilities and higher order service utilities in this phase.

3.1.2 Socio-economic framework

(1) Population distribution

The urban population in the LNE-UE regions have been projected as part of socio-economic framework. The total urban population in the LNE-UE regions will reach 4.5 million by 2010. The results of the projection is shown below.

Urban and Rural Population in 2010

Province	Population 2010		Annual Growth (%/year)			
	Urban	Rural	Total	Urban	Rural	Total
Nakhon Nayok	200.0	191.6	391.6⊹	9.9	0.0	2.9
Prachin Buri	650.0	719.1	1,369.1	12.1	0.0	2.8
Nakhon Ratchasima	1,700.0	1,905.5	3,605.5	6.6	0.0	2.1
Buri Ram	300.0	1,260.7	1,560.7	5.8	0.0	0.7
Surin	250.0	1,154.1	1,404.1	6.9	0.0	0.7
Si Sa Ket	150.0	1,228.6	1,378.6	4.9	0.0	0.3
Ubon Ratchathani	1,000.0	1,638.6	2,638.6	7.6	0.0	1.7
Mukdahan	180.0	221.1	401.1	7.3	0.0	2.1
Yasothon	120.0	491.8	611.8	6.0	0.0	0.7
Total	4,550.0	8,811.2	13,361.2	7.4	0.0	1.5
	(34.0%)	(66.0%)				

(2) Employment structure

The share of non-agricultural employment in total varied between 13.1% to 27.6% depending on seasons. Based on the dry season's ratio of 28%, there would seem to be almost three non-agricultural jobs in villages as there in cities.

The proposed urban system assumes that most new non-agricultural jobs will locate in urban areas. Daily commuting is not encouraged from villages to jobs in cities and people working in urban areas will also have residence there.

3.1.3 Spatial development framework

(1) Development axis/artery

The link with the ESB and Bangkok are already well established for Nakhon Ratchasima and the upper east. The same needs to be established for Ubon Ratchathani and Surin. Due to its location, Ubon Ratchathani's link with the BMR and ESB would necessarily be through Surin.

East-West development axis

There exist two main areas of urban population concentration in the LNE-UE regions. One is along the route no.2 from the western border of the Study Area to the capital city of Nakhon Ratchasima, and the other around the capital of Ubon Ratchathani. The corridor connecting these two areas would naturally constitute the most important east-west development axis.

North-south development axis and artery

The main north-south development axis at present passes through the western part of the Study Area. It leads from the ESB, passes through Kabin Buri in Prachin Buri and Nakhon Ratchasima and connects to Khon Kaen. With new industrial estates in Kabin Buri and Nakhon Ratchasima as a regional industrial and trade center, this development axis is developing into the Northeast Industrial Development Corridor.

New regional artery

To induce the development of economically depressed interior and frontier areas in the Study Area, a new regional artery should be established. It would lead from the ESB, effectively link the upper east and central part of the lower northeast, and extend to Yasothon and Mukdahan.

(2) Hierarchical structure of urban centers

Hierarchical urban structure has been clarified for guiding appropriate urban development network in the LNE-UE regions. Characterization and priority of each urban center are summarized in Table 1. The hierarchical structure of centers is illustrated in Figure 1.

(3) Urban land development

Urban land development in the LNE-UE regions will be realized in stages according to the Master Plan.

Phase I (1994 ~ 1996)

Expansion of urban areas during this phase will take place mostly centering around the two areas of urban population concentration: a) along the route no.2 from the western border of the Study Area to the city of Nakhon Ratchasima, and b) along the route no.226/217 within Ubon Ratchathani. Ribbon-type development in the primary and secondary urban centers will start to be controlled by planned development of urban lands.

Phase II (1997 ~ 2001)

Urban areas will expand gradually throughout this phase from the two areas of urban population concentration toward the central part of the Study Area. Secondary urban centers will start to develop more rapidly toward the end of the phase as the link with the ESB is established, including those in the central part of the Study Area.

Phase III (2002 ~ 2010)

Urban areas will be established in this phase along the east-west axis connecting the cities of Nakhon Ratchasima and Ubon Ratchathani.

 Table 1
 Characterization of Major Urban Centers and Clustering (1/2)

Major Urban Centers	Characterization and Priority	Other Urban Centers
Nakhon Ratchasima	Regional center with multiple functions; location of labour-intensive, footloose industry; secondary tourism center; priority includes urban infrastructure to serve industries, urban land use plan and water resources development/management	Pak Chong, Sikhiu, Sung Noen, Chok Chai, Pak Thong Chai (Bua Yai) Phimai
Ubon Ratchathani Si Sa Ket	Sub-regional center with multiple functions; future location of teleport; development of its hinterlands is the key Secondary agro-industrial center	Warin Chamrap, Det Udom, Phibun Mangsahan Amnat Charoen Kantralak
	complementing Ubon Ratchathani specialized in livestock	
Surin	Community urban growth center; center of handicrafts and rural industries; priority includes the link with the ESB and water resources development for diversified agriculture	Prasat
Buri Ram	Community urban growth center; future tourism center; priority includes better water management and beautification of the city, tourism areas and their access roads	Prakhon Chai, Nang Rong, Satuk

Table 1 Characterization of Major Urban Centers and Clustering (2/2)

Major Urban Centers	Characterization and Priority	Other Urban Centers
Prachin Buri	Community urban growth center; alternative site for industries to be relocated from the BMA; center for fruits and vegetable processing; priority includes flood control and increased water supply	Kabin Buri
Nakhon Nayok	Controlled urban growth center; future science and technology center; priority includes flood control, enhancement of urban functions and effective land use control	
Aranyaprathet	Controlled urban growth center; center for border trade and base for Indochina tourism; priority includes urban infrastructure and water supply	
Sa Kaeo	Secondary trade center located on the crossroads complementary to Aranyaprathet	
Mukdahan	Border trade center; future connection to Laos and Vietnam through a new bridge over the Mekong; priority includes improvement of transport infrastructure	
Yasothon	Secondary trade center located on the crossroads; aquaculture center; priority includes the improvement of road links with its hinterland	

Figure 1 Hierarchical Structure of Urban Centers

Regional Center	Sub-regional Center	Strategic Centers	Lower-tier Centers
Nakhon Ratchasima		Pak Chong	Si Khiu Sung Noen Chok Chai
			Pak Thong Chai (Bua Yai) Phimai
	Ubon Ratchathani (including Warin Chamrap)	Si Sa Ket	Det Udom Phibun Mangsahan Amnat Charoen Kantralak
	Buri Ram Surin		Prakhon Chai Prasat Nang Rong Satuk
	Prachin Buri	Nakhon Nayok Kabin Buri	
		Aranyaprathet Sa Kaeo	
	,	Mukdahan Yasothon	

3.1.4 Land use zoning and planning

(1) Macro-zoning for 2010

Macro land use zoning for 2010 in the LNE-UE regions are shown in Figure 2 and Figure 3.

(2) Strategic development areas

In relation to the three development axes/arteries, three development areas have been designated: a) Nakhon Ratchasima area, b) Ubon Ratchathani (with Warin Chamrap) area, and c) the central part of the lower northeast. Area development programs have been formulated for these areas (Figure 4).

(3) Greater Nakhon Ratchasima Industrial Center Development

A large area around the Nakhon Ratchasima city with several secondary towns has been designated as one of the strategic development areas. The Greater Nakhon

Ratchasima Industrial Center Development program has been formulated for this area.

The strategy for this programme is the following:

- 1) Improvement of urban infrastructure and utilities for footloose, labor-intensive and export-oriented industries,
- 2) Technological development and skill training for engineering and machinery industries,
- 3) Improvement of links between urban centers and between urban and rural areas, and
- 4) Encouragement of new agricultural activities to expand the local resource base.

For the implementation of this development, the Nakhon Ratchasima Integrated Urban Development project (IUD) is expected to be an important core project.

3.2 Project Formulation

3.2.1 Existing infrastructure and facilities

Infrastructure capacities among the municipalities of the Study Area are varied but generally deficient. Most of infrastructure and utility facilities in the municipalities need to be repaired or replaced. Only electricity supply network infrastructure has been extended to all municipality areas except Mukdahan Muang municipality area which was established in 1983.

1) Water supply

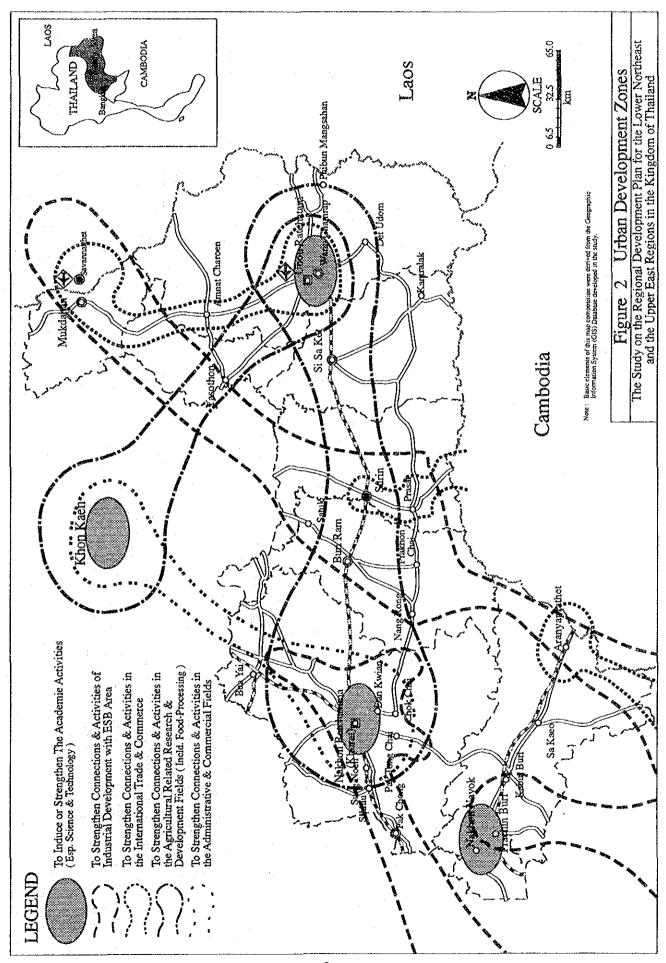
The percentages of piped-water users in Muang and Tambon municipalities are 72.0% and 63.1%, respectively. However, the pipe-water users in each municipality vary among the provinces. In eight municipalities, supply of piped-water is sufficient to meet the demand of almost all households (100-90%), while nine municipalities are able to supply less than 60% of their total households. Surin and Si Sa Ket have the lowest rates (28.6% and 11.0%, respectively), among the 17 municipalities.

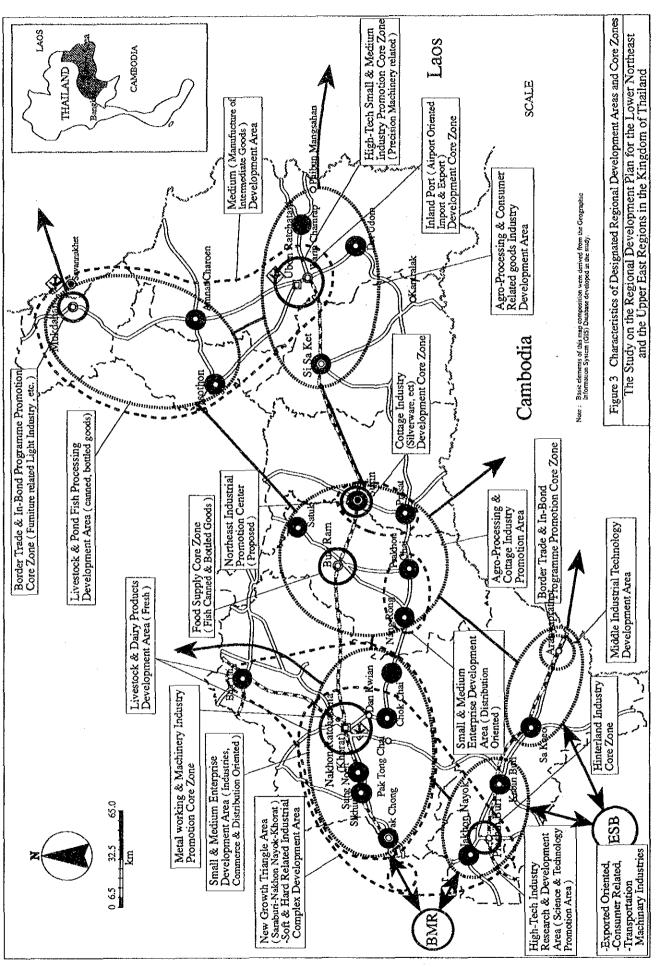
2) Sewerage and drainage

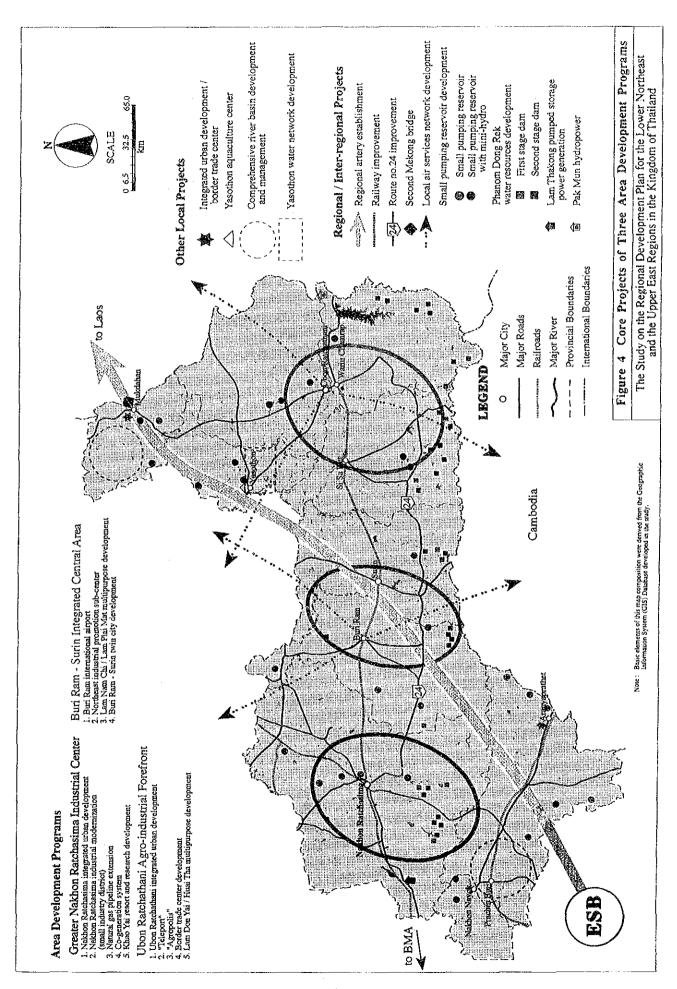
An urban sewerage system exists only in Nakhon Ratchasima. All other municipalities rely on the septic tanks, and drain the wastewater down to the canals, rivers or rice fields near roads. For large municipalities, only main roads are installed with water drainage system. In small municipalities, the drainage system is partially installed at main roads and secondary roads.

3) Solid waste disposal

Only four of the municipalities in the Study Area manage solid waste dumping sites. Many municipalities dump their collected garbage outside municipal boundaries. The four Muang municipalities have solid waste incinerators.







4) Electricity supply

All municipalities, except Mukdahan Muang municipality, have 100% electrification rates in their jurisdictions. However, most of them still lack public electricity for street lighting during the night time.

5) Telecommunications

The number of telephone subscribers indicates a very poor service level, even in urban areas. In 1989, the average number of telephones per 100 residents was 2.6 in the nation, and 16.2 in Bangkok. Study Area's average was 0.6 lines per 100 population.

6) Urban roads

Only regional roads and arterial roads within cities are paved with concrete and maintained well. However, community roads in and out of urban areas need to expand both in width and length with better quality of surface.

7) Other facilities

<u>Bus</u>: Presently, bus services with pick-up trucks are relatively well provided. However, additional bus routes will be necessary in response to the future development.

<u>Truck terminal</u>: The existing privately provided terminals are not conveniently located.

3.2.2 Projections

1) Utility demands due to the Master Plan phasing

The Master Plan indicates phasing of urban infrastructure and utilities development as follows.

Phase I (1994 ~ 1996)

- Extension of basic telephone services to all tambons with the introduction of the ISDN
- Expansion of piped-water supply for selected urban areas
- Household electrification
- Sewerage system for a few large cities
- Tourism facilities and services in a few cities will be upgraded to international standards.

Phase II (1997 ~ 2001)

- Solid waste disposal and wastewater treatment facilities will be introduced in the primary and the secondary urban centers.
- Expansion of the ISDN-based telecommunication services
- Establishment of local air services network