

CHAPTER II

SOCIO-ECONOMIC BACKGROUND

The Central Thailand include Chai Nat, Sing Buri, Ang Thong, Ayutthaya, Lop Buri and Saraburi. In 1988, the National Gross per capita was 8,327 Baht. The average per capita of the Central Thailand and Saraburi, in 1988, was 6,952 Baht and 13,967 Baht, respectively (Table 2.1).

2.1 Population

The population in Saraburi in 1988 were 509,750. The population density was 143 persons per square kilometers. The high density was cover in central, south and west of Saraburi in Amphoe Muang, Nong Kae, Ban Mo, Nong Don, Nong Sang and Sao Hai; The low density was on the east in Amphoe Kaeng Khoi and Muak Lek which was the mountainous area; the moderate density was in Amphoe Phra Phutthabat, Wihan Daeng and Don Put as shown in Table 2.2.

2.2 Economy

2.2.1 Gross Provincial Product (GPP)

In 1987, Saraburi had GPP about 7119.5 million Bahts (in standard price, 1972). The GPP could be categorized into two main parts : agricultural product and non-agricultural product. The

Table 2.1 Average Income Per Person in Changwat and Central Region
in 1988.

Changwat	Area (Sq.Km.)	Average income per person (Baht)	Annual total product (million Baht)
1. Chai Nat	2,469	6,111	2,104
2. Sing Buri	822	6,137	1,350
3. Ang Thong	968	4,733	1,295
4. Ayutthaya	2,556	5,446	3,641
5. Lop Buri	6,199	4,879	3,516
6. Saraburi	3,576	13,967	7,119
Central Region	16,590	6,952	19,026
Country	514,000	8,327	446,636

Source : Office of the National Economic and Social Development Board
(1988).

agricultural product consists of economic crops, livestock, fishery, and forestry which had total value of 672.810 million Bahts. The non-agricultural product consists of mining and quarrying, manufacturing, construction, electricity and water works, transportation and communication, wholesale and retailed trade, banking, insurance and real estate, public administration and defence, and the others which had total value of 6,446.715 million Bahts. The manufacturing branch provides about 30 percents of gross total value as shown in Table 2.3.

Table 2.2 Show area, Population and Population Density of Saraburi

Administration Boundary	Area (Sq. Km.)	population	population density (persons/sq.km.)
Saraburi	3,576	509,750	143
A. Muang	452	118,866	262
A. Nong Kae	263	75,735	288
A. Kaeng Khoi	801	69,423	86
A. Phra Phutthabat	287	47,100	164
A. Muak Lek	1,019	60,052	58
A. Ban Mo	204	46,254	227
A. Wihan Daeng	205	31,245	152
A. Sao Hai	113	25,498	228
A. Nong Sang	87	15,820	181
A. Nong Don	88	13,458	152
King A. Don Put	58	6,292	108

2.2.1.1 Agricultural Product Branch

In 1988, the agriculture had about 10 percent of the annual total product of Saraburi. These include, economic crop livestock, fishery, and agro service and transmute.

Table 2.3 Gross Provincial Product of Changwat Saraburi in 1988.

	Fiscal year	
	Thousand Baht	(%)
Agricultural product	672,810	10.97
- economic crops	472,937	6.64
- livestock	197,050	2.77
- fishery	2,823	0.04
- forestry	0	0
- Agro service and transmute	108,292	1.52
Non-Agricultural product	6,446,715	90.55
- manufacturing	2,134,416	29.98
- mining and quarrying	1,235,128	17.35
- wholesale and retail trade	1,107,163	15.55
- construction	131,368	1.85
- electricity and water works	532,118	7.47
- transportation and communication	207,469	2.91
- banking, insurance and real estate	85,731	1.20
- public administration and defence	250,597	3.52
- services	470,621	6.61
- lodging	183,812	2.58
Gross Provincial Product (GPP)	7,119,525	100
Average income per person (Baht)	13,967	

Source : Gross Regional and Provincial product (1989).

2.2.1.1.1 Economic Crops

The values of economic crops is about 6 percents of total product value of Saraburi. Besides, the economic cropping is important because of about 80 percents of population had a agriculture occupation. From 1,554,109 Rais or about 69.52 percents of the whole Changwat area, there are 712,219 Rais of paddy field, 750,641 Rais of uplack crop, 77,728 Rais of orchard, and 13,513 Rais of vegetable and flower. The important cultivated crops in the area are rice, corn, bean, cotton, and cassava. The crop productivity of the year 1988-1989 is shown in the Table 2.4.

Rice : In 1988/1989 the paddy field was 680,982 Rais with total produces of 334,919 metric tons, which was equivalent to 1,340 million Bahts.

Amphoe Nong Sang had the highest productivity of rice per Rai, Amphoe Muak Lek had the lowest productivity due to soil infertility and lack of irrigation. In Amphoe Wihan Daeng area there is the problem of acidic soil.


Maize : The active area for maize cultivation was about 602,690 Rais : It yielded total produces of 269,438 metric tons with the total value of 719 million Bahts. The average produce per Rai was 447 kilograms. Amphoe Muak Lek was the main area for cultivation which composed of more than half of total cultivated area.

Table 2.4 Plantation Area and Produces of the Main Crops in Saraburi
During 1989-1990.

Amphoe	Major rice		Second rice		Maize	
	area (Rai)	produces (tons)	area (Rai)	produces (tons)	area (Rai)	produces (tons)
Muang	80,940	37,232	3,779	2,456	27,240	12,003
Nong Kae	139,963	72,781	25,656	17,677	-	-
Kaeng Khoi	98,988	48,801	2,815	1,950	79,710	39,858
Phra Phutthabat	28,970	11,878	15	10	51,367	20,547
Muak Lek	3,960	1,426	-	-	420,217	187,021
Ban Mo	65,064	29,279	7,429	5,386	14,744	5,898
Wihan Daeng	69,551	29,211	6,005	3,723	402	201
Sao Hai	62,170	36,059	5,060	4,470	2,900	1,160
Nong Don	49,511	24,756	10,353	7,765	6,110	2,750
Nong Sang	47,233	30,701	65	46	-	-
King Don Put	34,582	12,795	1,512	983	-	-
Total	680,892	334,919	63,689	44,466	602,690	269,438

Source : Office of Agriculture Economics, Ministry of Agriculture and
Cooperatives (1990).

Table 2.4 (cont.) Plantation Area and Produces of the Main Crops in Saraburi During 1989-1990.



Amphoe	Mungbean		Soybean		Sorghum	
	area (Rai)	produces (tons)	area (Rai)	produces (tons)	area (Rai)	produces (tons)
Muang	2,880	576	-	-	255	52
Nong Kae	-	-	-	-	-	-
Kaeng Khoi	326	37	5,583	977	3,556	818
Phra Phutthabat	7,800	780	360	58	18,367	4,224
Muak Lek	45,870	4,589	38,620	7,724	14,462	3,333
Ban Mo	-	-	-	-	-	-
Wihan Daeng	-	-	-	-	-	-
Sao Hai	80	8	-	-	60	17
Nong Don	-	-	-	-	2,300	529
Nong Sang	-	-	-	-	-	-
King Don Put	-	-	-	-	-	-
Total	56,976	5,990	44,563	8,759	39,000	8,973

Source : Office of Agriculture Economics, Ministry of Agriculture and Cooperatives (1990).

Table 2.4 (cont.) Plantation Area and Produces of the Main Crops in Saraburi During 1989-1990.

Amphoe	Cassava		Sugar cane	
	area (Rai)	produces (tons)	area (Rai)	produces (tons)
Muang	250	500	-	-
Nong Kae	-	-	-	-
Kaeng Khoi	19,510	53,516	2,280	12,116
Phra Putthabat	-	-	60	300
Muak Lek	17,109	42,773	31,945	159,725
Ban Mo	-	-	-	-
Wihan Daeng	615	1,239	-	-
Sao hai	-	-	-	-
Nong Don	-	-	-	-
Nong Sang	-	-	-	-
King Don Put	-	-	-	-
Total	37,484	97,988	34,285	172,141

Source : Office of Agriculture Economics, Ministry of Agriculture and Cooperatives (1990).

Mung bean : This bean was a second rotation crops growing after maize harvesting. It covered about 56,976 Rais of cultivated area, yielded total produce of 10,256 metric tons. Amphoe Muak Lek, Phra Phutthabat and Muang was the main location of cultivation.

Sorghum : This plant use less water and was cultivated in the north part of Changwat in Amphoe Phra Phutthabat, Kaeng Khoi, Muak Lek and Nong Don. The cultivated area was about 39,025 Rais, yielding the total produce of 10,530 metric tons.

Cassava : Cassava cultivated area was about 37,484 Rais yielding the total produce of 79,987 metric tons. Amphoe Kaeng Khoi and Muak Lek was the main area of the cassava cultivation.

Sugar Cane : Like cassava, the main produce comes from Amphoe Kaeng Khoi and Muak Lek. The plantation area was 34,285 Rais with the total produce of 181,711 metric tons.

2.2.1.1.2 Livestock

Livestock was the second important source of income from agriculture constituted about 197.1 million Bahts. The detailed statistics of livestock is shown in Table 2.5.

Cattle : There were about 73,686 diary cows and beefs in Saraburi area. About 23,338 cattles were from 1,025 husbandries and the remaining were from household raising. Amphoe Muak Lek, Kaeng

Table 2.5 Major livestock statistic in Saraburi in 1988

Amphoe	Total		Muang		Nong kae		Kaeng Khoi		Pra Phutthabat		Muak lek	
		%		%		%		%		%		%
1. Cattle	73,686	100	8,800	11.94	1,742	2.36	13,200	17.91	6,160	8.36	26,800	36.37
1.1 Farming	23,330	31.67	2,985	4.1	1,402	1.9	3,200	4.34	4,160	5.65	7,800	10.59
1.2 Domestic	50,348	68.33	5,815	7.8	340	0.46	10,000	13.57	2,000	2.71	19,000	25.79
2. Water buffalo	16,180	100	4,000	24.7	286	1.77	5,500	33.99	540	3.34	2,120	13.10
2.1 Farming	2,864	17.7	560	3.5	-	-	2,200	13.59	96	0.59	-	-
2.2 Domestic	13,325	82.35	3,432	21.2	286	1.77	3,380	20.88	454	2.80	2,120	13.10
3. Swine	101,190	100	9,500	9.3	3,856	3.81	22,408	22.15	7,298	7.22	40,140	39.66
3.1 Farming	37,612	37.17	3,200	3.16	2,400	2.37	4,600	4.55	4,300	4.25	11,200	11.07
3.2 Domestic	63,578	62.8	6,300	6.22	1,456	1.44	17,800	17.59	2,990	2.96	28,940	28.69
4. Duck	55,569	100	11,500	20.69	10,160	18.28	3,800	6.84	4,175	7.51	10,160	18.28
4.1 Farming	24,100	43.37	10,200	18.36	-	-	-	-	2,200	3.95	3,100	5.58
4.2 Domestic	31,469	56.63	1,300	2.34	10,160	18.28	3,800	6.84	1,975	3.55	7,060	12.70
5. Chicken	1,870,090	100	138,000	7.37	153,742	8.22	312,000	16.68	67,300	3.60	166,500	8.90
5.1 Farming	87,488	4.68	12,000	0.64	9,600	0.51	5,900	0.32	6,100	0.33	2,800	0.15
5.2 Domestic	1,782,602	95.32	126,000	6.73	144,142	7.70	306,100	16.35	61,200	3.27	163,620	8.74

Source : Office of Agriculture Economics, Ministry of Agriculture and Cooperatives, 1988

Table 2.5 (cont.) Major livestock statistic in Saraburi in 1988

Amphoe	Ban Mo		Wihan Daeng		Sao Hai		Nong Sang		Nong Don		K. Don Put	
1. Cattle	3,446	4.68	2,298	3.12	5,840	7.93	1,750	2.37	3,200	4.34	450	0.61
1.1 Farming	1,445	1.96	1,298	1.76	72	0.09	-	-	976	1.32	-	-
1.2 Domestic	2,001	2.72	1,000	1.36	5,730	7.78	1,750	2.37	2,224	3.08	450	0.61
2. Water buffalo	152	0.94	2,967	18.33	122	0.75	220	1.36	250	1.54	30	0.19
2.1 Farming	-	-	-	-	-	-	-	-	-	-	-	-
2.2 Domestic	152	0.94	2,967	18.33	122	0.75	220	1.36	250	1.54	30	0.19
3. Swine	1,964	1.94	10,520	10.40	970	0.96	2,870	2.84	1,400	1.38	200	0.20
3.1 Farming	180	0.18	9,100	8.99	165	0.16	1,500	1.48	978	0.96	-	-
3.2 Domestic	1,778	1.76	1,420	1.40	805	0.80	1,370	1.35	436	0.42	200	0.20
4. Duck	3,005	7.17	4,915	8.84	4,100	7.38	2,100	3.84	850	1.53	8,000	14.4
4.1 Farming	-	-	3,600	6.48	2,500	4.50	-	-	-	-	7,200	12.95
4.2 Domestic	3,985	7.17	1,315	2.37	1,600	2.88	2,190	3.94	850	1.53	800	1.44
5. Chicken	26,550	1.42	301,700	16.11	394,100	21.05	55,650	2.97	250,000	13.35	4,590	0.24
5.1 Farming	2,000	0.11	31,300	1.67	2,800	0.15	6,800	0.36	3,980	0.21	4,200	0.22
5.2 Domestic	24,510	1.31	270,000	14.44	391,300	20.92	48,850	2.61	246,100	13.14	300	0.02

Source : Office of Agriculture Economics, Ministry of Agriculture and Cooperatives, 1988

Khoi, Muang and Phra Phutthabat are the main area for cattles raising. In Muak Lek alone constitutes about 36 percent of the total cottles of Saraburi.

In recent year the government promotes the diary are raising as the domestic animal to increase family income diary. There are 4 centers for milk buying from the farmer, two of which in Amphoe Muak Lek and the rest is in Wihan Daeng and Phra Phutthabat.

Water buffalo : In general, farmer raises water buffalo for animal labour. Domestic animal trade are mainly practiced in Amphoe Kaeng Khoi and Muang which consists of about 2,884 buffalo from total amount of 16,109.

Swine : About 101,119 pigs were raised in Saraburi. About 57,621 pigs were from 57 farms and 63,498 pigs were from domestic raising. Amphoe Muak Lek and Kaeng Khoi raised more than 60 percent of the whole.

Duck : There were about 28,800 ducks from 10 farms in Saraburi area.

Chicken : Out of 1,870,000 chickens, there were 87,480 chickens from farming and 1,782,662 were from domestic raising. Amphoe Sao Hai, Kaeng Khoi, Wihan Daeng and Nong Don were the major amphoe in chicken feeding for egg.

2.2.1.1.3 Fishery

In 1988, gross total value for fish production is about 2.8 million Bahts. Fishing is made in rivers, pond and paddy field. The major fish species were cat fish, fishshape ornaments, and snake head, as well as fresh water shrimp as shown in Table 2.6.

2.2.1.2 Non-Agricultural Product Branch

In this sector, the total product value was about 90 percent of gross provincial product (GPP). This covers manufacturing, mining and quarrying, wholesale and retailed trade, construction, electricity and water works, transportation and communication, banking, insurance and real estate, public administration and defence, sevice and lodging.

2.2.1.2.1 Wholesale and Retailed Trade

Wholesale and retailed trade constituted about 15.5 percents of GPP or about 1,107 million Bahts. The commercial trading in Saraburi is depended on manufacturing and the main agriculture produces. The main wholesale and retailed trade mostly cluster in municipal and sanitary destrict of which Saraburi municipal district is the biggest center. Besides, Tumbon Nha Pra Lan and Tumbon Kaeng Khoi are the sources for crushed rock aggregates and laterite/ lateritics soil trading centers.

Table 2.6 The Quantity of Fresh Water Animal that Can be Fished in the Area from the Year 1988.

UNIT : Kilogram

Amphoe	Cat fish	Fishshape ornament	Snake head	Gourami	Fresh water shrimp
Muang	7,500	12,000	6,000	4,000	2,500
Nong Kae	25,000	36,000	18,000	-	18,000
Kaeng Khoi	-	-	-	-	-
Phra Phutthabat	-	-	-	-	-
Muak Lek	200	180	250	60	-
Ban Mo	12,000	34,000	24,000	9,000	600
Wihan Daeng	78,000	7,000	3,500	2,500	23,750
Sao hai	12,000	16,500	10,400	4,000	200
Nong Sang	11,636	237	1,884	734	-
Nong Don	-	-	-	-	-
K. Don Put	-	-	-	-	-
Total	146,536	106,617	46,144	20,294	45,050

Source : Fishery Division of Saraburi (1988).

The registered wholesale and retailed trade categorized into private shop, limited partnership and company. Table 2.7 shows the registration fund and numbers of each registered categories in Saraburi.

Table 2.7 The Registration Fund of Commerced Trading in Saraburi
(1988).

Amphoe	Private shop		Limited Partnership		Company	
	Number	Fund (m. Bahts)	Number	Fund (m.Bahts)	Number	Fund (m. Bahts)
Muang	2,793	32.27	251	369.50	81	463.00
Nong Kae	1,163	13.83	86	115.39	17	56.99
Kaeng Khoi	334	3.91	53	109.15	15	70.42
Muak Lek	415	5.79	22	31.88	6	32.84
Phra Phutthabat	1,049	11.15	60	97.77	11	42.37
Ban Mo	665	6.46	67	69.13	9	19.01
Sao Hai	198	2.42	15	14.42	4	22.20
Wihan Daeng	325	3.50	15	26.70	4	14.82
Nong Saeng	197	1.87	2	6.54	-	-
Nong Don	54	0.56	2	1.57	2	4.2
K. Dong Put	5	0.03	-	-	-	-
Total	7,198	86.1	573	849.2	159	701.32

Source : Office of The National Economic and Social Development Board
(1988).

2.2.1.2.2 Mining and Quarrying

The gross total value of these sectors was about 1,235 million Bahts, constituting about 17.35 percents of gross total value of Saraburi. About 80 percent of limestone for industrial and construction aggregate in Thailand are from Tumbon Nha Phra Lan and Thap Kwang. Marble from Tumbon Nha Phra Lan produced about 45 percents of product in Thailand. About 79 percent of shale product in Thailand produced from Tumbon Tha Khao and Ban Pa Palit. Pyrophyllite at Tumbon Sum Pak Paew and Cha Om supplied 97 percents of the country product.

2.2.1.2.3 Manufacturing

The manufacturing branch produced the highest percentage of the GPP in Saraburi. This consists of about 29.9 percents of the GPP or about 2.134 million Bahts.

The major factor for industry expansion is good transportation, plenty of product of agriculture, labour and raw material for cement and construction. In 1989, Saraburi has 476 industrial plants which used 22,477 labours and the invested capital of 24,978 million Bahts. It concentrated in Amphoe Muang, Kaeng Khoi, Nong Kae and Phra Phutthabat. These industries can be classified into three categories, namely, agro industry, construction and mining industry.

2.2.1.2.3.1 Agro-industrv

Agro-industry is industry which use raw material from agriculture produces. This industry is located in Amphoe Nong Kae, Muang and Sao Hai. Rice-mill industrial plant is scattered all over the province. The biggest rice-mill plant is located in Tumbon Ban Klub Amphoe Nong Don. The industry which uses more than 500 labours is weaving and spine cotton thread and sack weaving. This is situated in Kaeng Khoi and Sao Hai as illustrated in Table 2.8.

2.2.1.2.3.2 Construction and Mining Industry

These industries are the foundation industries for construction work, which concentrated in Amphoe Muang such as rock aggregate crushing plants, white cement plant, concrete block plant and marble sawing plant, by getting raw material from Tumbon Phu Kae and Nha Phra Lan. Amphoe Kaeng Khoi, Ban Mo and Nong Kae also have a number of industries plants. The heavy industry such as cement plants are situated in Amphoe Ban Mo and Kaeng Khoi which need plenty of raw material such as limestone, shale. Another labour intensive sectors are iron production plant in Amphoe Ban Mo which employed more than 1,700 labours. The ceramic industry plants at Tumbon Kok Yae Nong Khae employed more than 2,200 labours from within the province.

2.2.1.2.3.3 Other industries

Other industries included food and beverage industry, wood

Table 2.8 Number of industrial plants and labour in each amphoe.

Amphoe	Muang		Nong Kae		Kaeng Khoi		Phraputtabat		Muak Lek	
	1	2	1	2	1	2	1	2	1	2
INDUSTRY										
1. Agro-Industry	31	548	36	445	22	2,625	17	210	6	43
1.1 rice-mill	27	438	30	239	13	47	8	58	-	-
1.2 Sack Weaving	-	-	-	-	1	1,270	-	-	-	-
1.3 Cloth weaving and spin thread	-	-	-	-	1	1,210	-	-	-	-
2. Construction & Mining	75	2,178	20	2,275	16	2,143	10	225	-	-
2.1 Crushing rock	23	572	-	-	1	12	7	170	-	-
2.2 Cement and white cement	21	412	-	-	5	1,363	1	40	-	-
2.3 Ceramic	1	313	6	2,205	1	432	-	-	-	-
2.4 Iron product	-	-	-	-	-	-	-	-	-	-
2.5 Marble cutting	2	197	-	-	-	-	-	-	-	-
3. Other	78	839	28	1,088	16	335	23	154	5	146
3.1 Wood and furniture	-	-	-	-	-	-	-	-	1	125
3.2 Food and Beverage	14	83	8	761	2	15	3	16	2	133
3.3 Services Manufacture	42	387	13	121	7	71	19	135	3	13
3.4 Others	13	114	5	193	6	238	1	3	-	-

(1) Number of plant

(2) Labour

K. Don put No industrial plant

Source : Local industry changwat Saraburi, 1988.

Table 2.8 (cont.) Number of industrial plants and labour in each amphoe.

Amphoe	Ban No		Wihan Daeng		Sao Hai		Nong Saeng		Nong Don	
	1	2	1	2	1	2	1	2	1	2
INDUSTRY										
1. Agro-Industry	10	57	15	88	15	1,681	13	69	7	37
1.1 rice-mill	10	57	15	88	14	132	13	69	7	37
1.2 Sack Weaving	-	-	-	-	1	1,549	-	-	-	-
1.3 Cloth weaving and spin thread	-	-	-	-	-	-	-	-	-	-
2. Construction & Mining	12	4,071	-	-	-	-	-	-	-	-
2.1 Crushing rock	-	-	-	-	-	-	-	-	-	-
2.2 Cement and white cement	1	820	-	-	-	-	-	-	-	-
2.3 Ceramic	-	-	-	-	-	-	-	-	-	-
2.4 Iron product	2	1,735	-	-	-	-	-	-	-	-
3. Other							-	-	-	-
3.1 Wood and furniture	9	245	2	13	1	11	-	-	-	-
3.2 Food and Beverage	1	23	6	23	11	73	-	-	-	-
3.3 Service manufacture	8	97	1	2	1	8	-	-	-	-
3.4 Others	1	24	-	-	1	69	-	-	-	-

Source : Local Industry Changwat Saraburi, 1988.

and furniture industry and service industry. These are mainly domestic industries with low investment and consume a few labours. These industries are located in Amphoe Muang, Nong Kae and Phra Phutthabat. The Thai Inter Arms company at Kaeng Khoi produced bullet and explosives. The lignite crushing plant at Tumbon Ban Crou, Amphoe Ban Mo which has 2,295 labours produced powdered lignite more than 300,000 tons.

2.2.1.2.4 Services

The services business covered about 6.6 percents of GPP or about 470 million Bahts. Due to Saraburi is close Bangkok, tourists and bussiness men which mostly come from Bangkok prefer to have a one-day trip. Therefore, the services business are not developed so much. Hotel and the other services facility have been medium to small scale.

2.2.1.2.5 Electricity and Water Works

This branch covered 7.4 percents of GPP or about 532 million Bahts. The expansion of new industries which use more electricity supply also make the value of this branch expand.

2.2.1.2.6 Others

The other production branches, namely, agro-services and transmute construction, transportation and communication, banking insurance and real estate, public administration and defence cover

the product value about 1.52, 1.85, 2.91, 1.20, 3.52 percents, respectively.

2.2.2 Potential

The major occupation of people in Saraburi is agricultural based. The value of this branch was about 10 percents of GPP. It showed that the poverty still was the problem for rural people. The increase of the income for these people should be considered to the advantage of Saraburi. The establishment of agro industries in Saraburi will produce industrial pollutants and will create problems to the neighbouring community around the plants.

2.3 Social Conditions

2.3.1 Institutions

The pattern and hierarchy of administration unit within Saraburi can be classified into 3 categories, notably, provincial administration, central administration and local administration.

The provincial administration is further classified into 4 levels, namely, Changwat, Amphoe, Tombon and Mu Ban in their decreasing scale respectively. Saraburi is subdivided into 10 Amphoes, 1 King Amphoe, 110 Tumbons and 943 Mu Bans.

The central administration is characterized by setting up Changwats' branches of many central administrative bodies. These



branches are generally technical operation in nature, namely, water supply, post and telegraph, telephone, electricity, irrigation etc.

The local administration is also further classified into 3 categories, notably, municipality, provincial administrative organization and sanitary district. Saraburi is divided into 4 municipalities, 1 provincial administrative organization and 16 sanitary district.

2.3.2 Education

Saraburi educations consist of kindergarten, primary and secondary school, vocational school and college as shown in Table 2.9.

From Table 2.9, it is shown that the vocational school and colleges are scarce. These education is required for the promotion of the future industry development.

2.3.3 Health Services

Saraburi has the ratio of doctor to population of about 1 : 5,624. A larger number of doctors are mostly in urban, or municipal area than in the rural area. The doctor to population ratio should be higher than this current figure to mitigate the problem of health services.

Data and information of health services were summarized in Table 2.10

Table 2.9 Education Level, quantity of schools, classrooms, teachers and instructor percentage of student in each level and ratio of teacher/student in Saraburi (1989).

Education level	No. of School	No. of classroom	No. of teacher & instructor	No. of student	Percentage of student at level per total student	Teacher : student ratio
Kinder Karten	299	480	448	10,305	10.66	1:23
Primary school	338	2,714	3,434	59,552	61.60	1:17
Secondary school	22	464	980	21,213	21.94	1:22
Vocational school	6	153	222	4,708	4.87	1:21
Colleges (Nurse colleges)	2	-	57	905	0.94	1:16

Source : Provincial Education Statistic Report, Office of the Permanent Secretary, Ministry of Education (1989).

Table 2.10 Numbers of Hospitals and Health services centers of Saraburi, 1989.

Amphoe	Hospital						Health Centers	Clinic	Drug store	No. of Doctor	No. of Nurse
	Public		Private		Other						
	No.	beds	No.	beds	No.	beds					
1. Muang	1	728	1	108	1	120	16	27	50	56	188
2. Nong Kae	1	30	-	-	-	-	17	7	16	3	8
3. Kaeng Khoi	1	10	-	-	-	-	12	8	28	2	6
4. Phraputtabat	1	360	-	-	-	-	9	2	63	22	105
5. Muak Lek	1	10	-	-	-	-	18	2	18	2	5
6. Ban Mo	1	10	-	-	-	-	8	3	5	2	4
7. Wihan Daeng	1	10	-	-	-	-	6	2	19	1	4
8. Sao Hai	-	-	-	-	-	-	11	-	11	-	2
9. Nong Sang	1	10	-	-	-	-	7	1	18	2	4
10. Nong Don	-	-	-	-	-	-	4	1	4	-	-
11. K. Don Put	-	-	-	-	-	-	6	-	3	-	-
Total	8	1,168	1	108	1	120	114	53	175	90	326

Source : Public health Saraburi, 1989.

2.3.4.1 Road and Highways

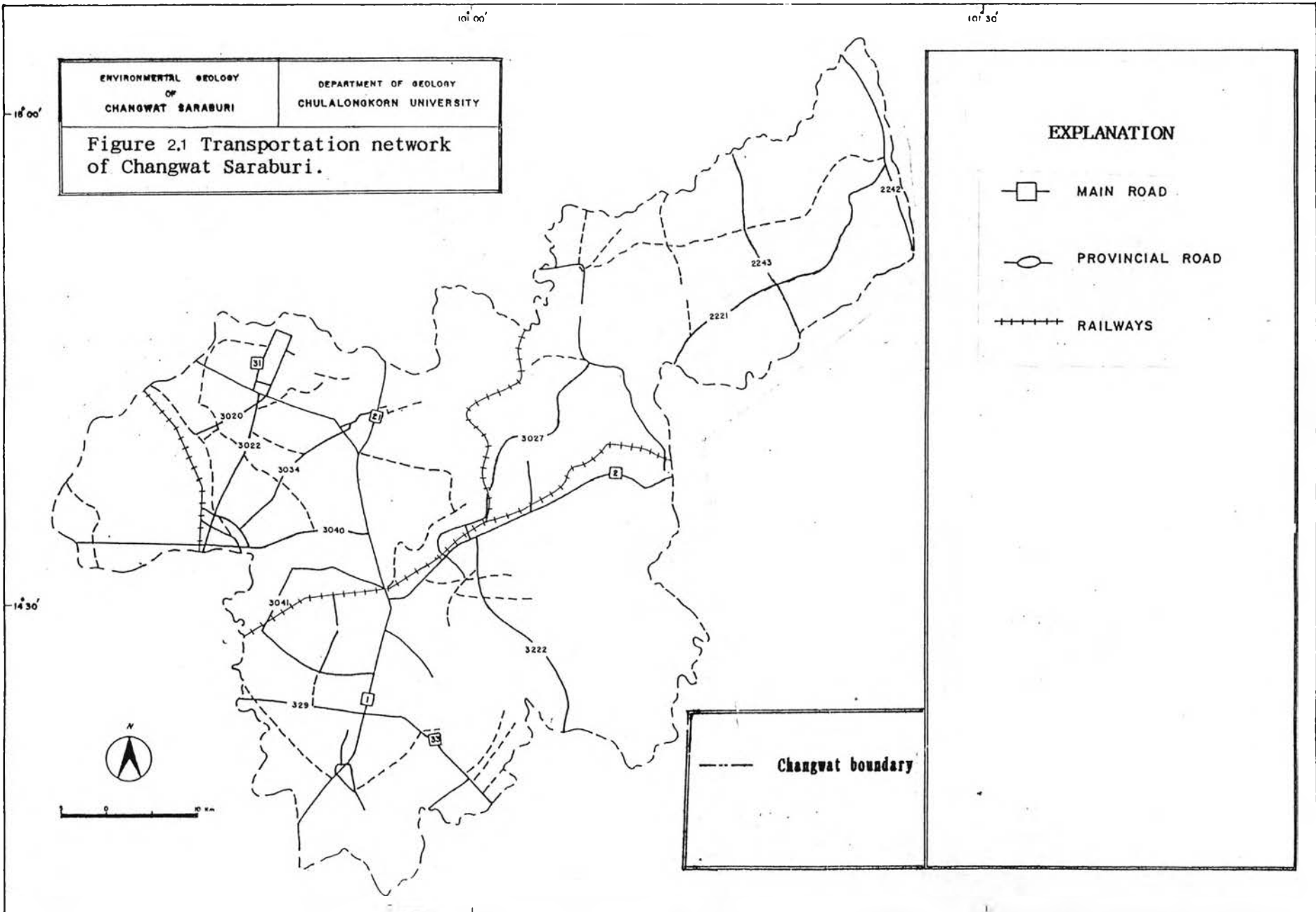
The road and highways within the area of Saraburi are classified into 3 categories, namely, paved national primary highway, paved provincial secondary highway and unpaved lateritic roads. Besides, there are road which are not under control of Department of Highways such as irrigation service road, which connected rural community. The map of roads and highways is shown in Figure 2.1 and Table 2.11.

The bus transportation route between provinces and around Saraburi comprises 60 routes, 3 are in municipality, 1 between Bangkok and Saraburi, 13 in the Saraburi Province, 17 between Amphoes and major Tambons, 26 between Mu Bans. There are buses from other Changwats pass through Saraburi from northeastern provinces 26 routes and 7 routes from northern provinces.

2.3.4.2 Railways

The road and the highway are the most important transportation routes in the area. However, railways are also essential for transportation of goods from and the Bangkok and the neighbouring provinces.

The railways from Bangkok to Northern part and Northeastern part pass through Saraburi. The northeastern route when reach Kaeng Khoi junction, it separated into 2 routes, one going North to Lop Buri and Chaiyaphum before connection again with northeastern route,



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Figure 2.1 Transportation network
of Changwat Saraburi.

EXPLANATION

□ MAIN ROAD

○ PROVINCIAL ROAD

⊢ RAILWAYS

--- Changwat boundary

Table 2.11 Pavement characteristics and quantity of traffic in highway, Saraburi, 1988.

Highway Number	From	Povement type	Quantity of traffic (vehicles)		
			Total	Bus	truck
1	KM.80+000 - Saraburi	Asphaltic concrete	19,122	10,437	8,685
	Saraburi - Phu Kae	"	9,758	2,792	6,966
	Phu Kae - Lop Buri	"	4,587	2,001	2,586
2	Saraburi - Muak lek	"	10,060	4,017	6,043
21	Phu Kae - Pattananikom	"	2,915	951	1,964
33	Hin Kong - Ban Mo	"	3,507	1,892	1,615
310	No. 1 - Phra Phutthabat	"	3,671	1,705	1,966
329	Hin Kong - Pa Chi	Surface treatment	1,232	649	583
2089	No. 2 - Muak Lek	"	2,745	555	2,290
	Muak Lek - Wang Mung	"	137	86	69
224	Muak Lek - Ban Sub Noi Nua	Unpavement	155	22	133
2273	Ban Maak - Suan Ma dua	"	467	125	342
3017	No. 1 No. 21	Surface treatment	1,866	1,011	855
	No. 21 - Pattana Nikon	"	881	548	333
3020	Phra Phutthabat - Nong Don	"	566	321	245
3021	No. 3022 - Ban Mo	"	1,752	866	886
3022	Phra Phutthabat - Tha Rua	"	2,080	588	1,492
3023	Ban Ta Lan - Tha Rua	"	2,020	822	1,186
3024	Nha Pra Lan - Ban Crua	"	1,519	201	1,318
3041	Saraburi - Sao Hai	"	1,433	895	538
	Sao Hai - Nong Sang	"	695	338	407

Table 2.11 (cont.) Pavement characteristics and quantity of traffic in highway, Saraburi, 1988.

Highway Number	From	Povement type	Quantity of traffic (vehicles)		
			Total	Bus	truck
3042	Pak Kao Sar - Khao Kad	"	390	235	155
3043	No. 329 - Ban Nong Ta Lo	"	588	691	365
3045	Wihan Daeng - Nong Mo	"	598	200	398
3046	Phraputtachay- Sam Lan fall	"	77	52	15
3048	Huai Bung - Tha Lan	"	1,879	769	1,119
3118	No. 2 - Kheng Khoi	"	375	237	138
3222	Kheng Khoi - Ban Na	Asphaltic Concrete	2,109	1,017	1,092
3223	No. 3017 - Kum Phran	Latterite	25	8	17
3224	Kheng Khoi - Salang Pun	Surface treatment	184	101	83
3225	No. 1 - Tha Chang	"	155	109	46
3226	No. 1 - Hin Kong	"	149	103	46
3250	No. 3022 - Huai Bong	Latterite	225	73	152
3267	KM. 26 + 457 - Ban Krua	Surface treatment	1,691	441	1,250
3302	No. 1 - Kok Tun	Surface treatment	1,207	439	769
3314	Pok Pak - Nong No	"	404	196	309
3334	No. 3302 - Khao Sung station	Laterite	173	24	149
3305	Nha Pra Lan - Nong Chan	Surface treatment	1,351	219	1,131

2.3.4 Transportation and Communication

Saraburi is the main junction for road transportation, it connected northern part, upper eastern part and northeastern part with Bangkok metropolitan. It also has good roads interconnected between Amphoe and Tambon.

2.3.4.1 Road and Highways

The road and highways within the area of Saraburi are classified into 3 categories, namely, paved national primary highway, paved provincial secondary highway and unpaved lateritic roads. Besides, there are road which are not under control of Department of Highways such as irrigation service road, which connected rural community. The map of roads and highways is shown in Figure 2.1 and Table 2.11.

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The railways transportation divided into 2 categories :

1. Passenger train : In 1988, total passengers of 1,607,931, were recorded. There were 691,609 passengers used the northern route. There were 916,322 passengers used the northeastern route.

2. Merchandise train : In 1988, total weight of goods transportation was 838,047 tons. The main merchandise was cement powder, gypsum and fuel. The main stations are Ban Mo, Ban Chong Tai, Mab Krabao station, as shown in Table 2.12.

2.3.4.3 Navigation

Navigation is less important due to road and highways transportation is more convenient. AT present navigation use for transportation of agricultural produces at the remote area in Pasak River basin and its branch.

Table 2.12 Quantity of Passenger, Merchandise and Income of Main
Railways Station in Saraburi (1988).

Station	Passenger Quantity	Income (Baht)	Merchandise (ton)	Income (Baht)
1. Amphoe Muang	348,068	6,565,198	5,227	1,701,619
1.1 Saraburi	281,770	6,369,880	5,214	1,702,619
2. Amphoe Kaeng Khoi	314,699	2,848,758	461,433	28,708,139
2.1 Kaeng Khoi junction	209,080	2,362,278	98	26,866
2.2 Mab Krabao	10,729	70,674	461,247	28,649,893
3. Amphoe Muak Lek	72,872	1,122,779	13	5,246
4. Amphoe Nong Sang	206,257	1,461,764	44	10,457
4.1 Nong Sang	145,684	1,194,764	44	20,422
4.2 Nong Sida	60,573	266,706	-	35
5. Amphoe Ban Mo	351,522	3,203,948	318,613	22,446,095
6. Amphoe Nong Don	340,087	1,756,027	52,717	5,152,064
6.1 Nong Don	190,383	1,232,956	67	40,704
6.2 Ban Klab	148,992	521,740	4,278	1,742,080
6.3 Ban Chong Tai	356	1,331	38,372	3,369,280
Total	1,067,931	16,985,182	838,047	58,024,620

Source : State Railway of Thailand (1988), Ministry of Communications

2.3.4.4 Air port and Air field

Due to Saraburi is near Bangkok, the commercial air port and air field is not present, but it has military air field.

2.3.4.5 Telecommunication

In Saraburi there are 17 post offices. At Amphoe Nong Kae 3 offices, Amphoe Muang, Kaeng Khoi, Muak Lek and Ban Mo each 2 offices, and in Amphoe Phra Phutthabat, Wihan Daeng, Sao Hai, Nong Sang, Nong Don and Don Put each 1 office.

The telephone services in Saraburi, in 1989, have 6 centers located at Amphoe Saraburi, Phra Phutthabat, Kaeng Khoi, Wihan Daeng, Nong Kae and Ban Mo of totally 6,448 numbers classified into household rent of 2,460 numbers, business hire of 2,371 numbers and other such as public telephone and government services, as shown in Table 2.13.

2.3.5 Electricity

There are 4 electricity power supply stations in Saraburi Province, situated at Saraburi, Kaeng Khoi, Hin Kong and Phra Phutthabat. There were 48,787 consumers : with the total consumption of 908,530,253 Kilowatts/hour. The heavy industry consume about 80 percents of total consumption, medium industry, house hold, small industry and small business consume 5.60, 4.87, 2.93 and 2.73

percents respectively, as shown in Table 2.14.

In the rural area, about 90 percents of Mu Bans in Saraburi have electricity supply.

Table 2.13 Telephone Service in Saraburi (1989).

Center	Numbers for rent	Numbers rent					
		Total	House- hold	Business	Public	Govrn. Service	TOT
Saraburi	2,213	2,155	899	930	61	201	64
Phra Phutthabat	1,200	1,177	435	657	9	57	56
Kaeng Khoi	1,000	810	403	354	8	28	17
Wihan Daeng	1,000	322	233	82	-	2	5
Nong Kae	635	591	286	242	9	44	10
Ban Mo	400	344	210	106	3	17	8
Total	6,448	5,399	2,466	2,371	90	349	123

Source : Telephone Authority of Thailand Changwat Saraburi (1989).

2.3.6 Water Supply

The water supply in Saraburi could be served in the major municipal area such as Amphoe Muang, Nong Kae and Kaeng Khoi and in

sanitary district such as Muak lek, Ban Mo, Nha Phra Lan, Sao Hai, Nong Saeng. Most of raw water come from Pasak River and its tributaries or irrigation cannal which draw water from Pasak River. However, in dry season ,they had the problem of water deficiency. Most of the people in rural area depend on private water wells and ponds.

Table 2.14 Type of Electrical Consumption, Numbers of Consumers and Percentage of Consumption in Saraburi.

Type of consumers	Quantity of Consumers	Unit of consumption (Kilowatt/hour)	Percentage of consumption
1. Public	24	3,380,042	0.37
2. House hold	44,959	44,384,759	4.87
3. Large business	22	6,699,302	0.74
4. Small business	2,947	24,831,573	2.73
5. Heavy industry	7	729,340,192	80.28
6. Medium industry	13	50,886,399	5.60
7. Small industry	75	26,620,910	2.93
8. Temporary lamps	175	2,708,948	0.30
9. Agriculture	20	3,466,809	0.38
10. Government	545	16,311,415	1.80
Total	48,787	908,530,253	100

Source : Provincial Electricity Office, Saraburi (1989).

Ground water development in the Saraburi area are undertaken by the Department of Mineral Resources and the Department of public Health.

2.3.7 Water Drainage

In the municipality of Amphoe Muang Saraburi the surface water is drained into main conduit directly to Pasak River and irrigation cannal. The topographic elevation of municipal is about 15-16 meters above mean sea level. In rainy season, heavey rain can cause flood due to the main conduit can not drain it out at once. In 1978, flooded water level was about 80 centimeters.

2.3.8 Fire station

The municipal of Amphoe Muang Saraburi has 1 fire station, 60 fire police manpowers, 8 trucks with water tank and 1 boat. In 1984, it had fires boats, they used water from Pasak River and reservoir.

2.3.9 Waste and Waste disposal

Saraburi municipal produced waste about 20 tons per day. They are 8 trucks for waste hauling and 150 wheelbarrows. The waste disposal site is at Phu Kae and used open dump and open incineration after dry.

2.3.10 Occupational and life style.

The ratio of population between rural and urban areas in Saraburi is about 60:40. The social conditions are mainly rural society type with traditional directed in the characteristics. However, within the centers of the municipality, the social conditions have the urban society type.

In the area of Saraburi municipality, there are 15 Buddhist monasteries, 1 Christian church and 1 Islamic mosque.

The social condition in Changwat Saraburi indicated that it has different in quality of life, especially in health services and education. The lacking of hospital and doctors in remote Amphoe around Saraburi is the index of health and educational services defficiency.

2.4 Future Development Prospects

2.4.1 Infrastructure Projects

2.4.1.1 Road and Highway

The road and highway construction plan in Saraburi composed of 3 main projects.

1. Saraburi by pass project : this project is a new road construction by-passing the Saraburi town. The project, when

completed, will mitigate the traffic jam in Saraburi town. The project has been undertaken.

2. Mittraphap highway (highway number 2) : The project begins from Saraburi to Nakhon Ratchasima with length the total of 149 kilometers. This project is aiming to upgrade standard of this highway by expanding from 2 lanes to 4 divided lane 5. The project has begun since 1988.

3. Phahon Yothin highway (Highway number 1) : The project starts from Rang Sit to Saraburi with the length the total of 108 kilometers. The highway is expanded from 4 lanes into 8 lanes. The project has started since 1990.

2.4.1.2 Rail Road

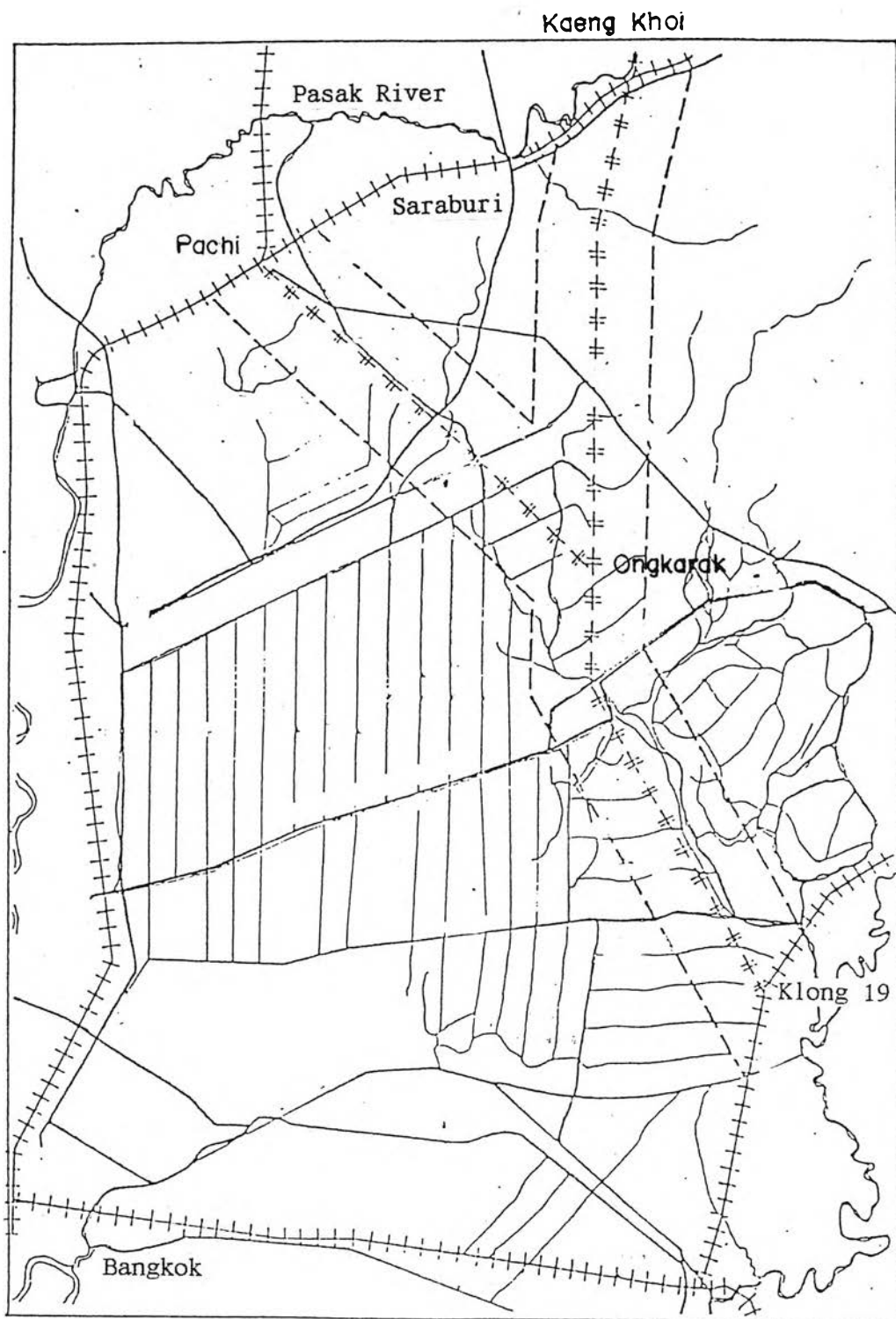


The State Railway Authority of Thailand plan to construct rail road to link the northern, northeastern and the eastern railways to serve the eastern seaboard industrial complex. The construction project has proposed two possible routes for feasibility study (Figure 2.2), namely ;

1. Kaeng Khoi junction - Ongkarak - Khlong Sib Kao
2. Pachi junction - Ongkarak - Khlong Sib Kao

2.4.2 Industrial development Projects

In 1990, the government promoted the new establishment of the cement factories within the country. Many project for cement plant



EXPLANATION

- ++++ Present Railroads
- #### Future Railroads Plan
- Right of Way Plan

Figure 2.2 Future Railroads Plan.

Source: Prachachat Business Newspaper, 29/04/1992.

construction were planned by many investor. The large projects on cement plant construction are

1. Cement plant of Siam Cement Co. Ltd. at Khao Wong : it was planned to produce cement about 10,000 tons per day.

2. Thai Poly Propylene factory : it was planned to build cement plant near Khao Wong to produce cement of 10 million tons per year in 1995.

2.4.3 Water resource plan

In 1992, the Royal Irrigation Department (RID) performed the feasibility study plan to construct a dam for irrigation purpose in the Pasak River at Kaeng Khoi.

2.4.4 Petroleum surveys

In 1985, BP Petroleum Development Co., England conceived 2 concessions on petroleum investigation in lower central plain as shown in Figure 2.3. The total area under concession is about 19,987 square kilometers which covers area from Nakhon Sawan to Bangkok. Some part of Saraburi in the western part of King Amphoe Don Put, Amphoe Phra Phutthabat, Nong Don, Ban Mo, Sao Hai, Nong Sang and Nong Kae are included in the concession.

Seismic surveys carried out in the western part of Saraburi consisted of 19 seismic traverses. These included 8 north-south

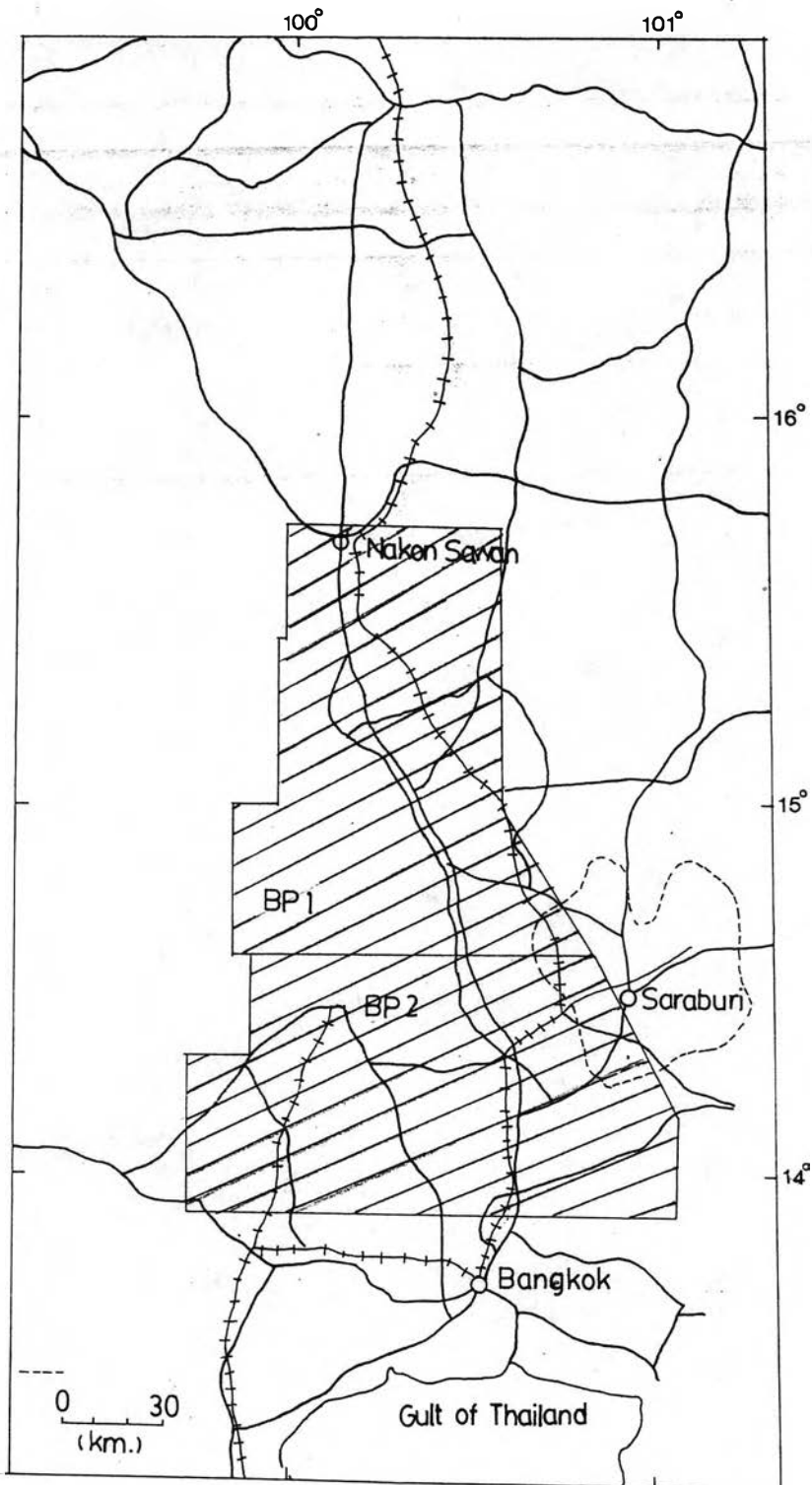


Figure 2.3 Petroleum Concession Blocks.



trending traverses, 8 north-south trending, 9 east-west trendings traverses and 2 traverses in other directions. Each investigation traverses has the length of more than 10 kilometers with traverse interval of 3-5 kilometers.

Data from seismic survey concluded that the area had some interesting geological structures. The drilling investigation found petroleum at Tumbon Suan Tang, Amphoe Muang Changwat Suphan Buri and at Amphoe Kamphaeng Saen Changwat Nakhon Pathom. One drilled hole of more than 1,500 meters deep was sunk in Ban Don Klang Tumbon Kra Jew Amphoe Pachi Saraburi. The result shown no petroleum. However, future investigation is still attractive in this area.

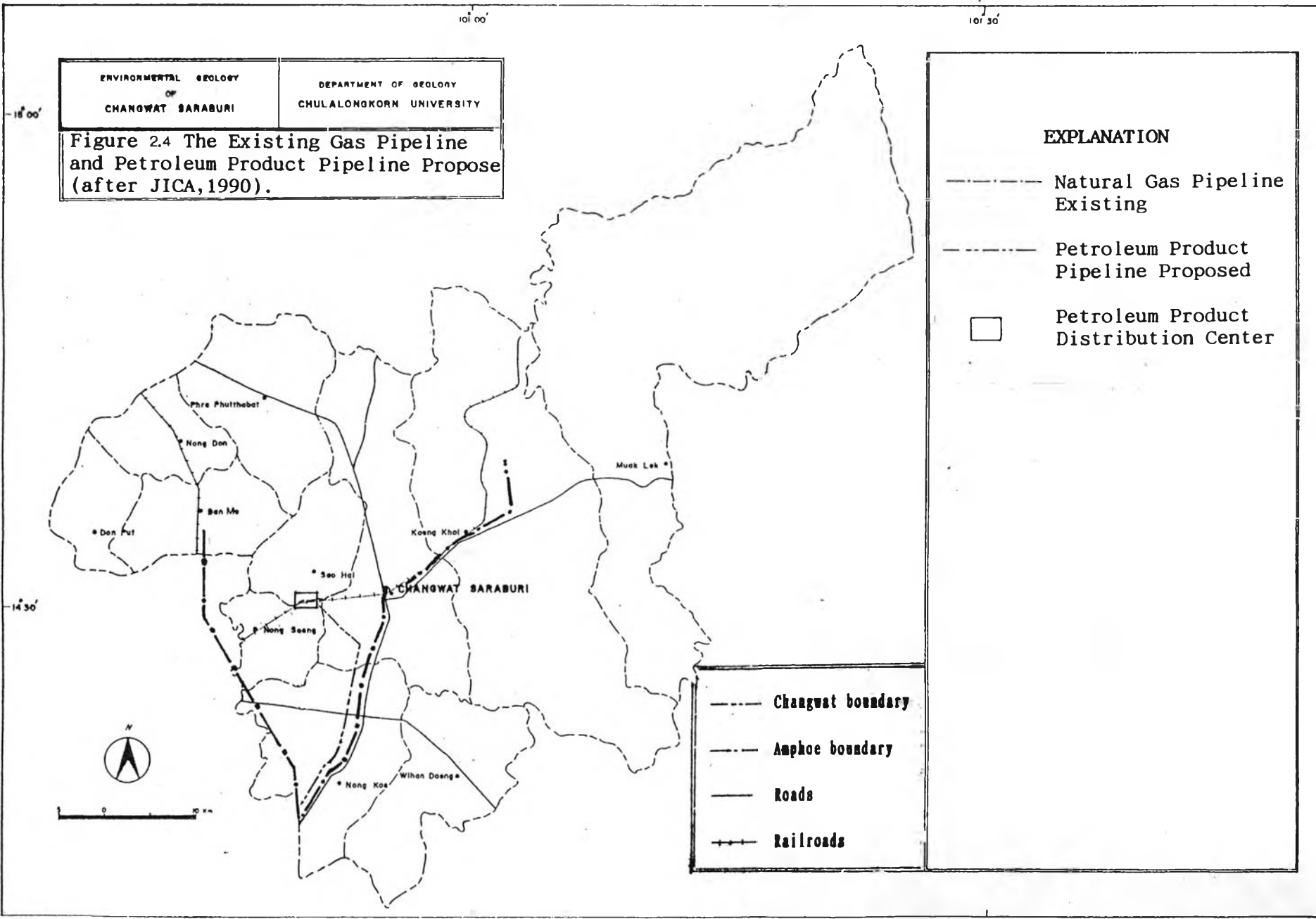
2.4.5 Oil transportation pipeline

Due to traffic jam in Bangkok, the oil transportation from Bang Chak to the whole country causes difficulties. The government plan to construct the oil transportation facility from Bang Chak to Saraburi by dividing into 2 phases. Phase 1 from Bang Chak to Don Muang and phase 2 to Saraburi (Figure 2.4).

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Figure 2.4 The Existing Gas Pipeline and Petroleum Product Pipeline Propose (after JICA, 1990).



EXPLANATION

----- Natural Gas Pipeline Existing

----- Petroleum Product Pipeline Proposed

□ Petroleum Product Distribution Center

----- Changwat boundary

----- Amphoe boundary

— Roads

---+--- Railroads