Table 1.5 The Number of Schools, Teachers and Students at Primary, Secondary, Vocational and Municipal Schools per 100,000 Population in the Study Area and Thailand in 1990

Item	Nakhon Nayok	Prachin Buri	Nakhon Ratchasima	Buri Ram	Surin	Si Sa Ket	Ubon Ratchathani	Mukdahan	Yasothon	Total	Thailand
Population in 1990 (thousand)	222	785	2,375	1,357	1,220	1,286	1,870	265	529	9,909	54,532
Number of schools per 100,000 population											
Office of the National Primary Education Commission	73	88	57	61	62	68	72	90	74	67	57
Department of General Education	4	4	3	3	3	3	3	6	4	3	3
Department of Vocational Education	0.5	0.3	0.1	0.1	0.2	0.2	0.2	0.0	0.4	0.2	0.3
Ministry of Interior	1.4	2.8	0.4	0.2	0.4	0.2	0.8	0.4	0.9	0.7	1.5
Number of teachers per 100,000 population											
Office of the National Primary Education Commission	794	960	616	741	735	752	704	885	804	731	620
Department of General Education	227	148	138	120	115	110	142	192	144	134	181
Department of Vocational Education	53	21	13	15	13	19	16	0	31	17	28
Ministry of Interior	24	29	14	7	7	3	18	2	24	13	23
Number of students per 100,000 population											
Office of the National Primary Education Commission	13,505	20,930	13,621	16,086	16,482	16,128	14,942	19,441	13,872	15,631	12,243
Department of General Education	3,568	2,821	2,648	2,263	2,237	2,176	2,237	3,561	2,278	2,445	3,066
Department of Vocational Education	609	253	210	175	236	172	242	0	401	227	401
Ministry of Interior	632	708	300	130	137	66	406	32	418	285	500

Source : Report on Educational Statistics by Changwat : Academic Year 1990, Office of the Permanent Secretary, Ministry of Education

Table 1.6 Density of Primary and Secondary Schools in the Study Area and Thailand in 1990

Province	Population (Thousand)	Area (sq.km)	Primary School			Secondary School		
			Number	Density per :		Number	Density per :	
				100,000 population	sq.km covered by a school		100,000 population	sq.km covered by a school
Nakhon Nayok	222	2,122	163	73	13	9	4.1	236
Prachin Buri	785	11,958	688	88	17	33	4.2	362
Nakhon Ratchasima	2,375	20,494	1,351	57	15	61	2.6	336
Buri Ram	1,357	10,322	833	61	12	36	2.7	287
Surin	1,220	8,124	758	62	11	33	2.7	246
Si Sa Ket	1,286	8,840	876	68	10	37	2.9	239
Ubon Ratchathani	1,870	18,609	1,344	72	14	56	3.0	332
Mukdahan	265	4,340	239	90	18	16	6.0	271
Yasothon	529	4,162	393	74	11	22	4.2	189
Total	9,909	88,971	6,645	67	13	303	3.1	294
Thailand	54,532	513,115	31,349	57	16	1,846	3.4	278

Source : Report on Educational Statistics by Changwat : Academic Year 1990, Office of the Permanent Secretary, Ministry of Education

Table 1.7 Transition Rate from Primary School to Secondary School in the Study Area and Thailand in 1991

Province	Number of primary school graduates in 1990	Number of secondary school entrants in 1991	Transition Rate (%)	Range in Transition Rate (a) Highest amphoe (%)	(b) Lowest amphoe (%)	(c) Differential (a)/(b) (%)
Nakhon Nayok	4,005	2,793	69.7	89.3	43.7	2.0
Prachin Buri	16,769	9,533	56.8	96.6	43.9	2.2
Nakhon Ratchasima	47,121	23,948	50.8	82.3	18.3	4.5
Buri Ram	29,085	11,496	39.5	61.7	25.4	2.4
Surin	24,098	10,306	42.8	62.7	26.2	2.4
Si Sa Ket	26,231	12,175	46.4	78.3	29.7	2.6
Ubon Ratchathani	39,698	14,956	37.7	65.9	15.2	4.3
Mukdahan	6,399	4,103	64.1	96.8	42.7	2.3
Yasothon	9,699	4,547	46.9	56.3	42.4	1.3
Total	203,105	93,857	46.2	-	-	-
Thailand	1,002,057	609,685	60.8	-	-	-
Bangkok	85,000	87,563	103.0	-	-	-
Other Areas	917,057	522,122	56.9	-	-	-

Source : Analysis on Secondary School Transition Rate, Department of General Education, Ministry of Education (1992)

Table 1.8 Change of Transition Rate from Primary School to Secondary School in the Study Area

Province	Number of Primary School Graduates in :			Number of Secondary School Entrants in :			Transition Rate (%)			
	1988	1989	1990	1989	1990	1991	1989	1990	1991	1991 - 1989
Nakhon Nayok	4,094	3,966	4,005	2,242	2,416	2,793	54.8	60.9	69.7	14.9
Prachin Buri	16,536	17,283	16,769	6,417	7,259	9,533	38.8	42.0	56.8	18.0
Nakhon Ratchasima	45,960	47,586	47,121	17,147	19,780	23,948	37.3	41.6	50.8	13.5
Buri Ram	29,231	29,280	29,085	7,759	9,081	11,496	26.5	31.0	39.5	13.0
Surin	24,353	25,895	24,098	7,115	8,532	10,306	29.2	32.9	42.8	13.6
Si Sa Ket	24,482	26,951	26,231	7,647	9,118	12,175	31.2	33.8	46.4	15.2
Ubon Ratchathani	39,522	38,804	39,698	10,922	11,719	14,956	27.6	30.2	37.7	10.1
Mukdahan	6,113	6,392	6,399	2,350	2,950	4,103	38.4	46.2	64.1	25.7
Yasothon	10,412	10,004	9,699	3,044	3,424	4,547	29.2	34.2	46.9	17.7
Total	200,703	206,161	203,105	64,643	74,279	93,857	32.2	36.0	46.2	14.0

Source : Analysis on Secondary School Transition Rate, Department of General Education, Ministry of Education (1992)

Table 1.9 The Number of Schools, Teachers and Students per 100,000 Population at Universities and Colleges and Teacher Colleges in the Study Area and Thailand in 1990

	Item	University/ College	Teacher College
(1)	Number of Schools		
	1) Study Area	0.01	0.05
	2) Thailand	0.10	0.11
	3) Bangkok Metropolis	0.53	0.17
	4) Other Regions	0.05	0.10
	5) 1) / 2)	10.0%	45.0%
	6) 1) / 4)	20.0%	50.0%
(1)	Number of Teachers		
	1) Study Area	0.81	7.03
	2) Thailand	33.80	11.72
	3) Bangkok Metropolis	214.96	24.88
	4) Other Regions	11.92	10.13
	5) 1) / 2)	2.0%	60.0%
	6) 1) / 4)	7.0%	69.0%
(1)	Number of Students		
	1) Study Area	6.28	75.87
	2) Thailand	397.62	123.82
	3) Bangkok Metropolis	2,498.03	261.91
	4) Other Regions	143.97	107.14
	5) 1) / 2)	2.0%	61.0%
	6) 1) / 4)	4.0%	71.0%

Source : Report on Educational Statistics by Changwat : Academic Year 1990, Office of the Permanent Secretary, Ministry of Education

Table 1.10 The Number of Classrooms and Students at Schools under Department of Vocational Education by Type of Education in Region 11 and Thailand

Type of Education	Number of Classrooms			Number of Students		
	Region 11	Thailand	Share(%)	Region 11	Thailand	Share(%)
Formal Education						
Certificate of Vocational Education	354	5,230	6.8	11,762	179,656	6.5
Diploma of Technical Education	37	428	8.6	1,084	11,809	9.2
Diploma of Vocational Education	90	1,489	6.0	2,630	44,484	5.9
High Diploma of Technical Education	0	10	0.0	0	214	0.0
Total	481	7,157	6.7	15,476	236,163	6.6
Non-formal Education						
One-year Training	6	74	8.1	102	1,447	7.0
225-hour Training	612	4,968	12.3	11,415	92,328	12.4
Cooperative Study Training	18	916	2.0	544	16,970	3.2
Agricultural Short Course Training & Mobile Extension Unit	0	0	0.0	18,655	84,432	22.1
Total	636	5,958	10.7	30,716	195,177	15.7

Note : Educational Region 11 includes Chaiyaphun, Nakhon Ratchasima, Buri Ram, Surin and Si Sa Ket.
Source : DOVE Statistics 1990, 1991, Department of Vocational Education, Ministry of Education

Table 1.11 The Number of Teachers, Classrooms and Students under the Non-Formal Education Programs in the Study Area in 1990

Province	Teachers/ employee	General Education Type		Vocational Education Type		Both Types	
		Classrooms	Students	Classrooms	Students	Classrooms	Students
Nakhon Nayok	25	154	1,940	67	871	221	2,811
Prachin Buri	28	118	4,342	81	1,266	199	5,608
Nakhon Ratchasima	42	241	11,324	272	3,425	513	14,749
Buri Ram	28	112	3,397	49	716	161	4,113
Surin	42	114	4,405	254	4,277	368	8,682
Si Sa Ket	33	250	5,215	98	1,137	348	6,352
Ubon Ratchathani	62	344	8,769	75	1,189	419	9,958
Mukdahan	16	85	2,401	34	526	119	2,927
Yasothon	26	109	2,487	41	658	150	3,145
Total	302	1,527	44,280	971	14,065	2,498	58,345
Thailand	3,493	14,109	377,827	6,216	89,030	20,325	466,857
Study Area/Thailand	**8.6%**	**10.8%**	**11.7%**	**15.6%**	**15.8%**	**12.3%**	**12.5%**

Source: Non-Formal Education Statistics by Province Fiscal Year 1990, Department of Non-Formal Education, Ministry of Education

Table 3.1
Employed Labor Force in Thailand and Study Area by Educational Attainment

Educational Attainment	(in thousand)			(in %)		
	Thailand	Study Area	BKK	Thailand	Study Area	BKK
(Total)						
None	1,579.7	226.0	78.3	5.2	3.9	2.6
Elementary and kindergartens	24,221.7	5,145.3	1,497.1	79.1	88.1	50.3
Lower secondary	1,793.1	208.4	385.4	5.9	3.6	12.9
Upper secondary	717.5	88.8	163.9	2.3	1.5	5.5
Vocational (upper secondary equivalent)	703.9	40.1	267.9	2.3	0.7	9.0
University/technical training	1,004.0	53.2	490.1	3.3	0.9	16.5
Teacher training	534.2	69.5	72.6	1.7	1.2	2.4
Short-course vocational	16.7	5.8	5.8	0.1	0.1	0.2
Others/unknown	44.3	4.3	17.2	0.1	0.1	0.6
TOTAL	30,615.1	5,841.4	2,978.3	100.0	100.0	100.0

Source : Report of the Labor force Survey, August 1989 (Round 3) for Thailand and NSO's computer output for the Study Area

Note : * % calculated by accumulating from higher level. Teacher training is assumed equivalent to university.

Table 3.2
Projected Educational Attainment of the Labor Force in the Study Area in 2001 and 2010

		1990	2001	2010
(1)	Employed Laborforce (thousand)	5,036	5,849	6,700
(2)	Number of Labor force to retire (thousand)		(1990-2001)	(2001-2010)
	none	-	14	18
	only primary	-	315	404
	up to lower secondary	-	13	28
	up to upper secondary or equivalent	-	8	15
	University /teacher training or equivalent	-	8	26
	other types	-	0	12
	Total	-	358	502
(3)	Remaining Labor Force (thousand)			
	none	-	182	188
	only primary	-	4,121	4,303
	up to lower secondary	-	168	293
	up to upper secondary or equivalent	-	103	158
	University /teacher training or equivalent	-	98	272
	other types	-	5	133
	Total	-	4,678	5,347
(4)	Assumed Composition of New Labor Force by Education (%)			
	none	-	2.0	0.0
	only primary	-	50.0	40.0
	up to lower secondary	-	13.0	20.0
	up to upper secondary or equivalent	-	6.0	10.0
	University /teacher training or equivalent	-	17.0	25.0
	other types	-	12.0	5.0
	Total	-	100.0	100.0
(5)	Number of Labor force to enter into labor market (thousand)			
	none	-	23	0
	only primary	-	586	541
	up to lower secondary	-	152	271
	up to upper secondary or equivalent	-	70	135
	University /teacher training or equivalent	-	199	338
	other types	-	141	68
	Total	-	1,171	1,353
(6)	Annual Average Requirement for graduates between :		(1990-2001)	(2001-2010)
	none	-	2	0
	only primary	-	95	118
	up to lower secondary	-	45	71
	up to upper secondary or equivalent	-	28	45
	University /teacher training or equivalent	-	18	31
	other types	-	13	6
	Total	-	106	123
(7)	Educational Attainment of the Labor Force (thousand)			
	none	196	206	188
	only primary	4,437	4,707	4,844
	up to lower secondary	181	321	564
	up to upper secondary or equivalent	111	173	294
	University /teacher training or equivalent	106	297	610
	other types	5	145	200
	Total	5,036	5,849	6,700
(8)	Educational Attainment of the Labor Force (%)			
	none	3.9	3.5	2.8
	only primary	88.1	80.5	72.3
	up to lower secondary	3.6	5.5	8.4
	up to upper secondary or equivalent	2.2	3.0	4.4
	University /teacher training or equivalent	2.1	5.1	9.1
	other types	0.1	2.5	3.0
	Total	100.0	100.0	100.0

Table 3.3 Objectives and Targets in Education and Skill Development

Sub-category	Targets		
	to 1996	to 2001	to 2010
Basic education	- extension of basic education from present 6 to 9 years (7th Plan target) - rise in transition rate from primary ro secondary school from present 46 % to 73 % (7th Plan target) - 124 more lower secondary schools or equivalent to be established and an area per lower secondary school to be reduced from present 440 sq.km to 260 sq.km (12 km radius circle to 9.1 km radius circle)	- basic education for 9 years - transition rate to rise to 100 % - 103 more lower secondary schools or equivalent to be established and an area per school to be reduced to 200 sq.km (8.0 km radius circle)	- basic education for 9 years - transition rate to remain at 100 % - 220 more lower secondary schools or equivalent to be established and an area per school to be reduced to 134 sq.km (6.5 km radius circle)
Higher Education	- 2 new universities start operation : Suranaree University of Technology and Ubon Ratchathani University	- Another new university starts operation by 2001. - Ubon Ratchathani University will be expanded to an open university along with Teleport development in Ubon Ratchathani.	- All the nine provincial capitals in the LNE-UE Regions will have at least one college or university by 2010.
Vocational education	- Technical colleges will be opend in Surin and Nakhon Ratchasima in 1992, Buri Ram and Yasothon in 1993 and Si Sa Ket by 1996.	- Expansion of existing schools and establishment of new schools will be implemented as needs arise.	- Expansion of existing schools and establishment of new schools will be implemented as needs arise.
Non-formal education	- expansion of non-formal education resources to the current national level, which is equivalent to a 112% and 48 % increase in the number of teachers and classrooms	- continuous expansion and quality improvement of non-formal education programs	- continuous expansion and quality improvement of non-formal education programs
Skill training	- Khorat Skill Training Center will open. - Buri Ram Provincial Skill Training Center will open.	- Various skill training projects proposed are to be implemented.	- Various skill training projects proposed are to be implemented.

Figures

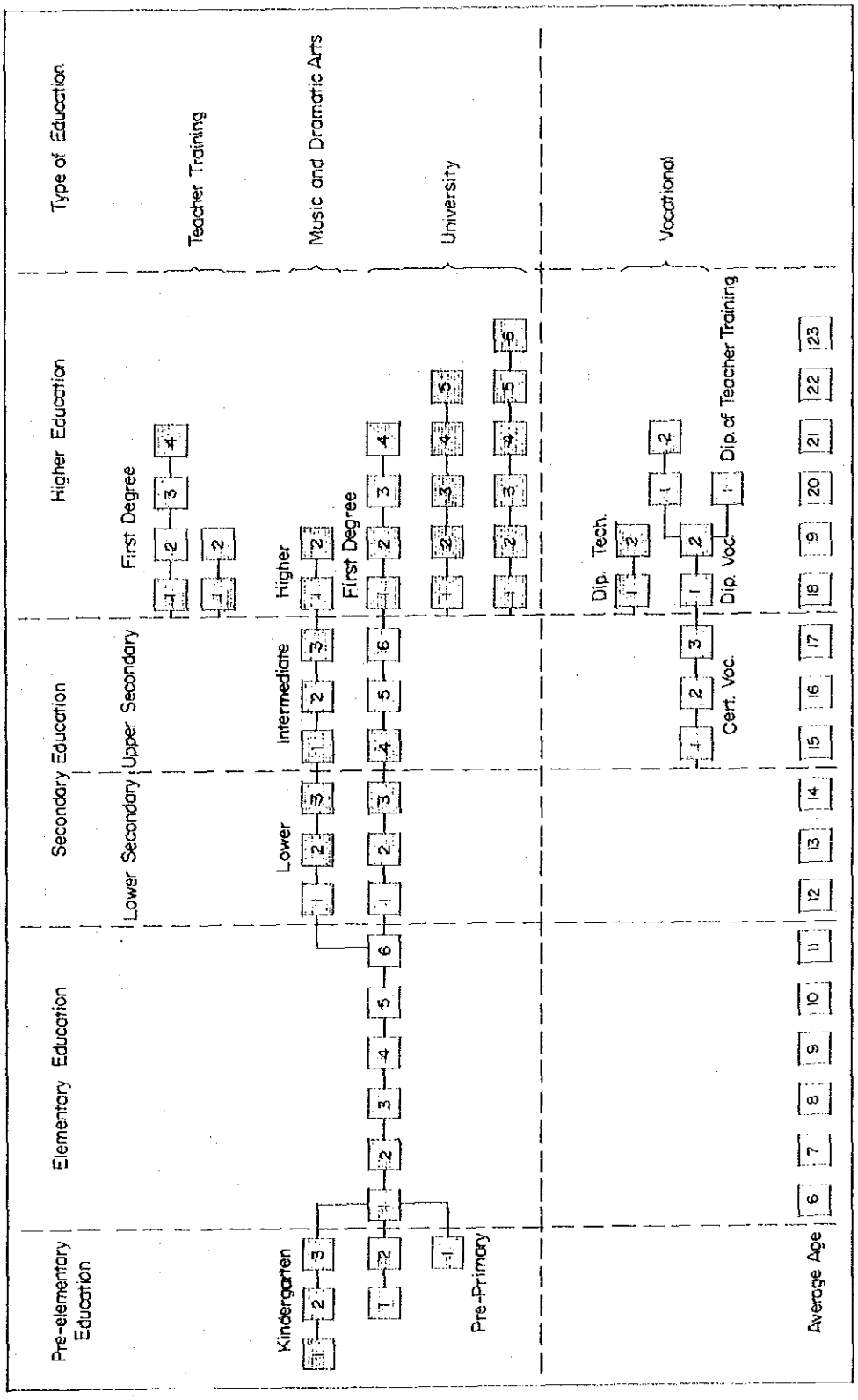


Figure 1.1 Average School Age by Type of Education in Thailand

The Study on the Regional Development Plan
for the Lower Northeast and the Upper East Regions
in the Kingdom of Thailand

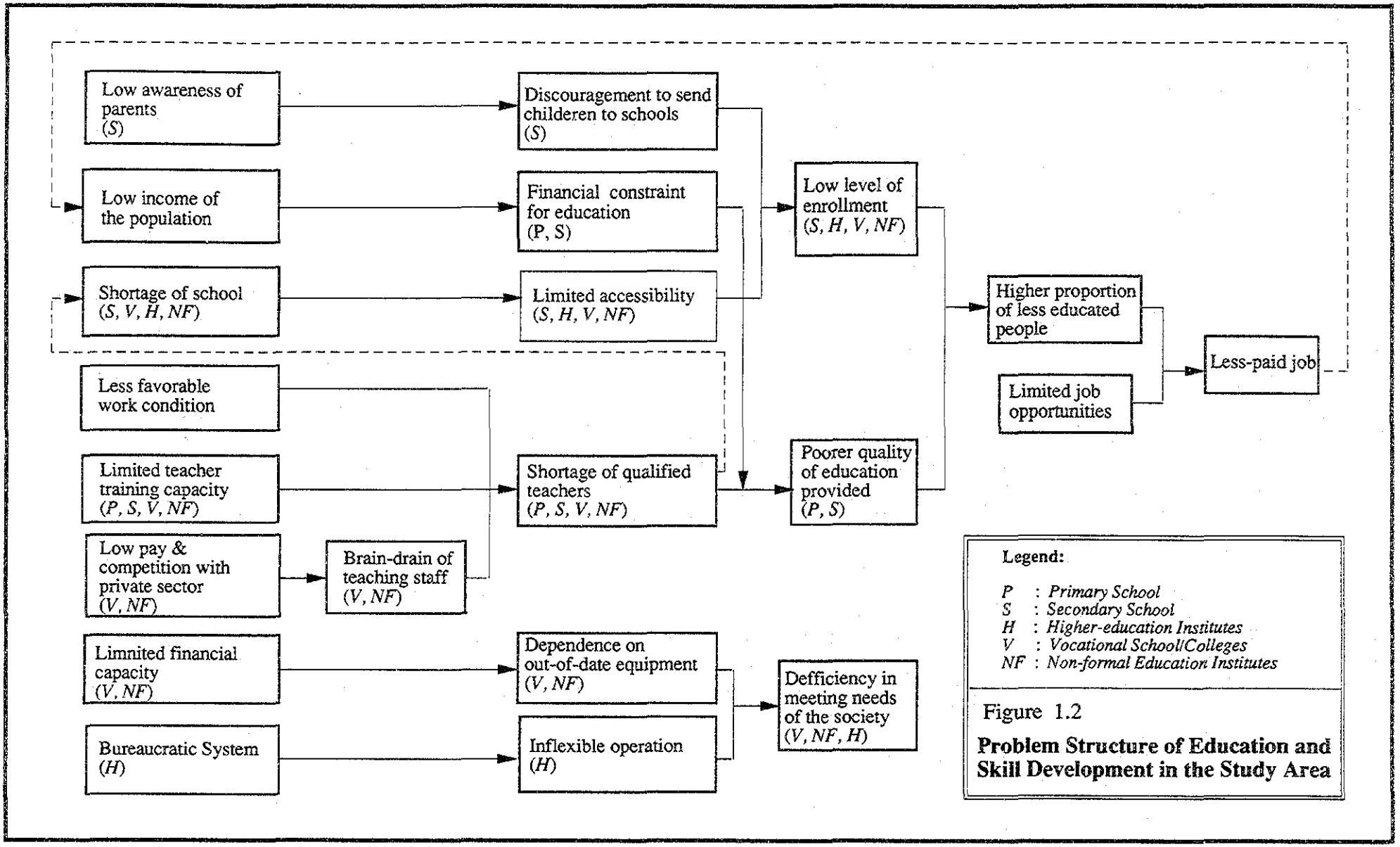


Figure 1.2

Problem Structure of Education and Skill Development in the Study Area

APPENDIX I

"THAI - KHMER CULTURAL BRIDGE PROJECT"

PROJECT PROFILE

1. **Project Title** : Thai-Khmer Culture Bridge Project

2. **Location** : Buri Ram or Surin

3. **Objective** :

   - To establish a job training center for border area population to create human resources that would function as a bridge strengthening Thai-Cambodia link.

4. **Component** :

   (1) Establishment of a job training center with 100 trainees per year

5. **Description** :

   (1) Important background factors include :
   - increasing role of the Lower Northeast Region as a tourism springboard for Cambodia.
   - existence of population with Cambodia heritage along the Thai-Cambodian border in Buri Ram and Surin provinces.
   - These people form a poorest segment of the population in the poorest provinces of the poorest region.

   (2) This project aims at taking advantage of this unique ethnic characteristics of the Study Area. These people, once given appropriate trainings to acquire upgraded skill, are expected to play an active role in strengthening link between Thailand and Cambodia, especially in tourism and international trade.

   (3) This project will supplement other sectors' development plans, especially tourism and international trade sectors, as part of human resource development program.

   (4) Involvement of local community will be pursued from planning stage all through management stage. For this type of project to succeed, participation of local community is indispensable especially in grasping needs and reflecting them in the Project.

   (5) A curriculum is proposed as follows.

   <u>Basic skill</u>
   - English language
   - Thai language
   - Khmer language
   - mathematics

Tour Guide Course
- Khmer and Thai history
- Khmer and Thai historical architecture
- Khmer and Thai culture
- Khmer and Thai art
- Principles and techniques of tour guiding

International Trade Course
- International business practices
- International trade practices

Field tours will be arranged to give trainees a better understanding and sense of the actual situation.

(6) The center will receive about 100 trainees per year. Trainees will be in their 20 to 30 years of age. Trainees should have completed at least lower secondary education or equivalent. Trainees from Cambodia can also be accepted.

(7) The number of teachers by speciality are as follows.

Basic Course	
- English language	2
- Thai language	1
- Khmer language	1
- mathematics	1
Tour Guide Course	
- History of Thai/Khmer	1
- Architecture/art	1
- Culture	1
- Principle and techniques of tour guidicy	2
International Trade Course	
- International business practice	1
- International trade practice	1
Total =	12

6. **Cost** : 20×10^6 Baht (initial cost), assuming about 10% of Ubon Ratchathani Institute for Skill Development

7. **Duration** : Phase II (1997-2001)

PART III

PUBLIC HEALTH

Final Report
Sector Report : Part III Public Health

Table of Contents

List of Tables

****

List of Figures

CHAPTER 1

PRESENT PUBLIC HEALTH CONDITION

1.1 Present Public Health Condition in Thailand

1.1.1 Public health administration

The Ministry of Public Health plays the major role in providing public health services in Thailand. The Ministry of University Affairs (MOUA) and the Ministry of Interior (MOI) also play some role in providing public health services : MOUA in relation with Mahidol University and MOI with regard to rural development through a number of departments.

The Ministry of Public Health is composed of six major units : the Office of the Permanent Secretary of Public Health, the Department of Health, the Department of Communicable Disease Control, the Department of Medical Services, the Department of Medical Science and the Food and Drug Administration each having divisions as shown in Figure 1.1. The Office of the Permanent Secretary is responsible for policy and planning, manpower development, health care services and administrative matters. This office supervises and controls the Provincial Health Administration providing medical and health services in each of 72 provinces in Thailand. The Department of Health covers a wide range of aspects related with health such as rural water supply, dental health, nutrition, sanitation, family health and occupational health. The Department of Communicable Disease Control deals with various communicable diseases by type of disease. It also supervises some hospitals specialized in communicable diseases. The Department of Medical Services provides part of the medical care to the Bangkok Metropolis and psychiatric services for the whole country. The Department of Medical Sciences is in charge of experiments and analytical works of various diseases and health problems with technical divisions, laboratories and research institutes. The Food and Drug Administration is responsible for controlling and supervising the quality of food and drug produced and sold in the market.

1.1.2 Health care resources in Thailand

Hospital and health care center

In Thailand, hospitals are operated by the public sector entities such as the Ministry of Public Health, other government agencies, state enterprises and municipalities as well as by the private sector. The number of hospitals and beds classified by type of administration is shown in Table 1.1 and summarized for 1989 as follows.

Type of Administration	Number of hospital	Number of bed
General Service		
Government	723	63,107
(Ministry of Public Health)	(660)	(46,239)
(Other)	(63)	(16,868)
State Enterprise	11	2,335
Municipality	7	2,057
Private	185	8,962
Total	926	76,461
Specialized Service		
Government	33	12,938
(Ministry of Public Health)	(32)	(12,688)
(Other)	(1)	(250)
Private	52	583
Total	85	13,521

The Ministry of Public Health hospital accounts for 71% and 61% of the total number of hospitals and beds respectively for general services, followed by the private sector in the number of bed. Overall both the number of hospital and bed for general service has been constantly increasing over 4 years from 1985 to 1989, while those for specialized service has been declining.

In the areas outside the Bangkok Metropolitan Area, the Ministry of Public Health provides medical and health services at four levels : regional, provincial, district (amphoe) and sub-district (tambon) levels. Scale and functions of these facilities are shown in Table 1.2. Regional hospitals are located in 17 places all over the country. Its function is curative providing services to patients referred by provincial hospitals. Provincial hospitals, 72 in total or one general hospital per each province, provide mainly curative services to the provincial population as well as function as the training center for medical and paramedical workers. Community hospital at district level provides curative, preventive, primitive and rehabilitative services with one to five physicians. There are 680 community hospitals all over the country. Tambon health care centers are staffed with two to three health and medical workers providing limited treatment services, preventive and primitive activities, and other various services. They also provide technical support to villages in primary health care programs. The number of facilities and beds for these establishments in Thailand are shown in Table 1.3 for 1985 and 1990.

Medical and health personnel

The following table shows a summary of medical and health care personnel resources in Thailand.

Item	1980	1989	Change (%/year)
Population (10^3)	46,961	55,888	2.0
Number of Doctors	6,897	12,713	7.0
Number of Nurses	35,181	74,152	8.6
Number of Doctors per 10,000 population	1.5	2.3	-
Number of Nurses per 10,000 population	7.5	13.3	-

Source : Table 1.4

Both the number of doctors and nurses kept increasing at high rates in the 1980s, leading to an improvement in their numbers per population. The levels in 1989, 2.3 doctors and 13.3 nurses per 10,000 people, are comparable with other middle income countries, higher than least developed countries but still significantly lower than developed countries as the following table shows.

Number of Doctors and Nurses per 10,000 population

(Unit : per 10,000 population)

Country	Year	Number of Doctors	Number of Nurses
USA	1984	21.4	83.0
UK	1981	16.4	32.5
France	1986	31.9	n.a.
Japan	1984	13.5	45.6
Thailand	**1984**	**1.6**	**10.7**
Philippine	1984	1.5	3.7
Indonesia	1984	1.1	n.a.
Bangladesh	1985	0.7	0.5
Nepal	1984	0.3	0.3

Source: (1) World Health Statistics 1988 (World Health Organization)
(2) World Development Report 1992 (World Bank)

Table 1.4 presents the number of physicians, dentists, pharmacists, nurses, midwives and health workers in Thailand in 1980 and 1989.

Health Insurance System

The health insurance system in Thailand is new in history. There are two types of insurance or semi-insurance systems in Thailand.

The Social Security Act passed in 1990 requires public and private hospitals to provide medical services to the workers covered by the medical insurance system as

medical benefit. This system is accessible to employers and employees of the companies with more than 20 employees. According to the law, 1.5% of the payroll is borne respectively by employer, employee and the government. There are also private health insurance programs, but these are still limited.

The community-based health card project, a kind of voluntary health insurance, has been effective since 1983 for the rural self-employed population. This system ensures rural population under the health card program to receive free services at tambon health care centers. One health card is priced at 200 baht for a year. As of 1991, there were 1,415,669 health card holders in 58 provinces throughout the country.

Government officers and the population with annual income of less than 15,000 baht are entitled to receive medical and health services at no cost.

1.1.3 Mortality and morbidity in Thailand

Overall trend

The public health condition in Thailand has been constantly improving in the last decades. Table 1.5 presents the major public health indicators in Thailand in 1980 and 1989. All the vital statistics such as crude death rate, infant death rate, maternal death rate and average life expectancy indicate an improvement in public health condition over the nine years. Morbidity and mortality figures also show upgrading of health condition in Thailand.

Upgraded health condition in Thailand can be attributed to a number of factors such as follows.

- a rise in income level leading to better nutrition and increased accessibility to medical and health services
- expansion and enhancement of medical and health services by the public and private sectors resulting in better access for the population to these services
- increased awareness of the population toward health improvement through various educational programs and awareness campaigns at community level

While a significant improvement in public health condition has been achieved overall, there are new types of diseases increasing in accordance with economic development. Table 1.6 shows that such diseases as heart disease and malignant neoplasm have been on the rise over 16 years. Factors influencing this trend would include changing life styles of the people in accordance with economic development such as changing eating habit, exercise pattern and an increase in intaking of food with additives as well as an increasing proportion of adult age population due to changing age structure of the Thai population.

While the rates of these diseases are still significantly lower than developed countries[1)], these diseases should be tackled by public health measures as well as

---

1) Death by malignant neoplasms and heart diseases in Japan were 193 and 142 per 100,000 population respectively in 1989 as contrasted with 34 and 44 in Thailand.

other measures such as environmentally sound development in industry and agriculture.

The case of AIDS (Acquired Immune Deficiency Syndrome) is becoming one of the most serious issues to be tackled. Since the first report of AIDS case in 1984, the number of AIDS patients and HIV (Human Immunodefficiency Virus) infected has been increasing reaching 142 confirmed AIDS cases, 371 ARC (AIDS Related Complex) cases and 32,553 HIV infected cases all over the country in 1992. Actual numbers, however, are said to be 5 to 10 times larger than these officially reported figures. While the main route of HIV infection used to be intravenous drug use (IVDU), nowadays it has diversified to sexual intercourse at 75%, IVDU at 20% and other routes such as blood infusion at 5%.

Regional trend

The following table summarizes Table 1.7 showing causes of death by diseases by region in 1989.

Cause of Death by Region

(Unit : per 100,000 population)

Disease	Thailand	Northeast	Central	North	South	Bangkok Metropolis
Tuberculosis	7.6	10.1	6.4	6.5	5.7	4.2
Pulmonary disease	7.5	10.0	6.4	6.2	5.6	3.9
Pneumonia	7.0	6.8	8.1	6.7	5.3	10.6
Heart failure	25.6	16.2	42.0	20.6	16.7	45.3
Chronic liver diseases & cirrhosis	8.7	17.1	4.6	5.1	2.1	5.2
Malaria	2.5	2.8	2.4	2.9	1.5	0.2
Intestinal infectious disease	3.0	4.7	1.2	3.4	2.3	0.3

The table indicates that the living standards of the regions affect the causes of death by disease. The Northeastern region shows higher incidence of tuberculosis, pulmonary disease, chronic liver diseases and cirrhosis and intestinal infections diseases as causes of death. This would be a reflection of the low living standard in the Northeast : poor nutrition, poor access to clean water, unhygienic eating habit, low level of sanitary facilities. The Bangkok Metropolis and the Central Region, on the contrary, show lower incidence of most diseases as cause of death except heart failure that has much to do with excessive or imbalanced nutrient and calorie intaking resulting from higher income level as well as more urbanized life style.

1.2 Present Public Health Condition in the Study Area

1.2.1 Public health resources in the Study Area

A number of indicators show a lower level of public health resources in the Study Area in comparison with the nation. The following table compares the number of hospitals, beds, physicians, dentists, pharmacists and nurses per 100,000 population in the Study Area and Thailand in 1989.

Medical and Public Health Resources in Thailand and Study Area

(Unit : per 100,000 population)

Item	Thailand	Study Area	Study Area/ Thailand
Hospital	1.7	1.4	0.82
Bed	139.4	86.8	0.62
Physician	23.0	7.3	0.32
Dentist	4.3	1.3	0.30
Pharmacist	8.6	1.9	0.22
Nurse	133.0	69.9	0.53

The table shows that all the indicators show disparity between the Study Area and Thailand. Especially, personnel resources such as the number of physicians, dentists, pharmacists and nurses per 100,000 population are significantly low in the Study Area implying poorer quality of medical services in the Study Area.

In terms of the number of hospitals and beds per 100,000 population, all the seven provinces in LNE are lower than the national average except the number of beds in Mukdahan, while 2 provinces in UE are better or at least same with the national level except the number of beds in Prachin Buri (Table 1.8).

In personnel resources, unfavorable condition of the Study area is even more conspicuous. In all indicators, nine provinces show significantly lower level than the national level except the number of nurses in Mukdahan (158 nurses per 100,000 population as opposed to 131 nurses in Thailand).

Public hospitals play a larger role especially in the Study Area. The shares of pubic sector are 85% and 82% in terms of the number of hospitals and beds respectively, while those for Thailand are 70% and 64% (Table 1.9). This would be a reflection of the lower economic level of the Study Area resulting in lower chances for economically successful operation of private hospitals.

1.2.2 Morbidity and mortality in the Study Area

Birth-related death

Table 1.10 shows the numbers of officially reported birth-related death cases in the Study Area in 1987 and 1990. In three cases of neonatal death, maternal death and perinatal death, an improvement was observed in three years. The rate of perinatal death, on the contrary, showed an increase from 1.1 to 1.5 per 1,000 livebirths.

Official infant mortality rate at 7.2 per 1,000 livebirths in the Study Area was lower than that of Thailand at 8.0 in 1990. Interpretation of these figures should be careful. According to "Public Health Statistics 1990" by Ministry of Public Health, there was a wide discrepancy between infant mortality rates reported by provinces and those surveyed through village health volunteers in 1983, 12.4 per 1,000 livebirths by the former source and 45.3 by the latter source, a difference of 3.65. The above report

suggests that an actual infant mortality rate be calculated by multiplying the officially reported rate by the coefficient of 3.65.

It would be reasonable to assume that there is a variation in the coefficient depending on the accuracy of provincial reports and geographical and living conditions of areas surveyed. In an area like the Study Area where income level and living conditions are low and rural element is high, it is likely that actual infant mortality rate is higher than other areas, resulting in a coefficient higher than 3.65. It would, therefore, be logical to assume a rate higher than 26.3 (7.2 times 3.65) for the Study Area and even 29.2 (8.0 times 3.65) for Thailand.

Malnutrition

Table 1.11 presents the incidence of malnutrition in the Study Area and Thailand in 1990 based on the 1990 Quality of Life Report prepared by the Ministry of Interior. The following is a summary.

% of Children Suffering from malnutrition

Study Area	:	25.5%
(UE)	:	(13.8%)
(LNE)	:	(26.7%)
Thailand	:	17.9%

Overall incidence of malnutrition in the Study Area is higher than Thailand, due to low nutrition condition in the lower Northeast. All the seven province in the lower Northeast show higher proportions of malnutrition. Buri Ram, Surin, Si Sa Ket and Mukdahan are the provinces showing especially low performance. Conditions in both Nakhon Nayok and Prachin Buri in the Upper East are better than the country. This contrast clearly shows the relation of malnutrition condition with income level of the population.

Case and death by major diseases

The number of cases and death by four major diseases in the Study Area (tuberculosis, pneumonia, malaria and intestinal infection disease) are shown in Table 1.12 for 4 years between 1987 and 1990. The rates of cases and death per 100,000 population are also calculated. The major trends can be summarized as follows.[2)]

- The rates of tuberculosis have been declining both for case and death.
- The case of pneumonia has shown a small decline, while the rate of death remained almost unchanged.
- The case of malaria has been fluctuating, while death rate showed an improvement in 1990.
- The case of intestinal infections disease have remained almost constant, while death rate has shown a constant improvement.

---

2) The numbers of cases in 1989 were excluded from analysis, since the figures obtained from the Ministry of Public Health for this year seem unreliable.

A comparison of death rate per 100,000 population with the national figure shows that the rates in the Study Area are significantly higher than the national average, ranging from two to six times higher, for all the four diseases as extracted from Table 1.12 as follows.

Rate of Death per 100,000 population in 1990

	(1) Study Area	(2) Thailand	(3) (1) / (2)
Tuberculosis	10.8	4.4	2.5
Pneumonia	6.4	1.5	4.3
Malaria	2.8	0.5	5.6
Intestinal infections disease	3.7	0.6	6.2

Table 1.13 presents the number of cases and deaths of the four diseases by province in the Study Area for 1990. The following are major findings.

(a) Relation between the rate of cases and the rate of death is clearly positive in the case of malaria : the larger the rate of cases, the larger the rate of death. No obvious relations are observed in the case of other three diseases.

(b) In terms of the percentage of death to case, three provinces of Mukdahan, Ubon Ratchathani and Buri Ram are especially high. This should be a reflection of such factors as seriousness of illness when patients come to the hospital, which might be related with accessibility to the hospital, and the level of treatment provided.

(c) Variations in the incidence of the four diseases and rate of death among provinces differ from disease to disease as shown by the deviations from the Study Area's average figures below.

Variations in Incidence of Four Major Diseases

(Average = 100)

	Tuberculosis	Pneumonia	Malaria	Intestinal infectious disease
Rate of case				
highest	185	143	257	157
lowest	67	68	23	69
Rate of death				
highest	217	166	379	419
lowest	55	66	0	0

Generally speaking, variations in the rate of death is greater than those in the rate of case.

In the case of malaria, both rates are high in the provinces where border trade is active such as Mukdahan and Prachin Buri.

(d) With regard to the rate of cases, the rates of Mukdahan and Si Sa Ket are above the Study Area's averages for all the four diseases. This is followed by

Nakhon Nayok and Prachin Buri where three diseases were above the averages.

(e) With regard to the rate of deaths, all the nine provinces in the Study Area showed the rates above the national average figures for all the four diseases except the rates of Malaria and intestinal infections diseases in Nakhon Nayok with no report of death. Mukdahan, in particular, showed high rates of death for the four diseases, followed by Ubon Ratchathani.

AIDS

The case of AIDS has been increasing in the Study Area as is the case in Thailand. In the Northeast, there are three AIDS centers, in Nakhon Ratchasima, Ubon Ratchathani and Khon Kaen. An interview survey was made at the Nakhon Ratchasima AIDS Center that covers five provinces of Nakhon Ratchasima, Chaiyaphum, Buri Ram, Surin and Si Sa Ket. The finding are summarized as follows.

- There are altogether 27 cases of AIDS and 44 cases of ARC in the 5 provinces in 1992. (Table 1.14)

- Though the sample size is small and time duration between the two survey points are short, there is a clear trend of increasing AIDS cases. (Table 1.15)

- Three provinces of Buri Ram, Surin and Si Sa Ket have especially high rates of HIV infection among prostitutes. (Table 1.15)

CHAPTER 2

EXISTING PLANS AND PROGRAMS

2.1 Seventh Five-Year Development Plan

The Seventh Five-Year Development Plan (1992-1996) sets forth the following targets, guidelines and measures for the improvement of public health condition in Thailand.

Targets

(1) To reduce the rates of morbidity and mortality from various diseases as follows:

- To reduce rates of infant mortality from 29 per 1,000 live births to 23 per 1,000 live births,
- To ensure that at least 90 percent of the 0-5 age group of children receive necessary immunization services,
- To reduce incidences of morbidity and mortality of all age groups from major diseases including gastro-intestinal tract disorder, heart disease, cancer and AIDS.

(2) To encourage the people to have nutritions and hygienic food in an adequate amount, together with appropriate housing and environmental conditions as follows:

- To reduce the rates of second and third degree malnutrition among the 0-14 age group to lower than 1 percent,
- To provide adequate health care services to the population over 60 years of age.

(3) To ensure adequate supply of public health care services, particularly among the poor, the elderly, children and the handicapped.

Guidelines and measures

(1) To promote good health for all the population.

- To encourage diversity in the pattern and form of people's participation in public health services,
- To support greater participation by people in decision making in health care,
- To develop knowledge base in traditional curative health care, such as traditional Thai medical care, herbal medicine, medicine, massage, in coordination with modern health care services,
- To set up a central agency to coordinate urban health care services to ensure more effective operations,
- To amend relevant laws, rules, regulations, and restrictions to encourage decentralization of power to municipalities.

(2) To develop health service stations at all levels to be capable of providing quality services efficiently by implementing the following measures:

- To allocate public health resources in sufficient quantity to support expansion and improvement of quality and efficiency of health service stations at various levels in the regions,
- To allocate public health resources more widely, and mobilize cooperation from all parties including the public and private sectors for prevention of illness, and promotion of health, both physical and mental, as well as rehabilitative efforts,
- To increase private sector role in provision of services, including health promotion, preventive health care, medical and nursing services, as well as participate in development of public health personnel in areas facing shortages and requiring high investment,
- To develop referral system of patients among public health centers, and between public and private institutions to increase efficiency in the provision of services, and reduce congestion in large urban hospitals,
- To set up a system to regulate import of foreign technologies, while ensuring appropriate dispersion of these technologies in all areas, as well as develop local technology emphasizing maximum self-reliance.

(3) To develop and expand basic public health care services to cater to the needs of the new economic zones, based on the following measures:

- To classify land into zones and set targets and guidelines for development of public health sector according to specific requirements of each zone,
- To encourage the private sector to set up medical care centers in large cities and in the new economic zones.

(4) To develop the existing health insurance system, such as voluntary health insurance, and subsidized health services for low-income groups to be in harmony and consistent with the Social Security Act.

(5) To speed up implementation of public health programs for the prevention, control, and solution of health problems related to people's occupations, to the polluted environment and to safety in consumption, via the following:

- To coordinate planning for activities under the jurisdiction of various agencies, such as environmental control, consumption safety, and occupational safety, etc.,
- To set up a new organization, or make use of existing ones, such as the Joint Public and Private Sector Consultative Committee for Public Health Development, to promote effective and sustained public and private sector cooperation,

- To amend laws, rules and regulations to ensure efficient enforcement, and to promote development of quality of life of the people,
- To encourage people and communities to have a role in prevention and solution of problems, through the dissemination of useful news and information,
- To regulate quality of food considered to be people's staple diets, such as fish sauce, mackerel ("pla-too"), salted fish, vegetables, etc.

(6) To continue campaign and programs for the prevention and control of AIDS by undertaking the following:

- To mobilize cooperation from both the public and private sectors in educating the people about prevention and control of the disease, and to have correct understanding of working and socializing with AIDS patients without having negative attitudes and reactions,
- To provide medical and social services to AIDS patients,
- To continue programs aimed at reducing the number of prostitutes,
- To promote education and research activities on AIDS.

(7) To promote a better standard of living.

- To accelerate implementation of programs in nutrition,
- To adjust fluoride content in potable water to prevent tooth decay and fluorosis, and regulate side effects arising from too much or too little fluoride,
- To support public relations campaigns on nutritional value,
- To develop existing information system for food and nutrition surveillance,
- To prevent and solve problems of obesity in urban children and youth,
- To encourage organization of sports and recreational activities as well as physical exercise.

(8) To prepare contingency plan to cope with public disasters caused by nature or accidents, via the following:

- To coordinate relevant public and private organizations, together with international organizations,
- To amend laws and relevant regulations to keep up to date with the present situation, as well as rehabilitate and develop areas damaged by disasters.

2.2 Major Health Development Programs by Ministry of Public Health

The following is a summary of the major on-going public health development projects undertaken by Ministry of Public Health.

Primary Health Care Program

Primary Health Care Program have been implemented with active participation of local communities as well as support from experts for special fields such as mental health and dental care. The following are the essential elements of primary health care.

- health education
- nutrition
- MCH (maternal and child health) including family planning
- safe water supply and sanitation
- immunization
- prevention and control of locally endemic diseases
- treatment of common diseases and injuries
- essential drugs

- mental health
- dental health

Through this program, various groups of primary health care actors have been developed such as health volunteers, health communicators, village craftsman, model mothers, and so on. Various financial support schemes were introduced to promote village based self-managed activities. The coverage of the program is 87% of all villages and 74% of the population as of the end of Fifth Five-Year Plan (1986).

Maternal and Child Health and Family Planning

Maternal and Child Health Program started in 1970 with the strong leadership of Ministry of Public Health targeting at the groups most vulnerable to life-threatening illness, that are mothers and children. The following measures have been taken in implementing this program.

- widen and accelerate improvement in the services offered by both public and private sectors.
- extend public information through greater use of mass media and other means of communication approach to people of all levels.
- improve the standard of operational efficiency and effectiveness of personnel both in the central office and in the provinces.
- promote cooperation and coordination among various government units as well as private organizations concerning the availability of services.

The achievements of the program can be measured by :

- antenatal care by trained personnel at 65%,
- deliveries taken care of by trained personnel at 71%,
- post natal care by trained personnel at 84%.

Family planning, the other component of the program, has been instrumental in reducing the population growth rate from 3.0% per year in 1970 to 1.4% per year in 1990. This National Family Planning Program has been implemented under the initiation of Ministry of Public Health and under close cooperation with other government agencies and private groups.

Expanded program on Immunization

Vaccination program started in 1950 in Thailand. Since the Forth Five-Year Plan period (1977-1981), this program has been integrated into overall provincial health services. The program has resulted in a wide coverage of vaccination services as shown in Table 1.5 and reduction in morbidity in such diseases as tuberculosis, measles, pertussis, tetanus, diphtheria and polio.

The Community-based Health Card Project

The Community-based Health Card Project was started in 1983 targeting at self-employed population outside Bangkok Metropolis. Health card system is a kind of voluntary insurance system under which a card holder buys a card effective for a year and he/she is entitled to receive health services provided by tambon health care centers at no cost. A person's decision on whether or not he/she joins the program depends on the income level and his/her expectation of receiving health care services

of health centers. As of 1991, there were about 1.4 million card holders in around 7,600 villages, 1,918 sub-districts, 389 districts and 58 provinces. The benefits of the program include the following:

- To strengthen community organization and enhance fund for improving health care facilities at tambon level by using the raised fund,
- To increase the use of Tambon Health Centers,
- To reduce congestion at upper-level hospitals by applying the referral system by which only patients referred by tambon health centers visit upper-level hospitals, and
- to create and develop value on health.

Basic Minimum Needs and Quality of Life Development Program

This is a program initiated and promoted by National Economic and Social Development Board (NESDB) with cooperation by Ministry of Public Health, Ministry of Agriculture and Cooperatives and Ministry of Interior. This program can be regarded as a tool for village-based inter-sectoral development planning. The activities include the following:

- preparation by all government officials concerned
- undertaking of Basic Minimum Needs Survey, a survey to be completed by villages and preparation of action plans by villagers
- organization of networks of self-managed primary health care villages and application of TCDV approach to development
- integration of all available revolving fund into villages.

The quality of life is defined by eight basic needs and 32 indicators as shown in Table 2.1.

The survey in 1988 showed that about 22% of all the villages survey fall under "most needy" category.

Nutrition Program

Three types of nutritient deficiency have been tackled: protein-energy malnutrition, iodine deficiency disorders and iron deficiency anemia. Since the Fifth Five-Year Plan period, nutrition program has been implemented as part of primary health care program with the following principles:

- community participation,
- application of appropriate technology, and
- intra-end inter-sectoral collaboration.

The main activities include growth monitoring, nutritional surveillance, breast feeding, collaboration with other government agencies and private sector.

Prevention and Control of AIDS Program

The Medium-term Plan for AIDS prevention and control in Thailand began in April 1989. The main activities are:

- health education,

- case detection,
- medical and social counselling for AIDS/HIV infected patients/people,
- treatment services for AIDS patients, and
- training of medical and health personnel.

CHAPTER 3

OBJECTIVES, STRATEGY AND PROJECTS

3.1 Objectives and Strategy

The following part summarizes the objectives and strategy in public health improvement.

Health is the basis for any kind of human activities: personal life, family life, economic activities and social activities. Good health opens the way for pursuing a better life and provides the basis for social engagement. Improvement in health condition, therefore, is one of the most important basic human needs to be fulfilled.

Public health condition in the Study Area is characterized by a high level of morbidity, malnutrition and infant mortality and poor health services level compared with other regions in Thailand. Poor public health condition in the Study Area is attributed, most fundamentally, to poverty as well as to under-investment in health service facilities and underutilization of the existing facilities due to various constraints on the part of the local population. It is certain that an increase in the income level will lead to the improvement of health condition because of better nutrition and better chances for using the existing medical facilities. This direction should be pursued in the context of promoting economic development and poverty alleviation. There are also a number of measures specific to the public health sector that would contribute to improving the public health conditions under the existing economic condition. The major strategy in the public health sector are summarized as follows.

(a) To strengthen and upgrade the functions of tambon health care centers

The function of tambon health care centers as the local medical center should be reinforced to be able to cope with most of the requirements both for prevention and treatment. They should have sufficient manpower and equipment so as to cover all communities under their jurisdictions in providing various medical and health services such as a routine health check-up, immunization services, more sophisticated treatment of injuries and disease currently transfered to amphoe medical centers, provision of educational programs and dispatch of mobile medical unit.

Targets for the Study Area would be:

- to enhance the staff of each tambon health care center to about five health workers by the year 2001, and
- to provide second health care centers at each tambon by the year 2010.

(b) To develop and promote educational and awareness programs

With the tambon health care centers as the core of activities, educational and awareness programs should be prepared and presented to local population more widely. The idea is that there are many simple measures in daily life that could prevent diseases and improve health condition (e.g. appropriate

management in water use, information on diseases, nutrition management, hygiene management). Cooperation with non-formal education programs under Department of Non-Formal Education (MONFE), Ministry of Education would be an effective approach, considering the active role being played by MONFE in providing various programs, both classroom type and mobile type, concerning every facet of rural life. Sharing of equipment such as audio-visual tools and transportation means are examples of collaboration.

(c) To encourage close collaboration between tambon health care centers and local communities

Any type of medical services provided by the public sector is most effective when a strong leadership and cooperative organization exist on the side of local community. Such programs as mentioned above in (a) and (b) should be promoted under a cooperative mechanism with local communities. Whenever necessary, financial support to the community should be considered for such a collaborative work and voluntary activities by the community.

(d) To effectively integrate public health improvement component into various infrastructure development projects

Certain types of infrastructure development contribute to improving public health condition of the local population such as improvement of access to hospitals by upgraded road, supply of clean water and transmission of medical information by improved telecommunications network. It is, therefore, recommended that such impacts on public health aspect be duly considered in planning various infrastructure projects.

An effective approach would be to integrate development of social systems such as public health improvement and educational resource development with economic development components into a package for selected areas. This type of an integrated development would ensure sustainable development both in social and economic levels.

(e) To accord priority to least advanced areas in terms of investment on medical service resources

From the view point of inter-provincial balance, priority in investment on medical resources expansion should be placed on least advanced provinces such as Si Sa Ket and Surin where various indicators show a low level of medical service resources in the Study Area.

(f) To develop and expand a medical insurance system to the rural population.

As a measure to reduce financial constraint in using medical services, a medial insurance system should be expanded to cover not only the employed people, who are at present accessible to the existing insurance system, but also self-employed people such as farmers and small scale enterprises. The final goal for the Study Area would be for all the population in the area to join health insurance system by the year 2010. The existing "community-based health card project" would be a transitional measure until then.

(g) To review advantages of traditional and indigenous medical techniques and effectively integrate them with the modern medical techniques

A review should be made on effectiveness of traditional and indigenous medical techniques such as herbal medicine and traditional nutritient management. Findings could be effectively incorporated into various programs to be provided by tambon health care centers in close cooperation with local communities.

(h) To take positive action to tackle AIDS problem

The first step would be for the government to be aware of the seriousness of the problem and take prompt actions to tackle the problem. AIDS unit would be established at amphoe community hospital level that would take initiative in campaigns and educational activities, counselling, test and if possible treatment as well. Measures for high risk groups would include special skill training programs for prostitutes as an incentive for them to change their job. Skill development programs can integrate this component.

3.2 Projects

3.2.1 Integrated Urban Development

One of the major changes anticipated to occur in the following two decades is rapid urbanization of the Study Area. The LNE-UE Master Plan estimates the urban population growth from present 1.1×10^6 urban population to 4.6×10^6 urban population in 2010, which is a growth at 7.4% per year.

An important implication of this rapid urbanization is necessity for appropriate management of urban development. In accordance with a rapid increase of urban population, major cities in the Study Area will see increasing demand for housing and various infrastructure facilities such as urban road, water supply, waste water treatment and solid waste disposal, which are all important components for maintaining and creating comfortable and hygienic living condition.

Approach of the Study is to prepare an integrated urban development plan as framework for guiding urbanization as well as strengthening institutional capability to implement the plan. The idea is to provide a development guideline for taking necessary measures in advance and in an integrated manner such that anticipated urbanization will not create serious environmental and public health problems in stead of not foreseeing possible problems and taking curative measures only after various urban problems emerge. In this sense, this integrated urban development approach is "offensive" rather than "defensive". An outline of integrated urban development is given in volume 13 "Preliminary Feasibility Analysis on Selected Priority Projects". Major components of the project are the following.

- Socio-economic framework
- Land use plan designating land uses for business and commercial, industrial, residential, recreational and other purposes
- development plan for various facilities such as housing, water supply, wastewater treatment, solid waste disposal, hospitals and health care centers, schools etc.

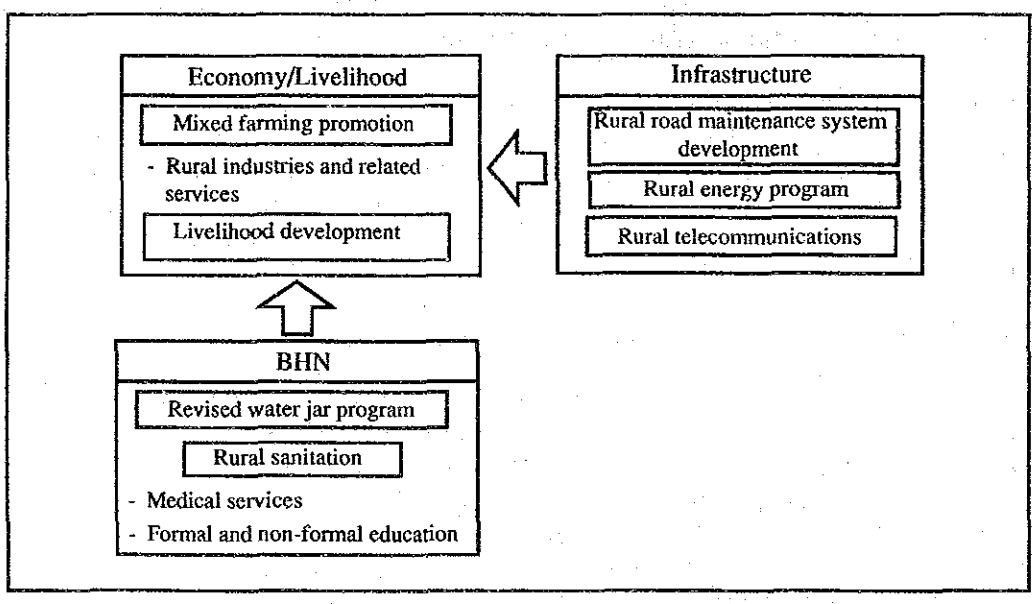
3.2.2 Tambon Health Care Center Expansion Program (THCCEP)

From the view point of improving public health condition of overall rural population in the Study Area, Tambon Health Care Center Expansion Program (THCCEP) is proposed. The rationale is to enhance the capacity of existing tambon health care centers to be able to cover larger segments of rural population. Preventive measures by strengthened primary health care by tambon health care centers will contribute to improving population's overall health condition, while government's continued efforts on expanding hospitals will strengthen curative treatment capability. Existing tambon health centers will be manned with 5 health workers and provided with vans and audio-visual equipment to be used for public health education. This program aims at upgrading all the tambon health care centers in the Study Area by 2001. Projected cost is about 3,000 x 10^6 baht. A project profile for THCCEP is attached in Appendix I.

Beyond 2001, establishment of second health care centers for each tambon would be a direction on primary health care aspect.

3.2.3 Rural Environment Enhancement Program (REEP)

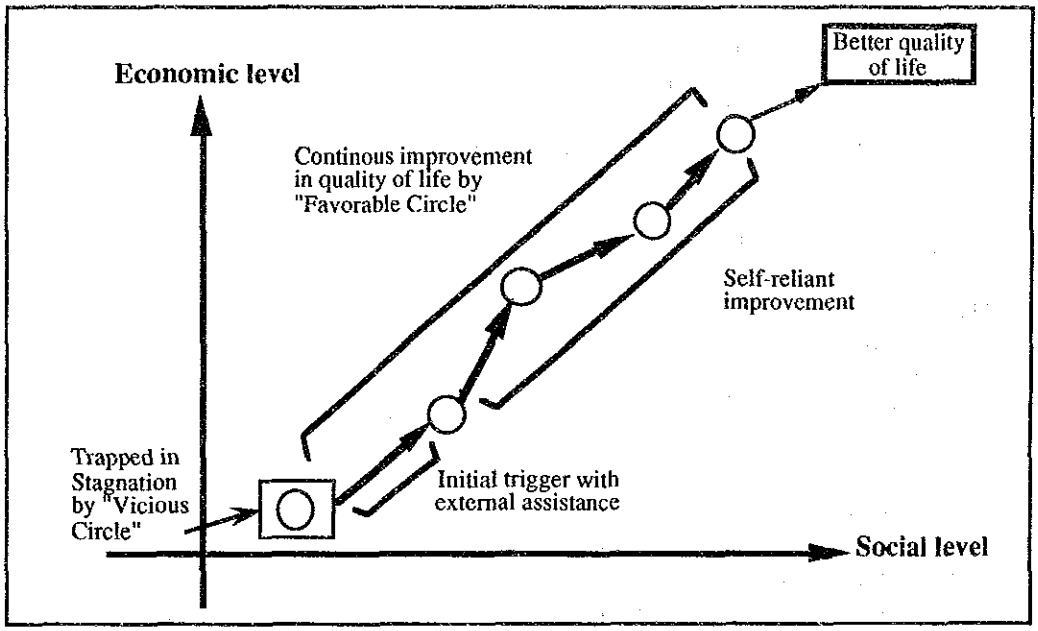
Rural Environment Enhancement Program or REEP is a program to pursue improvement of the quality of life of rural population by tackling three important components of development, economy/livelihood, basic human needs (BHN) and infrastructure, in an integrated manner and on the basis of participants' own initiative as the diagram below summarizes the idea.



Major characteristics of REEP are summarized as follows.

(a) REEP combines economy and livelihood component with BHN and infrastructure components effectively. The idea is that the overall quality of life of rural population can be upgraded more effectively by tackling economic and social aspects in an integrated manner rather than trying to resolve them individually. Improvement in BHN would give an impetus to seek a better job opportunity. With support in livelihood improvement, a person will be in a better position to find a new better job. Conversely, a person who has gotten a

new job will be able to improve his BHN condition more easily with government assistance. With initial assistance by the government, participants are expected to take off to get out of "poverty ---> low quality of live ---> poverty" vicious circle and reach a favorable circle in which people can keep improving the overall quality of life on their own. This mechanism of quality of life improvement can be simplified as shown below.



(b) REEP lays emphasis on local communitys' initiative from planning stage all the way down to implementation and operation/maintenance stage. It is imperative that a bottom-up type approach such as REEP be implemented on the basis of local community's initiative so that the program can be socially viable and acceptable and implementable. The role of non-governmental organizations (NGOs) as mediator and catalyst should be recognized.

(c) An important component of any REEP project will be water resources development. Water resources development is regarded as a trigger to promote new activities both in economic and social aspects. People will feel motivated to challenge new activities once water becomes available, which is a fundamental change in a dry area such as the Study Area. So, REEP will be promoted in combination with projects proposed as small pumping reservoir project and Phanom Dong Rek projects in water resources development plan of the master plan. The Study identified the minimum of 60 project sites in the Study Area under these two projects.

(d) In economic/livelihood aspect, REEP tries to integrate production component with other associated aspects such as marketing, farmers association and training in a coherent manner. Improvement in these aspects will resolve bottlenecks once production is increased as well as opening a market outlet would conversely stimulate production.

There are a number of components suited to be included in REEP. An appropriate combination will be determined considering potential and constraints of each area. The following are the possible components of REEP.

(a) Economy/livelihood improvement

Agriculture
- participatory irrigation
- integrated farming
- aquaculture
- livestock

Distribution/marketing
- local assembly market
- training on marketing
- promotion of farmers' association and cooperatives

Industry
- rural cottage industries

(b) BHN
- revised water jar program
- rural sanitation
- Tambon Health Care Center Expansion Program
- skill training programs

(c) Infrastructure
- water resources development
- rural energy program
- rural road maintenance program
- rural telecommunications program

Some examples of REEP are shown in Appendix II.

Tables

Table 1.1

Number of Hospitals and Medical Establishments with Beds and Health Facilities in Thailand

Type of facility	Number of hospital			Number of bed		
	1985	1989	Change (%/yr)	1985	1989	Change (%/yr)
General service						
Government	653	723	2.6	57,229	63,107	2.5
Ministry of Public Health	596	660	2.6	43,655	46,239	1.4
Others	57	63	2.5	13,574	16,868	5.6
State Enterprise	9	11	5.1	951	2,335	25.2
Municipality	6	7	3.9	1,687	2,057	5.1
Private	161	185	3.5	7,532	8,962	4.4
Total	829	926	2.8	67,399	76,461	3.2
Specialized Services						
Government	30	33	2.4	12,820	12,938	0.2
Ministry of Public Health	29	32	2.5	12,621	12,688	0.1
Others	1	1	0.0	199	250	5.9
Private	68	52	-6.5	743	583	-5.9
Total	98	85	-3.5	13,563	13,521	-0.1
Grand Total	927	1011	2.2	80,962	89,982	2.7
			(% distribution)			
General service			(difference)			(difference)
Government	78.8	78.1	-0.7	84.9	82.5	-2.4
Ministry of Public Health	71.9	71.3	-0.6	64.8	60.5	-4.3
Others	6.9	6.8	-0.1	20.1	22.1	1.9
State Enterprise	1.1	1.2	0.1	1.4	3.1	1.6
Municipality	0.7	0.8	0.0	2.5	2.7	0.2
Private	19.4	20.0	0.6	11.2	11.7	0.5
Total	100.0	100.0	-	100.0	100.0	-
Specialized Services						
Government	30.6	38.8	8.2	94.5	95.7	1.2
Ministry of Public Health	29.6	37.6	8.1	93.1	93.8	0.8
Others	1.0	1.2	0.2	1.5	1.8	0.4
Private	69.4	61.2	-8.2	5.5	4.3	-1.2
Total	100.0	100.0	-	100.0	100.0	-

Source : Public Health Statistics 1989, Ministry of Public Health

Table 1.2 Four types of Health Care Facilities Provided by the Ministry of Public Health

Level	Types of Hospital	Number	No. of beds No. of physicians	Functions
Region (4)	Regional Hospital	17	500-1,000	- Curative - Advanced treatment of patients refered by provincial hospitals
Province (72)	Provincial Hospital	72	150-500 beds (per hospital)	- Predominately curative - Provide training for medical/paramedical worker - Promotive, preventive and rehabilitative services
District (784)	Community Hospital (District Hospital)	680	10-60 beds 1-5 physicians	- Curative, preventive, promotive, and rehabilitative health services - Supervision and technical support of health center workers and programme in the district
Tambon (7,003)	Health Center	7,874	2-3 (one midwife, one sanitarian, sometimes technical nurse)	- Limited treatment of emergency or minor illness and refer to district or provincial hospitals - Referral unit at the primary and provide technical support to the village for the development of its primary health care programme - Prenatal, delivery and postnatal services, child immunizations, nutrition, family planning, water supply and sanitation activities

Note : Numbers in ( ) are numbers of provinces, districts, and tambons.

Table 1.3
Number of Hospital and Medical Estblishment in the Rural Areas under the Permanent Secretary of Public Health , Ministry of Public Health

Type of facility	Number of Establisment			Number of Bed		
	1985	1990	Change (%/yr)	1985	1990	Change (%/yr)
Regional hospital	15	17	3.2	10,009	11,420	2.7
General Hospital	74	69	-1.7	21,364	20,534	-0.1
Community hospital	496	567	2.7	9,620	12,445	5.3
Medical health center	4	0	-	56	0	-
Extended O.P.D	12	75	44.3	0	114	-
Health center	7,235	7,828	1.6	0	0	-
Community health center	365	542	8.2	0	0	-

Source : Public Health Statistics 1990, Ministry of Public Health

Table 1.4

Number of Physicians, Dentist, Pharmacist, Nurse, Midwife and Health Worker in Thailand in 1980 and 1989 (1/2)

Type of Administration	1980	1989	Change (%/year)
Physician			
Government	5,513	9,794	6.6
Ministry of Public Health	2,640	5,396	8.3
Other Ministries	2,873	4,398	4.8
State Enterprise	196	640	14.1
Municipality	407	483	1.9
Private	781	1,796	9.7
Total	*6,897*	*12,713*	*7.0*
Dentist			
Government	814	1,475	6.8
Ministry of Public Health	356	852	10.2
Other Ministries	458	623	3.5
State Enterprise	48	79	5.7
Municipality	82	143	6.4
Private	85	410	19.1
Total	*1,029*	*2,107*	*8.3*
Pharmacist			
Government	1,149	1,947	6.0
Ministry of Public Health	697	1,431	8.3
Other Ministries	452	516	1.5
State Enterprise	137	238	6.3
Municipality	86	109	2.7
Private	1,275	1,531	2.1
Total	*2,647*	*3,825*	*4.2*
Nurse *			
Government	28,132	63,378	9.4
Ministry of Public Health	18,846	47,097	10.7
Other Ministries	9,286	16,281	6.4
State Enterprise	1,377	3,054	9.3
Municipality	2,327	2,483	0.7
Private	3,345	5,237	5.1
Total	*35,181*	*74,152*	*8.6*
Midwife			
Government	7,633	10,731	3.9
Ministry of Public Health	7,585	10,569	3.8
Other Ministries	48	162	14.5
State Enterprise	19	64	14.4
Municipality	471	15	-31.8
Private	546	544	0.0
Total	*8,669*	*11,354*	*3.0*
Health Worker			
Government	7,564	13,624	6.8
Ministry of Public Health	7,556	13,620	6.8
Other Ministries	8	4	-7.4
State Enterprise	1	7	24.1
Municipality	53	39	-3.4
Private	5	14	12.1
Total	*7,623*	*13,684*	*6.7*

Note : * nurse including technical nurse and auxilliary nurse

Source : Public Health Statistics 1989, Ministry of Public Health

Table 1.4

Number of Physicians, Dentist, Pharmacist, Nurse, Midwife and Health Worker in Thailand in 1980 and 1989 (2/2)

Type of Administration	1980	1989	Change (difference)
		(% distribution)	
Physician			
Government	79.9	77.0	-2.9
Ministry of Public Health	38.3	42.4	4.2
Other Ministries	41.7	34.6	-7.1
State Enterprise	2.8	5.0	2.2
Municipality	5.9	3.8	-2.1
Private	11.3	14.1	2.8
Total	100.0	100.0	-
Dentist			
Government	79.1	70.0	-9.1
Ministry of Public Health	34.6	40.4	5.8
Other Ministries	44.5	29.6	-14.9
State Enterprise	4.7	3.7	-0.9
Municipality	8.0	6.8	-1.2
Private	8.3	19.5	11.2
Total	100.0	100.0	-
Pharmacist			
Government	43.4	50.9	7.5
Ministry of Public Health	26.3	37.4	11.1
Other Ministries	17.1	13.5	-3.6
State Enterprise	5.2	6.2	1.0
Municipality	3.2	2.8	-0.4
Private	48.2	40.0	-8.1
Total	100.0	100.0	-
Nurse *			
Government	80.0	85.5	5.5
Ministry of Public Health	53.6	63.5	9.9
Other Ministries	26.4	22.0	-4.4
State Enterprise	3.9	4.1	0.2
Municipality	6.6	3.3	-3.3
Private	9.5	7.1	-2.4
Total	100.0	100.0	-
Midwife			
Government	88.0	94.5	6.5
Ministry of Public Health	87.5	93.1	5.6
Other Ministries	0.6	1.4	0.9
State Enterprise	0.2	0.6	0.3
Municipality	5.4	0.1	-5.3
Private	6.3	4.8	-1.5
Total	100.0	100.0	-
Health Worker			
Government	99.2	99.6	0.3
Ministry of Public Health	99.1	99.5	0.4
Other Ministries	0.1	0.0	-0.1
State Enterprise	0.0	0.1	0.0
Municipality	0.7	0.3	-0.4
Private	0.1	0.1	0.0
Total	100.0	100.0	-

Note : * nurse including technical nurse and auxilliary nurse

Source : Public Health Statistics 1989, Ministry of Public Health

Table 1.5
Major Public Health Indicators in Thailand

	Indicator	Unit	Year	
			1980	1989
1	Crude birth rate	per 1,000 population	25.90	17.00
2	Crude death rate	per 1,000 population	7.00	4.50
3	Infant death rate	per 1,000 live birth	48.60	35.00
4	Maternal death rate	per 1,000 live birth	0.96	0.40
5	Average life expectancy	male	57.73 1)	62.24 2)
		female	61.57 1)	66.19 2)
6	Weight of new born	% of new born below 2,500 kg	9.30	7.00
7	Malnutrition	% of second degree malnutrtion , children under 5 years old	13.00	1.90
8	Vaccination	% receiving BCG vaccin	73.00 3)	96.00 4)
		% receiving diphtheria/whooping cough/tetanus vaccin	53.00 5)	90.00 4)
		% receiving poliomyelitis vaccin	21.00 5)	90.00 4)
		% receiving measles vaccin	5.90 6)	80.00 4)
9	Family planning service	% receiving	59.00 7)	70.50 8)
10	Morbidity	Haemorrhagic fever (per 100,000 population)	92.80	200.00 4)
		Encephalitis (per 100,000 population)	5.16	2.90
		Leprosy (per 1,000 population)	0.81	0.23 4)
		Venereal diseases (per 1,000 population)	5.58 5)	4.48 4)
		Malaria (per 1,000 population)	10.60 7)	5.20 4)
		Tuberculosis (per 1,000 population)	3.20	2.00
	(vaccin preventable diseases)	Diphtheria (per 100,000 population)	4.67	0.17
		Tetanus in newborn (per 100,000 newborn)	62.94 5)	31.07
		Other types of tetanus (per 100,000 population)	2.46 5)	1.50 9)
		Whooping cough (per 100,000 population)	7.93 10)	1.90
		Poliomyelitis (per 100,000 population)	1.06 10)	0.03
		Measles (per 100,000 population)	57.11 5)	21.31
11	Mortality	Malaria (per 100,000 population)	8.60 7)	2.50
		Rabies (per 100,000 population)	0.80	0.32 4)
		Tuberculosis (per 100,000 population)	14.24	7.70
		Diarrhea (per 100,000 population)	0.90	2.62

Note: 1) 1970-75 2)1985-90 3) 1985 4)1990 5)1982 6) 1984 7) 1981 8) 1987 9) 1988 10) 1975
Source : Health in Thailand, Ministry of Public Health

Table 1.6
Death Rates from Leading Causes of Death in Thailand

(per 100,000 population)

Cause of Death	Year		
	1962	1977	1988
Diseases of the heart	19.9	15.9	44.4
Malignant neoplasm all forms	10.2	19.0	33.5
Accidents and poisonings	19.1	34.6	30.2
Tuberculosis all forms	31.8	16.0	8.2
Pneumonia	28.9	12.8	6.3
Diarrhoeal desease	34.0	13.2	3.1
Malaria	24.3	10.9	2.7
Diseases of the stomach and duodenum	3.8	7.5	2.1
Nutritional deficiencies	n.a	2.4	0.5
Diseases of pregnancy childbirth and the Puerperium	13.1	3.2	0.5

Source : Health in Thailand 1991, Ministry of Public Health

Table 1.7 Deaths by Diseases by Sex and Region, Number and Rate per 100,000 Population

Disease	All Region		Northeast Region		Central Region (Including Bangkok Metro)		Northern Region		Southern Region		Bangkok Metropolis	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Tuberculosis (1985)												
Total	5,344	10.3	2,169	12.0	1,348	8.0	1,306	12.8	521	7.8	280	4.9
Male	3,526	13.6	1,301	14.4	989	11.8	871	16.9	365	11.0	218	7.8
Female	1,818	7.0	868	9.7	359	4.2	435	8.6	156	4.7	62	2.1
Tuberculosis (1989)												
Total	4,218	7.6	1,938	10.1	1,163	6.4	697	6.5	420	5.7	262	4.2
Male	2,815	10.1	1,178	12.2	878	9.8	458	8.4	301	8.2	210	6.9
Female	1,403	5.1	760	8.0	285	3.1	239	4.5	119	3.2	52	1.6
Pulmonary (1985)												
Total	5,279	10.2	2,143	11.9	1,329	7.9	1,293	12.7	516	7.8	267	4.7
Male	3,483	13.4	1,284	14.2	974	11.6	862	16.8	363	10.9	207	7.4
Female	1,796	7.0	859	9.6	353	4.2	431	8.6	153	4.6	60	2.1
Pulmonary (1989)												
Total	4,136	7.5	1,911	10.0	1,132	6.2	679	6.3	414	5.6	244	3.9
Male	2,760	9.9	1,164	12.1	852	9.5	444	8.2	300	8.2	195	6.4
Female	1,376	5.0	747	7.8	280	3.1	235	4.4	114	3.1	49	1.5
Pneumonia (1985)												
Total	3,839	7.4	1,441	8.0	1,173	7.0	739	7.3	486	7.3	526	9.3
Male	2,341	9.0	869	9.6	736	8.8	432	8.4	304	9.1	301	10.8
Female	1,498	5.8	572	6.4	437	5.2	307	6.1	182	5.5	225	7.8
Pneumonia (1989)												
Total	3,902	7.0	1,313	6.8	1,475	8.1	726	6.7	388	5.3	663	10.6
Male	2,380	8.6	763	7.9	948	10.5	420	7.7	249	6.8	414	13.6
Female	1,522	5.5	550	5.8	527	5.8	306	5.7	139	3.8	249	7.8
Heart Failure (1985)												
Total	11,407	22.1	2,502	13.9	5,297	31.5	2,354	23.1	1,254	18.9	2,005	35.3
Male	7,058	27.3	1,668	18.4	3,257	39.0	1,407	27.4	726	21.8	1,268	45.6
Female	4,349	16.9	834	9.3	2,040	24.1	947	18.8	528	15.9	737	25.4
Heart Failure (1989)												
Total	14,170	25.6	3,106	16.2	7,617	42.0	2,223	20.6	1,224	16.7	2,833	45.3
Male	8,700	31.4	2,086	21.7	4,560	50.6	1,289	23.7	765	20.8	1,707	56.0
Female	5,470	19.8	1,020	10.7	3,057	33.5	934	17.5	459	12.5	1,126	35.1
Chronic Liver Disease (1985) and Cirrhosis												
Total	4,137	8.0	2,787	15.5	651	3.9	540	5.3	159	2.4	207	3.6
Male	2,861	11.0	1,857	20.5	470	5.6	407	7.9	127	3.8	145	5.2
Female	1,276	4.9	930	10.4	181	2.1	133	2.6	32	1.0	62	2.1
Chronic Liver Disease (1989) and Cirrhosis												
Total	4,801	8.7	3,272	17.1	825	4.6	551	5.1	153	2.1	322	5.2
Male	3,381	12.2	2,248	23.3	594	6.6	415	7.6	124	3.4	229	7.5
Female	1,420	5.1	1,024	10.7	231	2.5	136	2.6	29	0.8	93	2.9
Malaria (1985)												
Total	1,829	3.5	592	3.3	585	3.5	512	5.0	140	2.1	18	0.3
Male	1,141	4.4	374	4.1	361	4.3	325	6.3	81	2.4	15	0.5
Female	688	2.7	218	2.4	224	2.6	187	3.7	59	1.8	3	0.1
Malaria (1989)												
Total	1,386	2.5	534	2.8	428	2.4	313	2.9	111	1.5	14	0.2
Male	914	3.3	340	3.5	296	3.3	207	3.8	71	1.9	10	0.3
Female	472	1.7	194	2.0	132	1.4	106	2.0	40	1.1	4	0.1
Intestinal Infectious Disease (1985)												
Total	1,976	3.8	1,006	5.6	274	1.5	530	5.2	193	2.9	46	0.8
Male	1,073	4.1	562	6.2	129	1.5	283	5.5	99	3.0	22	0.8
Female	903	3.5	444	5.0	118	1.4	247	4.9	94	2.8	24	0.8
Intestinal Infectious Disease (1989)												
Total	1,658	3.0	909	4.7	214	1.2	369	3.4	166	2.3	17	0.3
Male	936	3.4	511	5.3	131	1.5	197	3.6	97	2.6	9	0.3
Female	722	2.6	398	4.2	83	0.9	172	3.2	69	1.9	8	0.2

Table 1.8
Number of Hospitals, Beds, Pysicians, Dentists, Nurses and Pharmacists per 100,000 Population in the Study Area in 1989

Province	Number per 100,000 Population					
	Hospital	Bed	Doctor	Dentist	Pharmacist	Nurse
(Study Area)						
Prachin Buri	1.7	121.4	9.4	1.9	2.6	97.8
Nakhon Nayok	1.9	227.1	14.0	3.4	3.4	158.0
Nakhon Ratchasima	1.3	106.6	9.8	2.3	3.2	80.4
Buri Ram	1.0	56.5	4.3	0.5	1.1	51.1
Ubon Ratchathani	1.4	85.3	8.2	1.1	1.9	79.4
Mukdahan	2.2	121.3	7.5	0.7	2.2	102.6
Yasothon	1.8	77.9	5.5	1.2	1.4	53.8
Surin	1.3	63.2	5.6	0.8	1.2	49.1
Si Sa Ket	1.2	59.0	4.4	0.5	0.9	44.8
Total	**1.4**	**86.8**	**7.3**	**1.3**	**1.9**	**69.9**
(Nation)	**1.7**	**139.4**	**18.0**	**4.3**	**8.6**	**131.2**

Source : NESDB (orginally Ministry of Public Health)

Table 1.9 Number of Hospitals and Beds in Study Area in 1989

Province	Number of houspitals			Number of Beds		
	Public	Private	Total	Public	Private	Total
(Study Area)						
Prachin Buri	9	4	13	680	260	940
Nakhon Nayok	3	1	4	420	50	470
Nakhon Ratchasima	23	7	30	1,575	800	2,375
Buri Ram	13	0	13	740	0	740
Ubon Ratchathani	22	3	25	1,299	200	1,499
Mukdahan	6	0	6	325	0	325
Yasothon	8	1	9	354	30	384
Surin	13	3	16	637	120	757
Si Sa Ket	14	1	15	711	10	721
Total	*111*	*20*	*131*	*6,741*	*1,470*	*8,211*
(Nation)	*616*	*259*	*875*	*47,045*	*26,349*	*73,394*
(% distribution among provinces)						
(Study Area)						
Prachin Buri	8.1	20.0	9.9	10.1	17.7	11.4
Nakhon Nayok	2.7	5.0	3.1	6.2	3.4	5.7
Nakhon Ratchasima	20.7	35.0	22.9	23.4	54.4	28.9
Buri Ram	11.7	0.0	9.9	11.0	0.0	9.0
Ubon Ratchathani	19.8	15.0	19.1	19.3	13.6	18.3
Mukdahan	5.4	0.0	4.6	4.8	0.0	4.0
Yasothon	7.2	5.0	6.9	5.3	2.0	4.7
Surin	11.7	15.0	12.2	9.4	8.2	9.2
Si Sa Ket	12.6	5.0	11.5	10.5	0.7	8.8
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
(% to nation)	*18.0*	*7.7*	*15.0*	*14.3*	*5.6*	*11.2*
(% distribution between public and private sectors)						
(Study Area)						
Prachin Buri	69	31	100	72	28	100
Nakhon Nayok	75	25	100	89	11	100
Nakhon Ratchasima	77	23	100	66	34	100
Buri Ram	100	0	100	100	0	100
Ubon Ratchathani	88	12	100	87	13	100
Mukdahan	100	0	100	100	0	100
Yasothon	89	11	100	92	8	100
Surin	81	19	100	84	16	100
Si Sa Ket	93	7	100	99	1	100
Total	*85*	*15*	*100*	*82*	*18*	*100*
(Nation)	*70*	*30*	*100*	*64*	*36*	*100*

Source: NESDB (orginally Ministry of Public Health)

Table 1.10
Neonatal, Maternal, and Perinatal Deaths and Infant Mortality by Provinces: Number and Rate per 1,000 Livebirths in 1987 and 1990

Province	Neonatal Deaths		Maternal Deaths		Perinatal Deaths		Infant Mortality	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
				(1987)				
Nakhon Ratchasima	308	8.4	18	0.5	146	4.0	410	11.2
Buri Ram	52	2.5	12	0.6	5	0.2	139	6.6
Surin	20	1.0	18	0.9			53	2.7
Si Sa Ket	20	1.0	13	0.7	2	0.1	157	8.1
Ubon Ratchathani	105	3.9	18	0.7	21	0.8	414	15.2
Yasothon	20	2.4	2	1.0	2	0.2	109	13.1
Mukdahan	19	3.8	5	1.0	5	1.0	95	18.8
Nakhon Nayok	5	1.6	1	0.3			24	7.9
Prachin Buri	16	1.5	6	0.6	41	3.9	49	4.7
Study Area	63	3.0	10	1.0	25	1.0	161	100
				(1990)				
Nakhon Ratchasima	265	7.2	5	0.1	369	10.0	406	11.1
Buri Ram	18	0.9	8	0.4	5	0.2	73	3.5
Surin	9	0.4	7	0.3			68	3.3
Si Sa Ket	17	0.9	6	0.3	13	0.7	76	3.9
Ubon Ratchathani	24	0.7	17	0.5	5	0.9	317	9.0
Yasothon	11	1.3	1	0.1			84	10.1
Mukdahan	7	1.4			2	0.4	82	16.7
Nakhon Nayok	5	1.5			3	0.9	14	4.3
Prachin Buri	2	0.2	1	0.1			32	2.8
Study Area	40	1.6	5	0.2	44	1.5	128	7.2

Source :

Table 1.11
Incidence of Malnutrition in 1990 in the Study Area and Thailand

Province	Sample Size	Incidence of Malnutrition			
		1st degree	2nd degree	3rd degree	Total
			(in number)		
Nakhon Nayok	8,619	603	16	4	623
Prachin Buri	41,818	5,944	397	10	6,351
Nakhon Ratchasima	110,613	23,236	1,872	27	25,135
Buri Ram	52,198	21,123	1,816	151	23,090
Surin	65,881	18,173	1,381	201	19,755
Si Sa Ket	84,919	21,448	792	14	22,254
Ubon Ratchathani	103,169	20,488	1,765	635	22,888
Mukdahan	17,676	4,473	295	7	4,775
Yasothon	27,441	5,174	184	167	5,525
Total	*512,334*	*120,662*	*8,518*	*1,216*	*130,396*
Thailand	*2,285,313*	*377,835*	*25,638*	*5,416*	*408,889*
			(in %)		
Nakhon Nayok	-	7.0	0.2	0.0	7.2
Prachin Buri	-	14.2	0.9	0.0	15.2
Nakhon Ratchasima	-	21.0	1.7	0.0	22.7
Buri Ram	-	40.5	3.5	0.3	44.2
Surin	-	27.6	2.1	0.3	30.0
Si Sa Ket	-	25.3	0.9	0.0	26.2
Ubon Ratchathani	-	19.9	1.7	0.6	22.2
Mukdahan	-	25.3	1.7	0.0	27.0
Yasothon	-	18.9	0.7	0.6	20.1
Total	-	*23.6*	*1.7*	*0.2*	*25.5*
Thailand	-	*16.5*	*1.1*	*0.2*	*17.9*

Source : Thai's Quality of Life Report for 1990, Community Development Department , Ministry of Interior

Table 1.12
Number of Cases and Deaths from Tuberculosis, Pneumonia, Maralia and Intestinal Infectious Disease in 1987, 1988, 1989 and 1990 in the Study Area

Disease	1987	1988	1989	1990
Population (thousand)	9,615	9,775	9,886	9,909
Tuberculosis				
Case	7,696	7,290	17,244	6,117
Death	1,391	1,194	1,123	1,073
Rate (Case)	80.0	74.6	174.4	61.7
Rate (Death)	14.5	12.2	11.4	10.8
	(7.0)	(5.5)	(5.1)	(4.4)
Pneumonia				
Case	16,378	15,072	46,102	15,031
Death	581	498	720	630
Rate (Case)	170.3	154.2	466.3	151.7
Rate (Death)	6.0	5.1	7.3	6.4
	(1.1)	(1.5)	(1.6)	(1.5)
Malaria				
Case	12,740	14,715	29,926	10,955
Death	343	330	353	274
Rate (Case)	132.5	150.5	302.7	110.6
Rate (Death)	3.6	3.4	3.6	2.8
	(0.7)	(0.6)	(0.6)	(0.5)
Intestinal Infectious Disease				
Case	42,807	44,766	134,460	44,639
Death	650	449	417	370
Rate (Case)	445.2	458.0	1,360.1	450.5
Rate (Death)	6.8	4.6	4.2	3.7
	(1.1)	(0.9)	(0.7)	(0.6)

Note : (1) Rate per 100,000 population
(2) Figures in ( ) are those for Thailand.
(3) The number of cases in 1989 shows a big jump for all the four diseases. This is strange judging from the trend before and after 1989. This should be a simple mistake in the original data prepared by the Ministry of Public Health.

Source : Ministry of Public Health

Table 1.13
The Number of Cases and Deaths of Four Major Diseases in the Study Area by Province in 1990 (1/2)

Province	Case	Death	Death/ Case (%)	Rate per 100,000 population (Case)	(Death)
(Tuberculosis)					
Nakhon Nayok	253	27	10.7	114.0	12.2
Prachin Buri	681	70	10.3	86.8	8.9
Nakhon Ratchasima	1,212	184	15.2	51.0	7.7
Buri Ram	558	190	34.1	41.1	14.0
Surin	687	155	22.6	56.3	12.7
Si Sa Ket	1,172	236	20.1	91.1	18.4
Ubon Ratchathani	1,048	118	11.3	56.0	6.3
Mukdahan	180	62	34.4	67.9	23.4
Yasothon	326	31	9.5	61.6	5.9
Study Area	*6,117*	*1,073*	*17.5*	*61.7*	*10.8*
(Pneumonia)					
Nakhon Nayok	357	11	3.1	160.8	5.0
Prachin Buri	1,043	53	5.1	132.9	6.8
Nakhon Ratchasima	2,437	130	5.3	102.6	5.5
Buri Ram	2,415	100	4.1	178.0	7.4
Surin	2,653	55	2.1	217.5	4.5
Si Sa Ket	2,060	56	2.7	160.2	4.4
Ubon Ratchathani	2,753	175	6.4	147.2	9.4
Mukdahan	414	28	6.8	156.2	10.6
Yasothon	899	22	2.4	169.9	4.2
Study Area	*15,031*	*630*	*4.2*	*151.7*	*6.4*
(Malaria)					
Nakhon Nayok	73	0	0.0	32.9	0.0
Prachin Buri	2,127	38	1.8	271.0	4.8
Nakhon Ratchasima	611	16	2.6	25.7	0.7
Buri Ram	903	35	3.9	66.5	2.6
Surin	1,428	36	2.5	117.0	3.0
Si Sa Ket	1,428	31	2.2	111.0	2.4
Ubon Ratchathani	3,396	84	2.5	181.6	4.5
Mukdahan	752	28	3.7	283.8	10.6
Yasothon	237	6	2.5	44.8	1.1
Study Area	*10,955*	*274*	*2.5*	*110.6*	*2.8*
(Intestinal Infectious Disease)					
Nakhon Nayok	1,487	0	0.0	669.8	0.0
Prachin Buri	5,548	9	0.2	706.8	1.1
Nakhon Ratchasima	7,566	39	0.5	318.6	1.6
Buri Ram	6,694	45	0.7	493.3	3.3
Surin	5,014	39	0.8	411.0	3.2
Si Sa Ket	8,669	45	0.5	674.1	3.5
Ubon Ratchathani	5,774	117	2.0	308.8	6.3
Mukdahan	1,321	41	3.1	498.5	15.5
Yasothon	2,566	35	1.4	485.1	6.6
Study Area	*44,639*	*370*	*0.8*	*450.5*	*3.7*

Note : 1. Population of each province in 1990 in thousand :
Nakhon Nayok (222), Prachin Buri (785), Nakhon Ratchasima (2,375), Buri Ram (1,357), Surin (1,220), Si Sa Ket (1,286), Ubon Ratchathani (1,870), Mukdahan (265), Yasothon (529),

Source : Ministry of Public Health

Table 1.13
The Number of Cases and Deaths of Four Major Diseases in the Study Area by Province in 1990 (2/2)

(Rate of Cases in Descending Order)

Province	Rate of Case per 100,000 population
(Tuberculosis)	
Nakhon Nayok	114.0
Si Sa Ket	91.1
Prachin Buri	86.8
Mukdahan	67.9
Yasothon	61.6
Surin	56.3
Ubon Ratchathani	56.0
Nakhon Ratchasima	51.0
Buri Ram	41.1
Study Area	*61.7*
(Pneumonia)	
Surin	217.5
Buri Ram	178.0
Yasothon	169.9
Nakhon Nayok	160.8
Si Sa Ket	160.2
Mukdahan	156.2
Ubon Ratchathani	147.2
Prachin Buri	132.9
Nakhon Ratchasima	102.6
Study Area	*151.7*
(Malaria)	
Mukdahan	283.8
Prachin Buri	271.0
Ubon Ratchathani	181.6
Surin	117.0
Si Sa Ket	111.0
Buri Ram	66.5
Yasothon	44.8
Nakhon Nayok	32.9
Nakhon Ratchasima	25.7
Study Area	*110.6*
(Intestinal Infectious Disease)	
Prachin Buri	706.8
Si Sa Ket	674.1
Nakhon Nayok	669.8
Mukdahan	498.5
Buri Ram	493.3
Yasothon	485.1
Surin	411.0
Nakhon Ratchasima	318.6
Ubon Ratchathani	308.8
Study Area	*450.5*

(Rate of Deaths in Descending Order)

Province	Rate of Death per 100,000 population
(Tuberculosis)	
Mukdahan	23.4
Si Sa Ket	18.4
Buri Ram	14.0
Surin	12.7
Nakhon Nayok	12.2
Prachin Buri	8.9
Nakhon Ratchasima	7.7
Ubon Ratchathani	6.3
Yasothon	5.9
Study Area	*10.8*
(Pneumonia)	
Mukdahan	10.6
Ubon Ratchathani	9.4
Buri Ram	7.4
Prachin Buri	6.8
Nakhon Ratchasima	5.5
Nakhon Nayok	5.0
Surin	4.5
Si Sa Ket	4.4
Yasothon	4.2
Study Area	*6.4*
(Malaria)	
Mukdahan	10.6
Prachin Buri	4.8
Ubon Ratchathani	4.5
Surin	3.0
Buri Ram	2.6
Si Sa Ket	2.4
Yasothon	1.1
Nakhon Ratchasima	0.7
Nakhon Nayok	0.0
Study Area	*2.8*
(Intestinal Infectious Disease)	
Mukdahan	15.5
Yasothon	6.6
Ubon Ratchathani	6.3
Si Sa Ket	3.5
Buri Ram	3.3
Surin	3.2
Nakhon Ratchasima	1.6
Prachin Buri	1.1
Nakhon Nayok	0.0
Study Area	*3.7*

Table 1.14 The Case of AIDS and ARC by Cause and Age, 1992

	Nakhon Ratchasima	Chaiya Phum	Buri Ram	Surin	Si Sa Ket	Total
Risk Factors						
Sexual Intercourse	M 7		M 7	M 6 (H 2)	M 4	24
IVDUs	M 1	F 1				2
Unknown						0
Blood Receiving		M 1				1
Total	8	2	7	6	4	27
Age Group						
15-19						
20-24	1		1	1	N/A	3
25-29	2	1		2	N/A	5
30-34	2	1	3	2	N/A	8
35-39			2	1	N/A	3
40-44	1		1		N/A	2
45-49	1				N/A	1
50-54	1				N/A	1

	Nakhon Ratchasima	Chaiya Phum	Buri Ram	Surin	Si Sa Ket	Total
Risk Factors						
Sexual Intercourse	M 7*, F 4	M 3 (H 1)	M 6	M 7 (H 1), F 1	9	37
IVDUs			M 1		M 3	4
Unknown	M 3					3
Blood Receiving						0
Total	14	3	7	8	12	44
Age Group						
15-19	2				N/A	2
20-24	5	1	3	5	N/A	14
25-29	2		1	2	N/A	5
30-34	3	1		1	N/A	5
35-39	2		3		N/A	5
40-44		1			N/A	1
45-49					N/A	0
50-54					N/A	0

* All males are homosexual

M - Male

F - Female

H - Homosexual

Table 1.15 Percentage of HIV Infected People among High Risk Groups in 1991 and 1992

(%)

	Nakhon Ratchasima	Chaiya Phum	Buri Ram	Surin	Si Sa Ket
December, 1991					
Prostitutes					
Direct	3.10	3.80	8.20	17.90	25.70
Indirect	1.10	0.00	8.60	1.00	9.10
Male with STD	4.00	4.72	3.51	1.00	2.70
Pregant Women					
Amphoe & Muang	0.00	0.00	0.00	0.00	0.61
Rural					
Blood Donors	1.30	0.70	0.50	0.00	0.20
IVDUs	27.80				36.40
June, 1992					
Prostitutes					
Direct	3.23	8.70	22.94	20.00	32.56
Indirect	2.70	4.26	3.45	0.00	39.73
Male with STD	6.00	2.50	4.05	4.00	12.50
Pregant Women					
Amphoe & Muang	0.00			0.50	0.83
Rural	0.36				
Blood Donors	0.98		0.39	0.33	0.00
IVDUs					0.00

Source : Veneral Disease Center

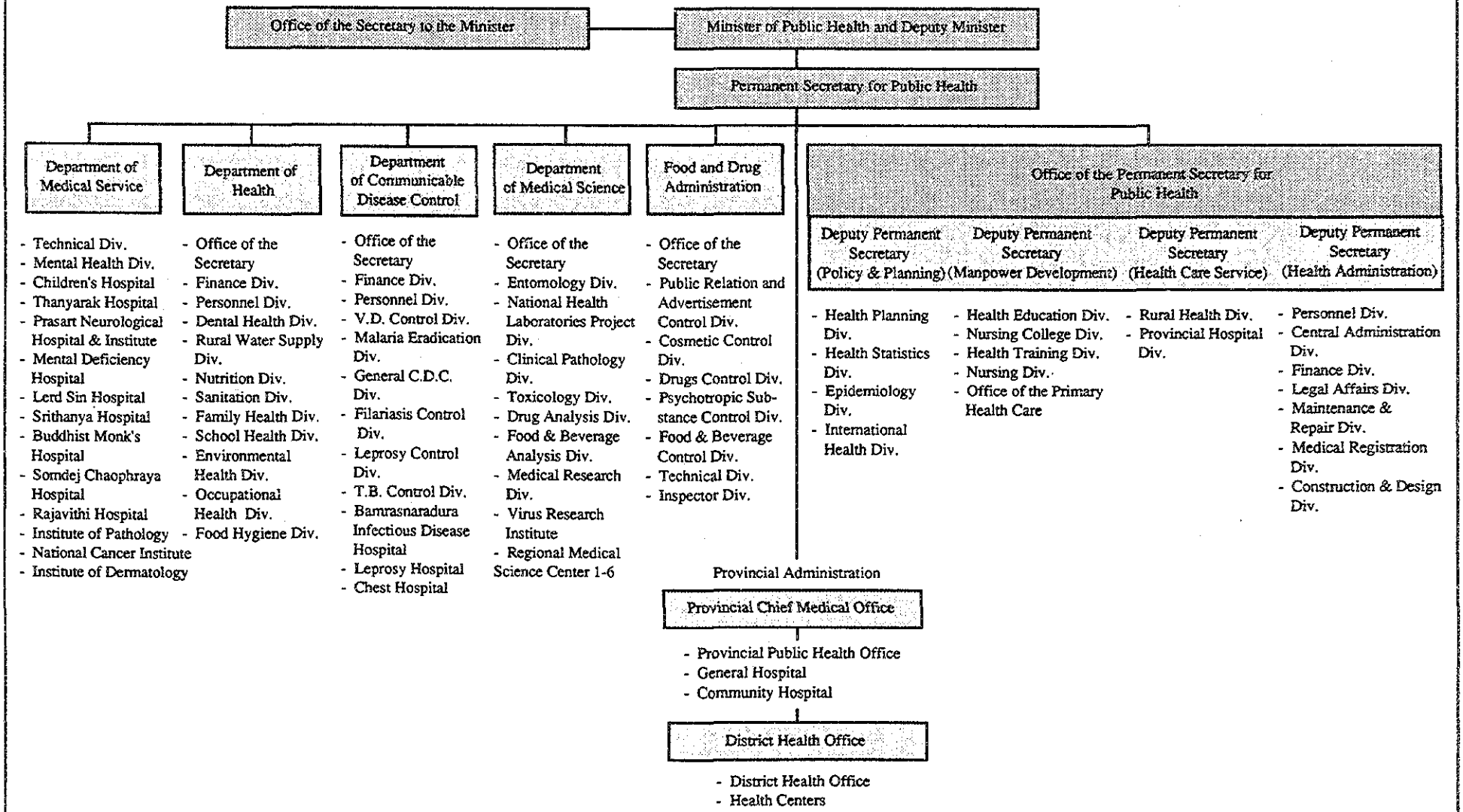
Table 2.1 Basic Minimum Needs Criteria

BASIC NEEDS	INDICATORS
1 SUFFICIENT FOOD	1 Growth monitoring of 0-5 olds 2 Growth monitoring of 5-14 olds 3 3,000 grams birth weight 4 Acute diarrhoea morbidity rate
2 APPROPRIATE HOUSING AND ENVIRONMENT	5 Housing durable for at least 5 years 6 Household garbage and drainage system 7 Household sanitary latrine 8 Sufficient clean household drinking water
3 ACCESS TO BASIC SOCIAL SERVICES	9 Full immunization of 0-1 year olds (DPT, OPV, BCG, measles) 10 Compulsory primary education enrollment 11 Primary School booster vaccination (TT, BCG, Pettussis, Typhoid) 12 Literacy rate among those over 12 years
	13 Availability on non-formal vocational, health, etd., education 14 Pre and post natal care and delivery by trained personnel
4 SECURITY OF LIFE AND PROPERTY	15 Crime rate (theft, murder, rape, etc.) 16 Security for travelling at night
5 EFFICIENT FOOD AND AGRICULTURAL PRODUCTION	17 Application of agricultural techniques, i.e. crop rotation 18 Appropriate crop strains and animal breeds 19 Usage of appropriate fertilizers 20 Ability to erdicate and prevent crop pests 21 Ability to raise and care for animals
6 FAMILY PLANNING AND SPACING	22 Families practising contraception and limited to 2 children
7 COMMUNITY PARTICIPATION	23 Membership of groups to improve socioeconomic conditions 24 Participation in self-help development 25 Maintenance of public properly 26 Reservation of cultural heritage 27 Protection of natural resources 28 Voting at tambon and village levels 29 Effectiveness of community organization
8 MORAL DEVELOPMENT	30 Abstinence from alcohol, gambling, drugs 31 Participation in religious events 32 Thrift

* These indicators are for rural areas; a modified version is used in urban areas.

Figures

Figure 1.1 Organization of the Ministry of Public Health



APPENDIX I

"PROFILE OF TAMBON HEALTH CARE CENTER EXPANSION PROGRAM"

PROJECT PROFILE

1. **Project Title** : Tambon Health Care Center Expansion Program

2. **Location** : Tambons with existing health care centers (specific locations to be determined by each province)

3. **Objective** :

(1) To reinforce the capacity of existing health care centers by expanding the facility and providing advanced equipment as part of an effort in strengthening primary health care services.
(2) To provide loan to rural population for upgrading water supply and sanitation facilities.

4. **Component** :

(1) Expansion of the existing facility: land and building
(2) Provision of vehicle (a van)
(3) Provision of audio-visual equipment: TV, VCR (Video Cassette Recorder), video camera, and stock of video tapes
(4) Increase of manpower from present 2 to 5
(5) Loan for water supply and sanitation facilities
(6) Preparation of education and campaign programs utilizing audio visual media (TV and video)

5. **Description** :

(1) This project will be carried out on a pilot scheme basis as an effort to solve the absolute shortage of health care centers in rural areas, the main actor in providing primary health care services. Its feature is to capitalize on the existing health care centers trying to expand them rather than establishing new health care centers.
(2) A new health care center will be manned with 5 health care workers (on average 2 at present). With a vehicle provided, additional health workers will be able to provide health care services and educational and campaign programs to a larger segment of villagers.
(3) The van will also be used as temporary ambulance to fill the shortage of ambulances (at present only 1 ambulance available for an amphoe on average).
(4) Audio visual equipment such as TV and VCR will be used as a media for educational and campaign programs on primary health care aiming at villagers. Portable video camera can be put to use for preparing primary health care programs matched to local condition.
(5) Loan will be provided to villagers to improve water supply and sanitary facilities. Benefit to be derived from expanded function of health care center will be multiplied by introduction of this loan.
(6) Ministry of Public Health will prepare new video educational/campaign programs on primary health care to be utilized by newly expanded health care centers.

(7) An attempt will be made to carry out this project under a unified supervision of provincial office to avoid burdens by a complex institutional set-up.

6. **Cost** :

			(10^6 Baht)	
(1)	Land purchase/building	:		
	Land (100 baht/m^2 x 300 m$^{2)}$	=	0.03	
	Building (50 m$^{2)}$	=	0.50	
	Sub total	=	0.53	
(2)	Van	:	0.50	
(3)	Audio-visual equipment	:	0.10	
(4)	Primary health care program preparation	:	1.00	
(5)	Loan for water supply/sanitation facilities improvement (2,000 baht/household x 100)		0.20	(?)

Total : 2.33 x 10^6 Baht/per center

* 1,298 tambons in the Study Area :
2.33 baht x 10^6 x 1,298 = 3,024 baht x 10^6 for Study Area

APPENDIX II

"EXAMPLES OF RURAL ENVIRONMENT ENHANCEMENT PROGRAM (REEP)"

REEP PROJECT - 1

1. **Project Title** : Nang Rong Participatory Irrigation Project

2. **Location** : Amphoe Nang Rong
   Buri Ram Province

3. **Objective** :

   (1) Establishment of water resources and irrigation infrastructure
   (2) Design of the project by participatory approach
   (3) Strengthening of marketing capability

4. **Component** :

   (1) Ban Khok Yang small pumping reservoir (73,000 m^3 capacity)
   (2) Irrigation system development
   (3) Training on agriculture products marketing
   (4) Revised water jar program

5. **Description** :

   (1) Small pumping reservoir development : an effective approach suited to local condition and environmentally sound
   (2) Irrigation canal development for an irrigation area of 1 ha (?)
   (3) The project is to be designed under a cooperative mechanism between government experts and local community to benefit from project from site selection to physical design and operation. Reflection of local needs in project design is aimed at. The whole system after the completion will be managed under the same cooperative mechanism. An information exchange mechanism will also be established so as to ensure easier solving of problems.
   (4) Marketing capability of local community will be strengthened by training on agriculture products marketing to be provided by NGOs experienced in providing this type of training.

6. **Cost** :

			(10^6 Baht)	
(1)	Nang Rong small pumping reservoir	:	11.0	
(2)	Irrigation system	:	2.0	(?)
(3)	Training on marketing	:	0.5	
(4)	Revised water jar program	:	0.5	
	Total	:	14.0	

REEP PROJECT - 2

1. **Project Title** : Ban Sawan Phatthana Integrated Rural Development Project

2. **Location** : Amphoe Prasat
Surin Province

3. **Objective** :

(1) To improve living standard of the rural community through increasing water availability, enhancing level of medical services and reinforcing income generating activities based on a multi-purpose small pumping reservoir development.

4. **Component** :

(1) Ban Sawan Phatthana small pumping reservoir (850,000 m^3 capacity)
(2) Increased domestic water supply by water jar and a water distribution truck during dry season.
(3) Establishment of a new health care center.
(4) Establishment of a new water supply system connecting the reservoir and the health care center
(5) Floating net cage aquaculture at the reservoir
(6) Marketing training on fishery products and existing agriculture products

5. **Description** :

(1) An integrated approach is taken to enhance living standard and reinforce income generating capability in parallel.
(2) BAAC loan will be applied to investment requirement.
(3) Marketing capability will be strengthened by training by NGOs.
(4) Technical guidance will be provided by government.

6. **Cost** :

			(10^6 Baht)
(1)	Small pumping reservoir	:	71.0
(2)	Water jar	:	1.0 *
(3)	Health Care Center	:	1.5 (?)
(4)	Water supply system to health care center	:	0.2 (?)
(5)	Floating net cage agriculture	:	0.2 (?)
(6)	Marketing training	:	1.0
	Total	:	74.9

* 500 baht/jar x 2 jars/household x 1,000 households

REEP PROJECT - 3

1. **Project Title** : Ban Yang Self-Sufficient Livelihood Improvement Project

2. **Location** : Amphoe Phutthaisong
   Buri Ram Province

3. **Objective** :

   (1) To promote on a pilot scheme basis integrated farming approach to achieve economically feasible and environmentally sound farming practice.
   (2) To pursue regional self-sufficiency in natural resources utilization : water and energy
   (3) To enhance livelihood of rural population by livestock promotion in connection with integrated farming as well as by expanding health care services.

4. **Component** :

   (1) Introduction of integrated farming by farmers.
   - rice
   - livestock
   - forestry
   - fishery
   - poultry
   - vegetables, fruits

   (2) Ban Yang pumping reservoir (360,000 m^3 capacity)
   (3) Livestock promotion
   - cattle
   - pasture land
   - housing facility

   (4) Rural energy development
   (5) Health Care Center
   (6) Water supply and energy supply system to health care center

5. **Description** :

   (1) Voluntary participation of farmers will be emphasized. Advice and guidance on integrated farming will be provided by NGOs and Sangwararam Maha Viharn Temple experts.
   (2) BAAC loan or Rural Development Fund will be provided to farmers.
   (3) Rural energy development will be promoted utilizing biogas technology in connection with livestock development.
   (4) Health care center to be established will be a beneficiary to receive hot water supplied by new small pumping reservoir and heated by biogas energy.
   (5) This site was selected on a basis of the following conditions.
   - availability of water by development
   - availability of potential grazing area in a large amount in the vicinity
   - remote rural area.

6. **Cost** :

			(10⁶ Baht)	
(1)	Small pumping reservoir	:	37.0	
(2)	Integrated farming	:	5.0 *	(BAAC/RDF loan)
	(* assuming 10,000 baht/household x 100 households)			
(3)	Livestock development			
	- beef cattle	:	0.4 *	(BAAC/RDF loan)
	(* assuming 4,000 baht x 100 heads)			
(4)	Biogas power generation	:	1.0	(?)
(5)	Health Care Center	:	1.5	(?)
(6)	Water supply for health care center	:	1.5	(?)
	Total	:	46.4	

JICA