

影響圏における農業の現状

Appendix 3

影響圏の農業の現況

3-1 耕地面積および作物生産量

1971年から1978年の間における全国および各関連県(Changwat)の耕作面積、農業生産額、単位当り収量および現地農産物産先価格は、政府の統計資料に基づいて、Table 3A-1に示すごとく作成した。プロジェクトの調査対象地域(Study Area)のデータは現地調査を行った各郡(Amphoe)で得た1974年から1978年までの5ヶ年間の資料に基づいて算定したものであるが、調査対象地域の小郡(Tambon)について確実な資料の入手が困難であったため、入手可能なデータに基づいて作成したものである。

単位当りの作物平均収量の従来傾向は、Table 3A-2に示した。

3-2 農家経済の分析

3-2-1 作物

農家経済の算定に当っては、影響圏(Influenced Area)内の水田および畑地双方の主要な元成作物・二次作物とを選定した。主要作物は米、メイズ、緑豆、キャッサバおよびケナフであり、その他の大豆、落花生、ソルガムおよび綿花等が二次的作物である。作物中綿花以外は、主として元成作物の裏作または間作として栽培されている。但し天水だけに依存した栽培を行っている影響圏の現況では、裏作物の栽培は極めい少い。

3-2-2 生産費

各作物の生産費の内容はTable 3A-3のとおりであるが、その算定の根拠は下記のとおりである。

1) 耕作費

圃場整備や耕起は通常トラクターの賃借および牛耕(水牛)によって行われている。Chaiyaphum県例はトラクターの需要が供給に満たないためNakhon Sawan/Phetchabun

県例より割高になっている。

通常水稻栽培は苗代からの移植栽培であるが、Chaiyapbun 例では直播栽培を行っている所が多い。

除草は通常畜力かまたは人力で行われている。

トラクターおよび水牛の耕作費は Table 3 A-3 の註に示した。

2) 肥料および農薬

現状では、影響圏内の農民は稲、棉花、そ菜、および果樹栽培以外には耕作費に投入する資金が限られているため、殆ど肥料や農薬は使用していない。然し、連作による地力の老朽化や、病虫害被害の増大のため、それ等の化学製品は、市場の手数料や途中運賃が節減され、地方価格が下ってくれば、漸次使用されるようになると考えられる。

硫酸と尿素とは、農作物に使用される典型的な肥料であり、1978年におけるバンコックの卸売価格および、地方市場価格は次のとおりである。

Prices of Fertilizer

	(Baht per ton)	
	Bangkok Wholesale Price	Local Market Price
Ammonium sulphate	2,800	3,400 - 3,600
Urea	4,400	5,000 - 5,200

生産費に使用する肥料の平均価格は、kg当り4~5パーセントと見積った。

農薬は病虫害防除、種子消毒および除草用に使用されるが、現状では影響圏の農民は主として作物の病虫害防除のために使用している。農薬の価格は夫々の防除薬の種類で異なるが、一般的な病虫害防除剤の地方市場価格は、1979年にkg当り約100パーセントであり、一回当りの散布量は約6ライ当り1kg(ヘクタール当り1kg)であるので、一回の散布に対する農薬費はライ当り15パーセントと見積った。

3) 労 賃

影響圏内では、農業労働者や役牛の提供は大部分自家労働や農家相互の労務提供行っている。但し一般には、家族労働や自前の家畜役務提供は、現金勘定とはしないが、ここでは雇傭労働や賃借の家畜と同様の経費に見積った。現地調査では一般の農業労賃は1日当り25パーセントであるが、メイズや豆類の収穫作業では労賃は次表のように出来高払いで行われている。

Labor Cost for Harvesting

Crop	Unit Wages per Bag ^{1/} (B/bag)	Number of Bags per Man-day (Bag)	Man-day per Rai (M/D)
Maize	5	5	1.3 - 1.5
Mung beans	14	3	2.2 - 2.3

註 一袋の精製付メイズ(80kg)は約45kgメイズ粒一袋のさや付緑豆は約20kg豆粒

精製用牛役の賃借費は平均1日当り60パーセントで、5ライを耕作する。

4) 脱穀および脱粒

稲の脱穀はトラクター又は畜力で行われており、影響圏では脱穀機は殆ど使われていない。メイズの脱粒は現在では大部分賃借しの脱粒機で行っており、緑豆のさや取りはトラクター、機械、および人力で行っている。

これ等の平均経費は次のとおりである。

稲	畜力脱穀	500~600kg当り60パーセント
"	トラクター脱穀	トン当り100パーセント
メイズ	機械脱粒	15kgメイズ当り1パーセント
緑豆	トラクターさや取り	150kg豆当り25パーセント
	機械さや取り	150kg豆当り50パーセント

なお、ケナフの収穫後における柔軟な繊維をとるための浸水処理作業は、現在のところ人力で行われている。

3-2-3 農家の庭先価格

農家の庭先価格はその産物のFOB価格、市場需用、作物の収穫季節や生産物の品質により変化する。この価格はまた、農家から市場までの距離、市場機構又は運送方法や接続道路の状況に影響される。特に影響圏では、この庭先価格は乾期および雨期の道路状況により左右される。

雨期における農産物の庭先価格は一般に乾期の価格より低い、この傾向は影響圏内に全天候道路が建設されると改良される。タイ国政府の統計報告によると、Table 3 A-1に示す如

く、1978年までの過去数年間における主要作物の農家先価格の傾向は、キャッサバは年々値上りしており、米は1978年比その前年より値上りしているが、メイズ、緑豆、ケナフは殆ど変化がないか、寧ろ値上りしている。

上記のような諸条件から判断して、影響圏内の1978年における各農産物の年平均農家庭先価格を次表のように算定した。

Average Farmgate Prices to the Farmers

Crops	(Baht per ton)	
	Nakhon Savan/ Phetchabun	Chaiyaphum
Paddy	2,420	2,420
Maize	1,620	1,550
Mung beans	4,700	4,650
Cassava root		550
Kenaf	2,000	3,100
Soy beans	4,600	4,500
Ground nuts	5,400	5,300
Sorghum	1,450	1,400
Cotton	8,000	7,800

ここで注意すべきことは、ここで記す実際の市場価格としての農家庭先価格は、あくまでも農家経済の観点からとり上げた農産物の財政分析上の価格であり、第1巻第V章で論じた国家経済上の観点から見た農産物の経済分析上の価格とは異なるものである。

3-2-4 典型的農家の農業収入

上記の生産費と価格を基として、Table 3 A-4に示すように典型的農家の作物収入を見積った。この収入は特定作物を主体として生産した場合の農業収入である。

然し多くの農家は水田と畑地を共有しているし、また、主要作物と共に裏作や間作で数種の作物を栽培しているほか、作物収入以外に他の農作業や農業外の副業や賃労働の収入がある。但しキャッサバ栽培を主体とした農家は、この作物の生育期間が1年以上かゝることから、1年を通じて農作業があり、農業外の副収入を得ることは少い状況である。

TABLE 3A-1 (1)

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Table 3A-1 (1) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (1)
(1971 - 1978)

Description	1974/75				1975/76				1976/77			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
Paddy												
Nakhon Savan	1,780.0	600.0	337	2.24	1,701.5	406.6	239	2.18	1,583.7	396.8	251	2.18
Phetchabun	516.0	228.0	442	1.95	1,111.5	512.6	461	2.15	765.4	327.1	427	1.94
Chaiyaphum	336.0	66.0	196	2.01	1,418.8	529.7	373	2.07	923.1	248.7	269	1.79
Thailand	47,821.0	12,447.0	260	2.12	53,243.9	14,091.7	265	2.21	50,858.7	13,674.2	269	2.00
Study Area	295.2	93.5	317	-	313.7	106.3	339	-	407.0	143.4	352	-
Maize												
Nakhon Savan	1,000.0	320.0	320	2.30	847.8	263.7	311	1.91	1,015.6	314.8	310	1.75
Phetchabun	1,220.0	520.0	426	2.25	1,668.9	685.9	411	2.13	1,160.8	511.9	441	1.64
Chaiyaphum	140.0	35.0	250	2.31	113.6	36.7	323	1.90	102.4	31.6	308	1.82
Thailand	7,749.0	2,500.0	323	2.19	8,199.5	2,863.2	349	1.90	8,029.3	2,675.2	333	1.72
Study Area	48.9	17.2	352	-	129.9	38.6	297	-	378.0	124.1	328	-
Mungbeans												
Nakhon Savan	152.0	22.6	149	3.58	119.0	16.5	139	3.45	206.2	18.3	89	5.84
Phetchabun	177.8	28.0	158	2.64	180.0	17.9	99	3.90	322.2	29.2	91	5.88
Chaiyaphum	1.9	0.3	152	2.50	0.4	0.05	131	3.59	1.1	0.08	68	5.43
Thailand	1,293.0	187.9	145	3.10	1,022.1	120.6	118	3.32	1,392.5	124.8	90	5.61
Study Area	16.0	1.6	100	-	37.0	5.05	136	-	72.2	10.9	151	-
Cassava Root												
Nakhon Savan	13.9	29.5	2,115	0.20	17.2	38.2	2,213	-	3.7	12.7	3,374	-
Phetchabun	7.9	18.1	2,297	0.25	8.0	15.8	1,989	0.30	-	-	-	-
Chaiyaphum	42.1	72.4	1,721	0.21	92.7	192.1	2,072	0.41	284.5	671.1	2,359	0.46
Thailand	3,000.0	6,240.0	2,080	0.30	3,715	8,100.0	2,180	0.41	4,373.0	10,138.0	2,318	0.46
Study Area	-	-	-	-	10.6	21.4	2,019	-	21.8	40.4	1,853	-

Table 3A-1 (1) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (1)

Description	1977/78				1978/79			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Paddy</u>								
Nakhon Savan	1,661.7	296.6	178	1.94	2,219.2	668.1	301	2.42
Phetchabun	835.1	272.5	326	1.90	817.2	268.6	329	2.44
Chaiyaphum	1,516.4	313.6	207	1.86	1,164.2	270.4	232	2.25
Thailand	53,465.2	12,334.9	231	2.05	60,621.2	17,313.0	286	2.40
Study Area	331.0	81.9	247	-	408.4	138.2	338	-
<u>Maize</u>								
Nakhon Savan	756.9	152.9	202	1.80	673.5	201.9	300	1.67
Phetchabun	1,427.8	458.3	321	1.36	1,602.0	532.9	333	1.38
Chaiyaphum	102.4	18.7	183	1.68	173.1	51.9	300	1.33
Thailand	7,533.9	1,676.5	232	1.65	8,093.5	2,695.4	333	1.51
Study Area	420.2	127.6	304	-	431.3	157.2	364	-
<u>Mungbeans</u>								
Nakhon Savan	262.1	21.8	83	6.53	434.1	36.9	85	4.77
Phetchabun	528.9	41.3	78	6.55	483.7	53.6	111	5.01
Chaiyaphum	1.9	0.16	81	4.72	21.5	2.6	121	4.35
Thailand	2,719.7	206.9	90	6.09	2,892.5	262.4	91	4.57
Study Area	52.0	6.47	124	-	81.7	9.4	115	4.57
<u>Cassava Root</u>								
Nakhon Savan	20.4	27.0	1,320	0.40	9.7	24.2	2,492	-
Phetchabun	-	-	-	-	1.1	2.2	2,000	-
Chaiyaphum	327.1	621.4	1,900	0.54	156.8	301.7	1,924	0.55
Thailand	5,999.9	12,371.9	2,062	0.46	8,269.2	18,399.0	2,225	0.36
Study Area	26.0	53.4	2,054	-	39.2	95.4	2,434	-

TABLE 3A-1 (2)
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Table 3A-1 (2) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (2)

Description	1974/75				1975/76				1976/77			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Kenaf</u>												
Nakhon Savan	-	-	-	-	-	-	-	-	-	-	-	-
Phetchabun	-	-	-	-	3.3	0.4	118	1.41	-	-	-	-
Chaiyaphum	204.9	56.0	118	1.71	261.0	24.2	132	1.99	211.1	34.4	157	2.16
Thailand	2,523.7	384.1	152	2.35	2,038.6	307.6	151	2.65	1,008.6	183.3	182	2.99
Study Area	20.8	4.4	212	-	20.0	5.9	295	-	14.3	3.5	245	-
<u>Soybeans</u>												
Nakhon Savan	22.2	2.7	122	4.27	24.7	4.3	174	4.91	91.8	12.3	134	4.50
Phetchabun	96.2	17.3	180	4.24	28.6	4.5	157	3.91	25.3	4.2	168	6.00
Chaiyaphum	1.3	0.1	96	3.00	0.18	0.02	120	4.32	-	-	-	-
Thailand	822.8	110.4	134	4.24	738.4	143.9	154	4.36	635.1	113.6	179	4.67
Study Area	5.95	1.2	200	-	6.79	1.47	216	-	44.5	6.0	135	-
<u>Ground Nuts</u>												
Nakhon Savan	33.8	11.1	327	3.54	30.6	9.8	321	2.86	75.6	11.0	146	4.92
Phetchabun	30.5	7.7	252	2.42	23.5	5.7	261	2.50	25.7	8.7	244	3.10
Chaiyaphum	25.5	2.5	98	3.05	16.2	2.2	137	2.76	10.0	1.6	162	3.59
Thailand	814.0	160.9	198	3.48	736.0	142.2	193	3.66	761.0	151.5	199	4.04
Study Area	0.66	0.13	197	-	4.65	0.77	161	-	11.2	1.9	169	-
<u>Sorghum</u>												
Nakhon Savan	720.2	216.1	300	2.05	418.4	125.6	300	1.94	406.3	84.1	207	1.46
Phetchabun	124.7	28.2	226	1.78	85.9	24.2	282	1.55	67.4	19.5	289	1.10
Chaiyaphum	0.9	0.14	157	1.97	1.1	0.25	225	1.68	3.2	0.86	270	1.99
Thailand	-	-	-	1.85	1,452.1	310.9	230	1.69	911.2	221.0	249	1.49
Study Area	-	-	-	-	0.7	0.25	357	-	10.5	2.57	245	-

TABLE 3A-1 (2)

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Table 3A-1 (2) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (2)

Description	1977/78				1978/79			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Kenaf</u>								
Nakhon Savan	-	-	-	-	3.30	0.5	140	2.50
Phetchabun	2.5	0.3	138	2.30	1.20	0.2	175	-
Chaiyaphum	211.3	34.8	165	3.36	241.50	48.3	200	2.81
Thailand	1,603.2	245.8	153	3.94	1,960.00	336.7	172	2.82
Study Area	18.5	4.7	252	-	41.10	10.8	262	-
<u>Soybeans</u>								
Nakhon Savan	57.8	7.4	128	6.34	6.00	1.1	181	5.5
Phetchabun	188.3	18.4	98	6.00	199.40	27.6	138	5.0
Chaiyaphum	1.7	0.28	163	5.24	1.30	0.18	139	6.5
Thailand	957.5	96.3	94	6.78	1,009.60	151.4	150	5.5
Study Area	14.2	2.29	161	-	11.56	2.1	183	-
<u>Ground Nuts</u>								
Nakhon Savan	9.2	1.3	144	4.49	30.90	7.7	250	5.39
Phetchabun	28.8	9.0	252	4.44	35.00	8.1	230	4.71
Chaiyaphum	0.97	0.03	297	4.79	10.10	1.8	178	5.34
Thailand	641.4	105.6	165	4.61	1,062.60	222.3	209	5.11
Study Area	7.98	1.5	188	-	9.03	1.96	217	-
<u>Sorghum</u>								
Nakhon Savan	418.4	125.6	300	1.64	362.6	100.8	279	1.55
Phetchabun	96.6	23.4	242	1.38	166.4	35.6	213	1.75
Chaiyaphum	1.0	0.28	250	1.19	1.6	0.39	250	1.50
Thailand	589.1	87.7	149	1.50	879.5	203.3	231	1.51
Study Area	40.8	4.3	105	-	13.2	2.2	165	-

Table 3A-1 (3) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (3)
(1971 - 1978)

Description	1971 / 72				1972 / 73				1973 / 74			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Cotton</u>												
Nakhon Savan	4.3	1.2	296	5.0	41.7	6.7	200	4.66	3.2	0.72	220	-
Phetchabun	18.0	4.1	226	4.06	58.3	6.4	109	5.07	25.7	2.8	109	3.01
Chaiyaphum	8.0	0.85	107	2.01	9.1	1.0	107	4.62	1.7	0.31	187	4.00
Thailand	287.5	40.5	141	3.84	384	49.4	129	4.48	180.8	28.4	157	6.13
Study Area	-	-	-	-	-	-	-	-	-	-	-	-
<u>Caster Bean</u>												
Nakhon Savan	8.4	1.66	200	-	5.6	0.64	175	-	5.2	0.9	173	-
Phetchabun	0.21	0.05	214	-	0.05	0.01	240	-	2.95	0.48	165	-
Chaiyaphum	-	-	-	-	-	-	-	-	3.0	0.37	123	-
Thailand	274	41.1	150	1.67	279	41.2	148	2.34	282	39.1	139	3.38
<u>Sugar Cane</u>												
Nakhon Savan	20.8	10.4	500	(B/ton)	22.9	61.6	2,680	-	37.8	327.9	8,677	-
Phetchabun	-	-	-	-	-	-	-	-	-	-	-	-
Chaiyaphum	-	-	-	-	-	-	-	-	-	-	-	-
Thailand	991	5,926	651	109.9	1,133	9,513	1,055	111	1,616.3	13,338.8	8,253	131

Table 3A-1 (3) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (3)
(1971 - 1978)

Description	1974 / 75				1975 / 76				1976 / 77			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Cotton</u>												
Nakhon Savan	2.8	0.59	210	6.0	1.7	0.41	239	-	1.3	0.27	205	9.10
Phetchabun	56.2	11.3	201	7.0	12.5	1.8	143	6.75	35.5	5.1	144	10.93
Chaiyaphum	1.9	0.19	103	7.95	3.1	0.3	98	5.87	0.8	0.07	87	6.50
Thailand	322.9	56.4	175	7.4	188.4	28.7	153	6.43	153.8	26.8	174	6.07
Study Area	2.02	0.4	198	-	4.1	1.04	254	-	22.2	5.5	248	-
<u>Caster Bean</u>												
Nakhon Savan	6.1	0.9	148	-	9.5	1.5	158	-	6.2	1.05	165	-
Phetchabun	5.4	1.3	250	-	10.1	1.6	158	3.49	5.6	0.97	173	3.99
Chaiyaphum	6.0	0.59	99	-	12.1	1.7	139	-	10.0	1.39	140	-
Thailand	198	32.2	163	4.97	231	38.5	167	3.06	281	43.2	154	3.74
<u>Sugar Cane</u>												
Nakhon Savan	40.0	300.0	7,500	-	36.6	288.2	7,865	-	100.4	941.2	7,865	-
Phetchabun	-	-	-	-	6.7	39.1	5,828	249	5.0	33.0	5,828	280
Chaiyaphum	-	-	-	-	-	-	-	-	-	-	-	-
Thailand	1,535.2	14,592	7,540	177	2,443.5	11,910	8,148	252	3,118.7	26,094	8,367	283

Table 3A-1 (3) CROP PRODUCTION AREA, YIELD AND FARMGATE PRICE (3)
(1971 - 1978)

Description	1977 / 78				1978 / 79			
	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)	Planted area (1,000 Rai)	Production (1,000 ton)	Average yield (Kg/Rai)	Average price (B/Kg)
<u>Cotton</u>								
Nakhon Savan	2.2	0.44	200	7.5	12.0	2.4	200	9.75
Phetchabun	87.7	17.5	200	10.2	62.3	11.8	190	6.00
Chaiyaphum	0.6	0.06	111	5.7	1.2	0.2	170	7.85
Thailand	527.8	90.8	172	9.1	482.7	84.1	174	8.12
Study Area	25.1	4.5	179	-	15.1	3.5	233	-
<u>Caster Bean</u>								
Nakhon Savan	2.9	0.47	162	-	n.a			
Phaetchabun	5.07	0.43	85	3.98	n.a			
Chaiyaphum	5.1	0.43	85	-	n.a			
Thailand	241	37.1	154	4.76	n.a			
<u>Sugar Cane</u>								
Nakhon Savan	59.4	265.7	4,472	-	70.2	432.9	6,170	-
Phetchabun	1.7	10.8	6,342	282	3.2	21.8	6,833	-
Chaiyaphum	-	-	-	-	-	-	-	-
Thailand	3,541.7	18,941	5,349	280	3,254.6	24,964.2	7,671	281

- Sources: - "Agricultural Statistics of Thailand Crop Year 1977/78" by Ministry of Agriculture & Cooperatives and "Statistical Reports of Changwat" by National Statistical Office.
- Data of Study Area are from field survey information.
- Average prices are from "Prices of Agricultural Crops" by Division of Agricultural Economics, Ministry of Agriculture Cooperatives (Sugar cane B/ton)

TABLE 3A-2
2 of 2Table 3A-2 AVERAGE YIELD PER ACREAGE OF THE MAIN CROPS
(1971 - 1978)

	1971	1972	1973	1974	1975	1976	1977	1978	Average		1971	1972	1973	1974	1975	1976	1977	1978	Average
										(kg/rai)									
<u>Ground Nuts</u>										<u>Sugar Cane</u>									
Nakhon Savan	300	250	249	327	321	146	144	250	248	Nakhon Savan	500	2,680	8,677	7,500	7,865	9,379	4,472	6,170	5,905
Phetchabun	343	169	211	252	261	244	252	230	245	Phetchabun	-	-	-	-	5,828	6,557	6,342	6,833	6,390
Chaiyaphum	110	115	119	98	137	162	297	178	152	Thailand	651	1,055	8,253	7,540	8,148	8,367	5,349	7,671	5,879
Thailand	187	206	189	198	193	199	165	209	193										
Study Area (N/P)		-	-	197	164	167	188	219	187										
(c)		-	-	-	176	197	192	204	192										
<u>Sorghum</u>										Notes: Sources: (1) Agricultural Statistics of Thailand Crop Year 1976/77 & 1977/78									
Nakhon Savan	246	202	220	300	300	207	300	279	257	(2) Study Area - Data from field survey information									
Phetchabun	270	187	260	226	282	289	242	213	246	N/P : Nakhon Savan & Phetchabun side									
Chaiyaphum	198	200	248	157	225	270	250	250	225	C : Chaiyaphum side									
Thailand	258	-	-	-	230	249	149	231	223	- : Data not available									
Study Area (N/P)		-	-	-	400	246	104	163	228										
(c)		-	-	-	200	200	176	200	194										
<u>Cotton</u>																			
Nakhon Savan	296	200	220	210	239	205	200	200	227										
Phetchabun	226	109	109	201	143	144	200	190	165										
Chaiyaphum	107	107	187	103	98	87	111	170	121										
Thailand	141	129	157	175	153	174	172	174	159										
Study Area (N/P)		-	-	198	260	247	178	235	224										
(c)		-	-	-	217	235	229	206	221										

TABLE 3A-3
1 of 3Table 3A-3 CURRENT PRODUCTION COST FOR CROPS
1978-1979 (Baht per Rai)

- PADDY -

	N/P			C			Remarks:
	Materials & Equipment/ <u>1</u>	Labor/ <u>2</u>	Total Cost	Materials & Equipment	Labor	Total Cost	
Variable Cost							
Nursery bed		10	10				
Seed & Sowing	15	10	25	15	10	25	
Nursery management		25	25				
Cultivation <u>3</u>	50	30	80	80	55	135	
Transplanting		75	75				
Fertilizer <u>4</u>	20	-	20	20		20	
Agro-chemical <u>5</u>	20	-	20	20		20	
Weeding & Management		30	30		50	50	
Harvesting & Drying <u>6</u>		100	100		100	100	
Threshing <u>7</u>	30	10	40		45	45	
Others <u>8</u>	15		15	15		15	
Total	150	290	440	150	260	410	
(1) Variable Production Cost	150	290	440	150	260	410	
(2) Fixed Cost <u>9</u>			50			50	
(3) Total Cost (1) + (2)			490			460	

*Adopted direct sowing for paddy in Chaiyaphum side.

1 Materials, equipment and hired charges of tractor and machinery.

2 Labor and draft cattle cost including family labor and self-supply cattle (buffalo)
1 Man/Day = B.25, 1 Buffalo/Day = B 60

3 Tractor ploughing N/P B 50-60/rai, C B 80-90/rai }
harrowing N/P B 30-40/rai, C B 40-50/rai } 20 rai/day
Buffalo ploughing }
weeding } B 60/5 rai/day

4 Fertilizer, Ammonium Sulphate B 2,800/ton }
Urea B 4,400/ton } Average B 4/kg

5 Agro-chemical, Insecticide B 90-100/kg 1 kg/5 - 6 rai/ 1 time spray
Seed disinfection B 10/20 gr. 7gr/1 kg seed

6 Harvesting by labor
(1) Maize B 5/bag (80 kg corn cob or 45 kg shelled corn)
5 bags/man/day
(2) Mung beans B 14/bag (20 kg shelled beans) 3 bags/man day
(3) Cassava root 900-1000 kg/man/day

7 Paddy threshing by buffalo 2 - 2.5 rai/day
by tractor B 100/ton
Maize shelling by machine B 1/15 kg shelled corn
Mung beans shelling by machine B 5/15 kg shelled beans

8 Cost of agricultural tools and materials

9 Land rent, agricultural imposts and depreciation cost of agricultural machines.

Note: N/P: Nakhon Savan & Phetchabun side

C: Chaiyaphum side

TABLE 3A-3
2 of 3Table 3A-3 CURRENT PRODUCTION COST FOR CROPS
1978/1979 (Baht per Rai)

	- MAIZE -						- MUNG BEANS -											
	N/P			C			N/P			C								
	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost						
Variable Cost																		
Cultivation /3	90	32	122	110	22	132	50	40	90	80	40	120						
Seed & Seedling	15	20	35	15	20	35	52	20	72	52	20	72						
Fertilizer /4																		
Agro-chemical /5																		
Weeding & Intercultivation		95	95		95	95		75	75		75	75						
Harvesting & Transportation /6		60	60		60	60		100	100		100	100						
Shelling & Drying /7	22	25	47	20	25	53	45	10	55		50	50						
Others /8	11		11	11		11	13		13	13		13						
Total	138	232	370	156	152	308	160	245	405	145	285	430						
1) Variable Production Cost	138	232	370	156	152	308	160	245	405	145	285	430						
2) Fixed Cost /9			40			30			40			30						
3) Total Cost (1)+(2)			410			338			445			460						
	- CASSAVA -						- KENAP -						- SOY BEANS -					
	C			C			N/P			C								
	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost						
Variable Cost																		
Cultivation/3	90	65	155	80	55	135	50	45	95	80	45	125						
Seed & Seedling	40	30	70	15	30	45	52	20	72	52	20	72						
Fertilizer/4	10		10	10		10												
Agro-chemical/5																		
Weeding & Intercultivation		100	100		50	50		75	75		75	75						
Harvesting & Transportation/6		110	110		65	65		75	75		75	75						
Shelling & Drying/7				(Retting)	165	165		50	50		50	50						
Others/8	30		30	15		15	13		13	13		13						
Total	170	305	475	140	365	505	115	265	380	145	265	410						
1) Variable Production Cost	170	305	475	140	365	505	115	265	380	145	265	410						
2) Fixed Cost /9			80			30			40			30						
3) Total Cost (1)+(2)			555			535			420			440						

TABLE 3A-3
3 of 3

Table 3A-3 CURRENT PRODUCTION COST FOR CROPS
1978/1979 (Baht per Rai)

	- GROUND NUT -						- SORGHUM -					
	N/P			C			N/P			C		
	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost
Variable Cost												
Cultivation /3	90	105	195	120	105	225	50	10	60	80	10	90
Seed & Seedling	150	50	200	160	50	210	10	10	20	10	10	20
Fertilizer/4												
Agro-chemical/5	30	30	60	20	30	50						
Weeding & Intercultivation		120	120		120	120		15	15		15	15
Harvesting & Transportation/6		110	110		110	110		40	40		35	35
Shelling & Drying/7		50	50		50	50	20	10	30		20	20
Others/8	20		20	20		20	10		10	10		10
Total	290	465	755	320	465	785	90	85	175	100	90	190
1) Variable Production Cost	290	465	755	320	465	785	90	85	175	100	90	190
2) Fixed Cost /9			40			30			40			30
3) Total Cost (1)+(2)			795			815			215			220

- COTTON -

	N/P			C		
	Material Equipment/1	Labor/2	Total Cost	Material Equipment/1	Labor/2	Total Cost
Variable Cost						
Cultivation /3	50	45	95	80	45	95
Seed & Seedling	10	40	50	10	40	50
Fertilizer/4						
Agro-chemical /5	270	25	295	270	25	295
Weeding & Intercultivation		240	240		240	240
Harvesting & Transportation /6		175	175		175	175
Shelling & Drying /7		50	50		50	50
Others /8	35		35	35		35
Total	365	575	940	395	575	970
1) Variable Production Cost	365	575	940	395	575	970
2) Fixed Cost			40			30
3) Total Cost (1)+(2)			980			1,000

Table 3A-4 CURRENT FARM INCOME

(1) UNIT CROP INCOME FOR FARMERS

	Parngate ^{/1} Price (B/kg)	Average ^{/2} Yield (kg/rai)	Gross Crop Income (B/rai)	Production ^{/3} Cost (B/rai)	Net Crop Income (B/rai)
Paddy					
N/P	2.42	320	774	490	284
C	2.42	280	678	460	218
Maize					
N/P	1.62	330	535	410	125
C	1.55	295	457	338	119
Mung beans					
N/P	4.7	130	611	445	166
C	4.65	130	605	460	145
Cassava					
C	0.55	2,090	1,150	555	595
Kenaf					
C	3.1	250	775	535	240
Soybeans					
N/P	4.6	180	828	420	408
C	4.5	175	788	440	348
Groundnut					
N/P	5.4	185	999	795	204
C	5.3	190	1,007	815	192
Sorghum					
N/P	1.45	230	334	215	119
C	1.4	200	280	220	60
Cotton					
N/P	8.0	225	1,800	980	820
C	7.8	220	1,716	1,000	716

Note: ^{/1} Average prices based on the price information of the related Changvats provided by the Ministry of Agriculture and Cooperatives, at 1978 constant price.

^{/2} Based on 5 years (1974-78) average in the related Amphoes.

^{/3} Including variable and fixed costs estimated based on the data obtained from the Ministry of Agriculture and Cooperatives 1978, and adjusted by the information obtained in the field survey in 1979. Details are shown Table 2A-3.

N/P : Nakhon Savan & Phetchabun

C : Chaiyaphum

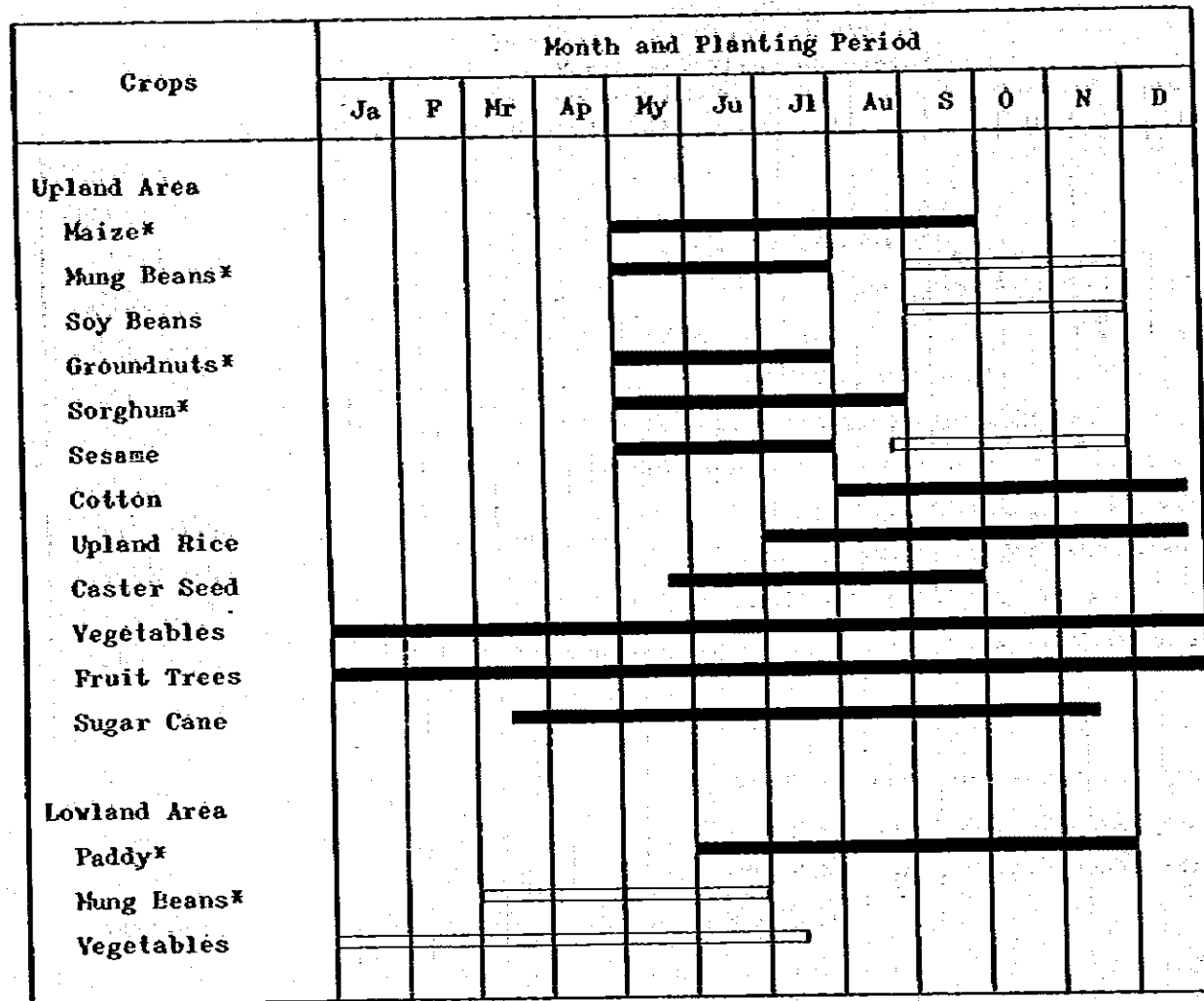
(2) ANNUAL FARM INCOME OF TYPICAL FARM

Farm Type	Nakhon Savan/Phetchabun		Chaiyaphum	
	Cultivated Area (rai)	Net Crop Income (B)	Cultivated Area (rai)	Net Crop Income (B)
1. Paddy Farm				
Paddy	24	6,816	19	4,142
Mung beans	1	166		
Other crops ^{/1}	1	235	1	225
Total	26	7,217	20	4,367
2. Maize Farm				
Maize	23	2,875	17	2,023
Mung beans	2	332	Kenaf 2	480
Other crops ^{/1}	1	235	1	225
Total	26	3,442	20	2,728
3. Cassava & Kenaf Farm				
Cassava			7	4,165
Kenaf			8	1,920
Other crops ^{/2}			5	1,125
Total			20	7,210

Note: ^{/1} Including soybeans, groundnuts, sorghum, sesame, cotton and vegetables.

^{/2} Including upland crops other than cassava and kenaf.

FIGURE 3A-1 CROPPING CALENDAR IN THE CHANGWAT NAKHON SAVAN (1)

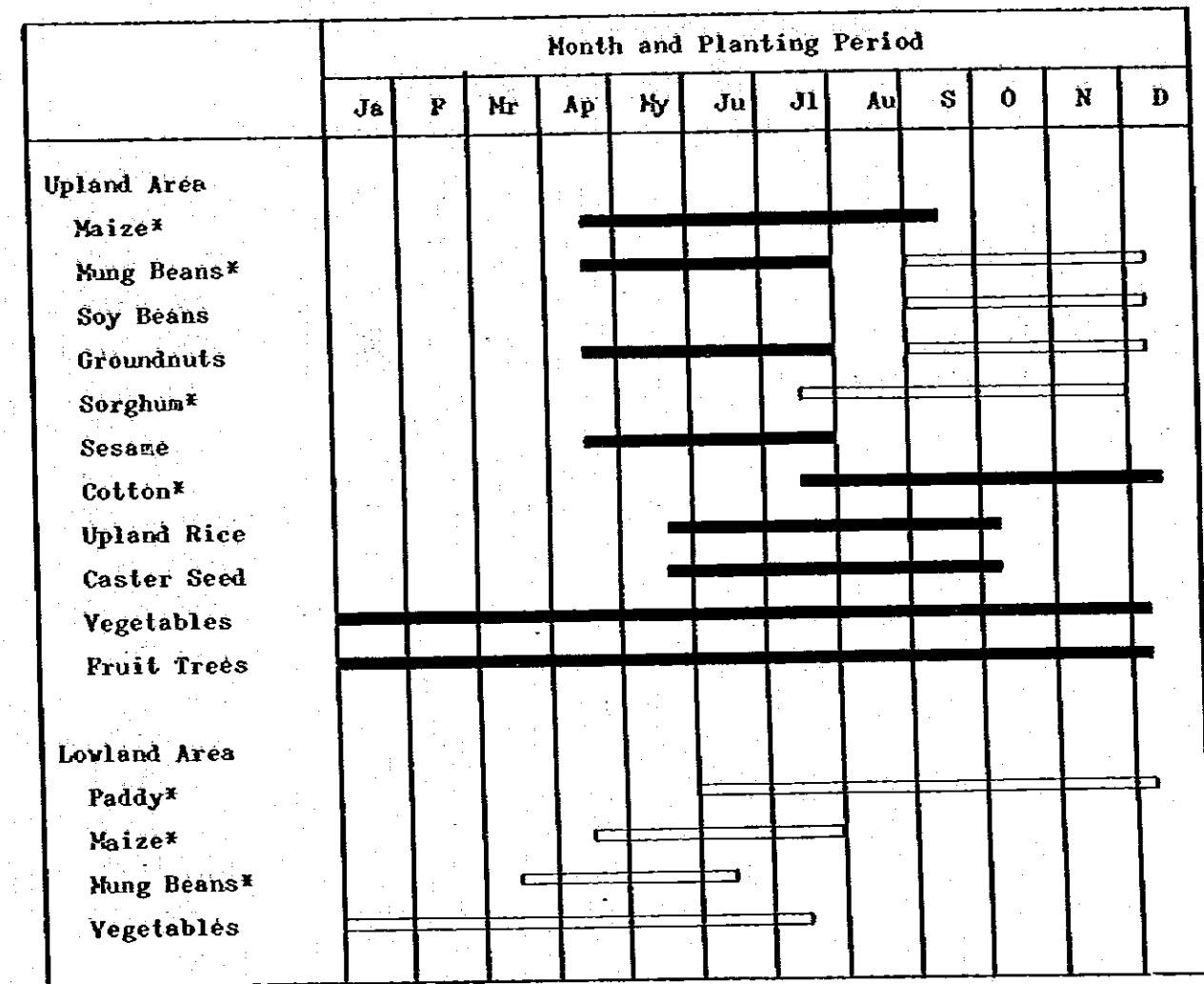


Note: █ First Crop or Inter Crop

▬ Second Crop

* Major Crops in the Project Area.

FIGURE 3A-1 CROPPING CALENDAR IN THE CHANGWAT PHETCHABUN (2)



Note: █ First Crop or Inter Crop

▬ Second Crop

* Major Crops in the Project Area.

FIGURE 3A-1 CROPPING CALENDAR IN THE CHANGWAT CHAIYAPHUM (3)

Crops	Month and Planting Period											
	Ja	F	Mr	Ap	My	Ju	Jl	Au	S	O	N	D
Upland Area												
Maize*					█	█	█	█				
Mung Beans								█	█	█	█	█
Soy Beans				█	█	█	█					
Groundnuts						█	█	█				
Cassava*	█	█	█	█	█	█	█	█	█	█	█	█
Kenaf*				█	█	█	█	█	█	█	█	█
Cotton						█	█	█	█	█	█	█
Upland Rice						█	█	█	█	█	█	█
Vegetables	█	█	█	█	█	█	█	█	█	█	█	█
Fruit Trees	█	█	█	█	█	█	█	█	█	█	█	█
Lowland Area												
Paddy*						█	█	█	█	█	█	█
Sugar Cane				█	█	█	█	█	█	█	█	█
Kapok					█	█	█	█	█	█	█	█
Vegetables	█	█	█	█	█	█	█	█	█	█	█	█

Note: █ First Crop or Inter Crop

▭ Second Crop

* Major Crops in the Project Area.

Appendix 4

影響圏の交通

TABLE 4A-1

1 of 2

Table 4A-1 BUS OPERATION IN THE AREA OF INFLUENCE

Route Code	Bus Route		Season of Operation	Type of Buses	Frequency of Operation per day	Bus Fare (\$/person)	Number of Passengers at Terminal		Remarks
	Terminal as origin	Destination					Dry Season	Rainy Season	
T1	Tha Tako	Nakhon Sawan	All	H/B	24	10	70	40 - 50	School bus
T2		Nakhon Sawan	All	H/B	2	10	80 - 100	80 - 100	
T3		Yang Phikun	All	H/B	15	13	70	40 - 50	
T4		Nong Bua	All	H/B	12	10	40 - 50	20 - 30	
T5		Tak Pa	All	H/B	12	10	30 - 40	15 - 25	
V1	Yang Phikun	Nakon Savan	All	H/B	14	23	80 - 100	40 - 50	
V2		Khlong Kumlung	All	L/B	D(32), R(16)	12	12	6	
N1	Nong Bua	Chumsaeng	All	H/B	16	D(8), R(10)	35	20	Via Nong Phai
N2		Khlong Kumlung	Dry only	L/B	10	10	15 - 20	-	
N3		Khlong Lan	Rainy only	L/B	7	15	-	15	
N4		Nong Ngu Luam	All	L/B	D(30), R(25)	20	7	9	
NN1	Nong Ngu Luam	Khlong Kumlung	All	L/B	D(40), R(20)	5	10	6	
K1	Khlong Kumlung	Mine	All	L/B	3	12	7	5	
S1	Sap Samo Thot	Yang Phikun	All	L/B	D(40), R(20)	10	15	10	Via Rahun Via Nong Phai Via Wichian Buri Via old route 21
S2		Nong Ngu Luam	All	L/B	D(15), R(10)	13	14	6	
S3		Khlong Kumlung	All	L/B	D(10), R(6)	D(15), R(20)	10	4	
S4		Sap Bon	Dry only	L/B	50	10	20	-	
S5		Sap Bon	Rainy only	L/B	15	15	-	20	
S6		Sap Bon	Rainy only	L/B	22	15	-	15	
S7		Sam Yaek	All	L/B	D(36), R(24)	3	20	20	
S8		Bung Sanphan	All	L/B	8	2	15	6	
VB1	Wichian Buri	Noen Sanga	All	L/B	20	8	20	15	Via Khok Prong
VB2		Nam Ron	All	L/B	42	8	15	12	
VB3		Khok Gruat	Dry only	L/B	15	18	30	-	
VB4		Na Raya	Dry only	L/B	3	35	30	-	
SB1	Sap Bon	Sap Chom Pu	Dry only	L/B	20	30	25	-	
SB2		Sa Khao	Rainy only	L/B	12	15	-	20	
C1	Chatturat	Huai Yae	Dry only	H/B	3	15	50	-	
C2		Tha Pong	Dry only	H/B	1	15	50	-	
C3		Yang Ma Kit	Dry only	H/B	1	15	50	-	
C4		Wang Katha	All	H/B	D(1), R(6)	12	50	50	
C5		Nong Bua Rave	All	H/B	2	7	50	50	
C6		Som Poy	All	H/B	1	5	50	50	
C7		Nong Bua Ban	All	H/B	1	4	50	50	

(Cont'd)

TABLE 4A-1

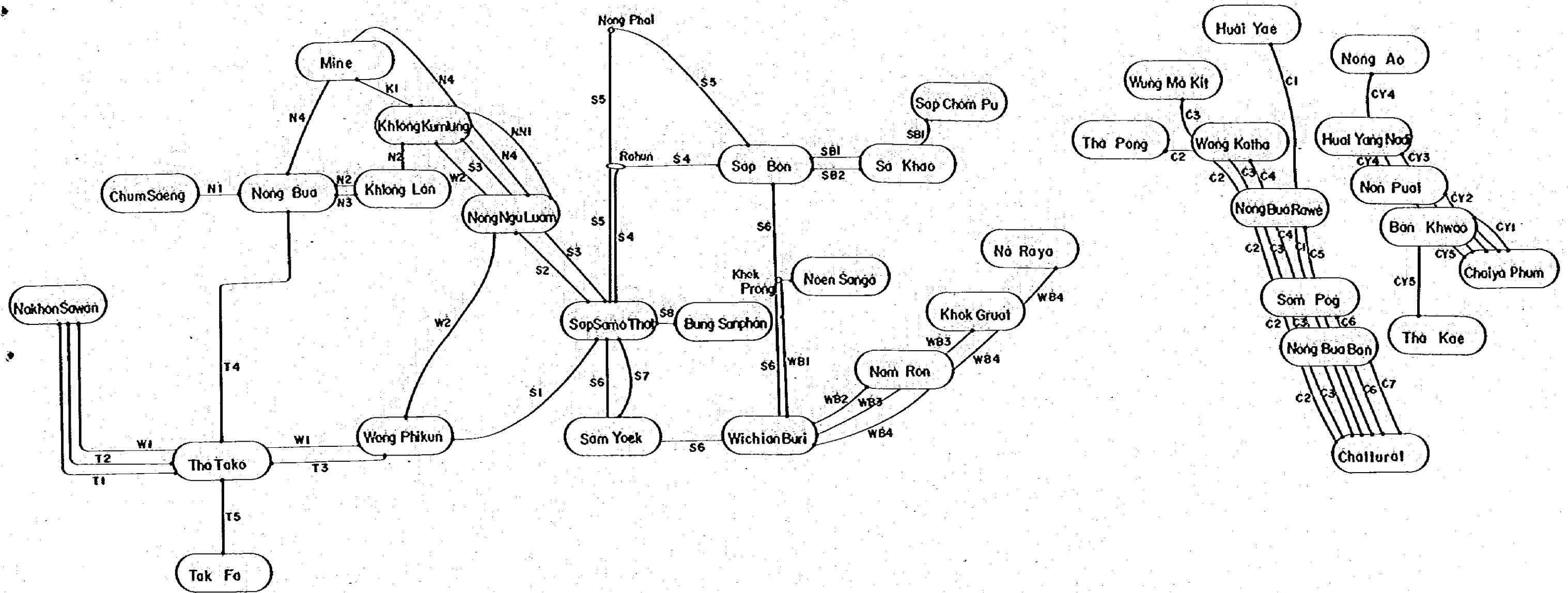
2 of 2

Table 4A-1 BUS OPERATION IN THE AREA OF INFLUENCE (Cont'd)

Route Code	Bus Route		Season of Operation	Type of Buses	Frequency of Operation per day	Bus Fare (\$/person)	Number of Passengers at Terminal		Remarks
	Terminal as origin	Destination					Dry Season	Rainy Season	
CY1	Chaiyaphum	Ban Khvao	All	L/B	38	3	22	20	
CY2		Non Puai	All	H/B	2	5	66	60	
CY3		Huai Yang Nadi	All	L/B, H/B	2	5	L/B(33), H/B(66)	L/B(30), H/B(60)	
CY4		Nong Ao	All	H/B	1	15	66	60	
CY5		Tha Kae	All	L/B, H/B	9	7	L/B(33), H/B(66)	L/B(30), H/B(60)	

FIGURE 4A - 1

Figure 4A-1 BUS NETWORK IN THE AREA OF INFLUENCE



ルート代替案の建設費

TABLE 5A-1
1 of 2

Table 5A-1 CONSTRUCTION COSTS BY ROUTE ALTERNATIVE

(1,000 Baht)

DESCRIPTION	UNIT OF Q'ty	UNIT RATE (Baht)	PART I									
			Route Alternative I - 1									
			Sec. Alt. A - 1		Sec. Alt. A - 2		Sec. Alt. B - 1		Sec. Alt. B - 2		Sec. Alt. B - 3	
			Q'ty	Amount	Q'ty	Amount	Q'ty	Amount	Q'ty	Amount	Q'ty	Amount
DIRECT CONSTRUCTION COST												
Clearing & Grubbing	ha	15,000	101	1,515	87	1,305	133	1,995	131	1,965	195	2,925
Earth Excavation	m ³	35	9,600	336	0	0	230,500	8,067	251,600	8,806	84,300	2,951
Soft Rock Excavation	m ³	95	0	0	0	0	9,500	903	19,000	1,805	24,300	2,309
Hard Rock Excavation	m ³	135	0	0	0	0	14,900	2,012	13,200	1,782	13,200	1,782
Embankment, Side Borrow	m ³	55	124,800	6,864	143,400	7,887	377,600	20,768	404,900	22,270	495,200	27,236
Embankment, Borrow Pit	m ³	60	0	0	0	0	159,500	9,570	159,500	9,570	190,000	11,400
Embankment with Selected Material	m ³	80	66,300	5,304	44,700	3,576	82,000	6,560	86,890	6,951	105,890	8,471
Soil Aggregate Surfacing	m ³	140	61,100	8,554	41,100	5,754	78,700	11,018	83,140	11,640	97,640	13,670
Pipe Culvert	m	2,100	832	1,747	651	1,367	916	1,924	1,073	2,253	1,644	3,452
Box Culvert	m	19,000	17	323	51	969	42	798	110	2,090	68	1,292
Long Span Bridge	m	65,000	0	0	0	0	0	0	0	0	100	6,500
Short Span Bridge	m	40,000	150	6,000	70	2,800	250	10,000	305	12,200	345	13,800
Sub total				30,643		23,658		73,615		81,332		95,788
Minor Items (10% of the above)				3,067		2,362		7,365		8,138		9,582
Total				33,710		26,020		80,980		89,470		105,370
LAND ACQUISITION												
Highly Developed Land	ha	40,000	104	4,160	53	2,120	63	2,520	66	2,640	143	5,720
Less Developed Land	ha	10,000	26	260	34	340	70	700	58	580	43	430
Total				4,420		2,460		3,220		3,220		6,150
TOTAL				38,130		28,480		84,200		92,690		111,520

Table 5A-1 CONSTRUCTION COSTS BY ROUTE ALTERNATIVE (Cont'd)

DESCRIPTION	UNIT OF Q'ty	UNIT RATE (Baht)	(1,000 Baht)							
			PART I				PART III			
			Route Alt. I - 1		Route Alt. I - 2		Route Alt. III - 1		Route Alt. III - 2	
			Sec. Alt. B - 4							
		Q'ty	Amount	Q'ty	Amount	Q'ty	Amount	Q'ty	Amount	
DIRECT CONSTRUCTION COST										
Clearing & Grubbing	ha	15,000	152	2,280	273	4,095	198	2,970	148	2,220
Earth Excavation	m ³	35	46,700	1,635	46,700	1,635	71,300	2,496	0	0
Soft Rock Excavation	m ³	95	11,300	1,074	11,300	1,074	21,300	2,024	0	0
Hard Rock Excavation	m ³	135	700	95	700	95	63,500	8,573	0	0
Embankment, Side Borrow	m ³	55	418,900	23,040	569,600	31,328	231,500	12,733	192,800	10,604
Embankment, Borrow Pit	m ³	60	152,000	9,120	152,000	9,120	0	0	0	0
Embankment with Selected Material	m ³	80	82,500	6,600	135,200	10,816	92,300	7,384	51,500	4,120
Soil Aggregate Surfacing	m ³	140	83,400	11,676	135,400	18,956	105,200	14,728	82,100	11,494
Pipe Culvert	m	2,100	1,189	2,497	2,161	4,538	930	1,953	885	1,859
Box Culvert	m	19,000	51	969	34	646	40	760	17	323
Long Span Bridge	m	65,000	100	6,500	100	6,500	105	6,825	0	0
Short Span Bridge	m	40,000	455	18,200	555	22,200	185	7,400	275	11,000
Sub total				83,686		111,003		57,846		41,620
Minor Items (10% of the above)				8,374		11,097		6,784		4,160
Total				92,060		122,100		74,630		45,780
LAND ACQUISITION										
Highly Developed Land	ha	40,000	105	4,200	152	5,080	18	720	29	1,160
Less Developed Land	ha	10,000	41	410	72	720	156	1,660	34	340
Total				4,610		6,800		2,380		1,500
TOTAL				96,670		128,900		77,010		47,280

農業生産費及び純付加価値予測

Table 6A-1 PRODUCTION COST WITH AND WITHOUT PROJECT (1)

Crop Year Without & With Region	(Baht per Rai)					
	Paddy					
	1984		1998			
	\bar{W}/Y	\bar{V}	\bar{W}	\bar{V}	\bar{W}	\bar{V}
	N/P	C	N/P	C	N/P	C
Variable Cost						
Nursery bed	10	-	10	-	10	-
Seed & Sowing	25	25	25	25	25	25
Nursery management	25	-	25	-	25	-
Cultivation	80	135	80	135	80	135
Transplanting	75	-	75	-	75	-
Fertilizer	20	20	30	30	56	56
Agro-chemical	20	20	20	20	18	18
Weeding & Intercultivation	30	50	30	50	40	50
Harvesting & Drying	100	100	100	100	100	100
Threshing	40	45	43	45	45	45
Others	15	15	15	15	15	15
(1) Variable Production Cost	440	410	453	420	479	444
(2) Fixed Cost	50	50	50	50	50	50
(3) Total Cost (1)+(2)	490	460	503	470	529	494

Note: 1978/79 Constant price

Adopt direct sowing for paddy in Chaiyaphum side

 \bar{W} : Without Project \bar{V} : With Project

N/P : Nakhon Sawan/Phetchabun side

C : Chaiyaphum side

TABLE 6A-1
2 of 3

Table 6A-1 PRODUCTION COST WITH AND WITHOUT PROJECT (2)

Crops Year Without, With Region	Maize						Mung beans						Cassava		
	1984		1998		1998		1984		1998		1998		1984	1998	
	\bar{V}/V		\bar{V}		V		\bar{V}/V		\bar{V}		V		\bar{V}/V	\bar{V}	V
	N/P	C	N/P	C	N/P	C	N/P	C	N/P	C	N/P	C	C	C	C
Variable Cost															
Cultivation	122	132	122	132	122	132	90	120	90	120	90	120	155	155	155
Seed & Seedling	35	35	35	35	35	35	72	72	72	72	72	72	70	70	70
Fertilizer	-	-	-	-	-	-	-	-	-	-	-	-	10	10	200
Agro-chemical	-	-	-	-	15	15	-	-	-	-	15	15	-	-	-
Weeding & Intercultivation	95	50	95	50	95	50	75	75	75	75	75	75	100	100	100
Harvestings Transportation	60	35	60	35	60	40	100	100	100	100	100	100	90	90	105
Shelling & Drying	47	45	47	45	53	46	55	50	55	50	55	50	20	20	30
Others	11	11	11	11	11	11	13	13	13	13	13	13	30	30	30
(1) Variable Production Cost	370	308	370	308	386	329	405	430	405	430	420	445	475	475	700
(2) Fixed Cost	40	30	40	30	40	30	40	30	40	30	40	30	80	80	80
(3) Total Cost (1)+(2)	410	338	410	338	426	359	445	460	445	460	460	475	555	555	780

(Baht per Rai)

TABLE 6A-1
3 of 3

Table 6A-1 PRODUCTION COST WITH AND WITHOUT PROJECT (3)

Crops Year Without & With Region	Kenaf		Soy bean		Groundnut 1984 - 1998		Sorghum		Cotton	
	\bar{V}/W		\bar{V}/W		\bar{V}/W		\bar{V}/W		\bar{V}/W	
	C	N/P	C	N/P	C	N/P	C	N/P	C	N/P
Variable Cost										
Cultivation	135	95	125		195	225	60	90	95	125
Seed & Seedling	45	72	72		200	210	20	20	50	50
Fertilizer	10	-	-		-	-	-	-	-	-
Agro-chemical	-	-	-		60	50	-	-	295	295
Weeding & Intercultivation	50	75	75		120	120	15	15	240	240
Harvesting & Transportation	65	75	75		110	110	40	35	175	175
Shelling	165	50	50		50	50	30	20	50	50
Others	20	13	13		20	20	10	10	35	35
(1) Variable Production Cost	505	380	410		755	785	175	190	940	970
(2) Fixed Cost	30	40	30		40	30	40	30	40	30
(3) Total Cost (1)+(2)	535	420	440		795	815	215	220	980	1,000

TABLE 6A-2 NET ADDED VALUE

Year	Cultivation Area ^{1/} (1,000 rai)		Net Value of Production (MnB)		New Land Opened (1,000 rai)		Land Prepara- tion Cost (MnB)		Net Added Value (MnB)		Incre- ment (MnB)
	With	Without	With	Without	With	Without	With	Without	With	Without	
1984	404.8	370.3	135.5	111.2	39.7	5.2	26.6	3.5	108.9	107.7	1.2
1985	444.5	375.6	146.4	113.1	39.7	5.2	26.6	3.5	119.8	109.6	10.2
1986	484.3	380.9	157.4	115.0	39.7	5.2	26.6	3.5	130.8	111.5	19.3
1987	524.0	386.2	168.3	116.8	39.7	5.2	26.6	3.5	141.7	113.3	28.4
1988	563.8	391.5	179.3	118.7	39.7	5.2	26.6	3.5	152.7	115.2	37.5
1989	568.9	396.7	179.7	120.6	5.1	5.2	3.4	3.5	176.3	117.1	59.2
1990	574.0	402.0	181.2	122.5	5.1	5.2	3.4	3.5	177.8	119.0	58.8
1991	579.0	407.3	182.7	124.5	5.1	5.2	3.4	3.5	179.3	120.9	58.4
1992	584.1	412.6	184.2	126.3	5.1	5.2	3.4	3.5	180.8	122.8	58.0
1993	589.2	417.9	185.6	128.2	5.1	5.2	3.4	3.5	182.2	124.7	57.5
1994	594.3	423.2	187.1	130.1	5.1	5.2	3.4	3.5	183.7	126.6	57.1
1995	599.4	428.5	188.6	132.0	5.1	5.2	3.4	3.5	185.2	128.5	56.7
1996	604.4	433.8	190.0	133.9	5.1	5.2	3.4	3.5	186.6	130.4	56.2
1997	609.5	439.1	191.5	135.8	5.1	5.2	3.4	3.5	188.1	132.3	55.8
1998	614.6	444.4	193.0	137.7	5.1	5.2	3.4	3.5	189.6	134.2	55.4

Note: ^{1/} Excluding areas of second crops

TABLE 7A-1

Table 7A-1 PERSON TRIP RATE

(trip/1000 persons day)

Village Code	Name of Village	Dry Season				Rainy Season			
		C	B&S	O	Total	C	B&S	O	Total
H1	Nong Phai	43.5	40.2	3.5	87.2	35.4	31.8	2.1	69.3
H2	Pak Dong	35.3	59.0	4.9	99.1	35.3	44.5	3.4	83.2
H3	Nong Ngu Luam	18.3	35.3	12.0	65.5	18.0	18.3	5.9	42.1
H4	Khlong Kumlung	3.4	33.2	6.6	43.2	3.2	14.2	2.3	19.7
H5	Wang Phikun	39.1	16.3	5.5	60.9	82.7	11.0	4.6	98.3
H6	Huai Sai	7.9	26.9	1.9	36.7	7.7	27.2	2.1	37.1
H7	Hin Dat	19.8	16.4	2.9	39.1	45.1	15.1	2.4	62.6
H8	Bung Klachap	1.6	42.8	10.5	54.9	1.6	36.2	5.5	43.3
H9	Sap Bon	16.0	21.5	0.1	37.6	92.4	18.3	0.1	110.8
H10	Khok Prong	109.4	74.1	14.1	197.5	173.3	71.0	11.3	255.6
H11	Nam Ron	9.3	63.4	2.9	75.6	8.7	55.7	1.1	65.5
H12	Wang Katha	20.9	27.5	8.9	57.3	10.5	13.4	3.4	27.3
H13	Wang Takhe	9.0	16.9	5.5	30.4	2.6	15.9	4.0	22.5
H14	Huai Yae	0.0	21.8	3.4	25.2	0.0	18.2	3.1	21.2
H15	Khok Sa-at	8.9	38.0	6.1	53.0	8.9	35.9	3.4	48.2
H16	Nong Bua Rave	13.4	23.8	4.0	41.2	13.4	26.4	2.1	42.0
H17	Non Puai	25.2	12.0	2.7	39.9	25.2	15.1	2.8	43.2
H18	Ban Khvao	58.5	16.3	0.3	75.1	66.7	10.4	0.0	77.1

Note: C : To farm, office and school

B&S: Business, shopping and production transport

O : Others such as entertainment, visiting friends, etc.

TABLE 7A-2

Table 7A-2 PERSON TRIP RATE (WITHOUT PROJECT CASE)

DESTINATION ORIGIN		DESTINATION																																				
		1 NONG BUA	2 NONG PHAI	3 KHLONG KUMLUANG	4 NONG NGULUAM	5 WANG PHIKUN	6 SAP SAMO THOT	7 SAP BON	8 KHOX PEONG	9 WICHIAN BURI	10 SA KHAO	11 NAY RON	12 NA RAYA	13 TEA PONG	14 TEA KUP	15 WANG KATHA	16 WANG TAKHE	17 HUAI YAE	18 NONG BUA RAVE	19 NONG AO	20 NON PUAI	21 NONG BIA BAN	22 TEA KAE	23 BAN KHVAO	24 NAKHON SAMAN	25 CHUNSAENG	26 TEA TAKO	27 PHAI SARI	28 BANNETNARONG	29 CHATTURAT	30 CHAITAPHUM	TOTAL						
1	N. BUA	0	0.69	0.25	0.31	0.21	1.48	0.03	0	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.77	10.82	12.02	11.47	0	0	0.19	44.63					
2	N. PHAI	63.81	0	0.36	0.12	0.40	0.49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.16	6.43	5.82	4.84	0	0	0.18	88.60					
3	K. KUMLUANG	5.79	0.29	0	18.35	1.90	6.71	0.10	0.07	2.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.99	2.49	2.79	2.15	0	0	0.27	44.55						
4	N. N. LUAM	1.23	0.10	4.01	0	5.32	28.64	0.16	0.12	2.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4.53	1.08	2.85	14.38	0	0	0.34	65.53						
5	W. PHIKUN	4.89	0.06	0.50	17.39	0	22.69	0.09	0.07	1.59	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.55	9.21	20.18	0	0	0.27	81.45						
6	S. S. THOT	0.47	0.07	0.24	2.24	1.04	0	1.08	0.78	20.38	0.08	0.16	0.01	0.01	0.02	0.01	0.01	0.01	0.05	0.02	0.03	0.05	0.03	0.05	1.90	0.44	0.85	1.19	0.29	0.36	0.37	32.25						
7	S. BON	0.12	0	0.02	0.15	0.10	18.29	0	9.11	59.55	0.17	0.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0.43	0	0	0.24	0	0	0.26	116.60					
8	K. PRONG	0	0	0.02	0.15	0.09	19.56	17.68	0	77.75	0.03	0.37	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.43	0	0	0.24	0	0	0.26	116.60					
9	V. BURI	0.14	0	0.05	0.23	0.15	23.73	8.19	8.23	0	0.07	0.17	0.01	0	0	0	0	0	0	0	0	0	0	0	1.30	0.16	0.27	0.34	0.12	0.18	0.36	43.68						
10	S. KHAO	0	0	0	0	0	1.54	0.38	0.09	1.68	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0.35	0	0	0	0	0	0.21	4.27						
11	N. BON	0	0	0	0.27	0.16	14.98	1.15	1.44	53.58	0.02	0	0.06	0	0	0	0	0	0	0	0	0	0	0	0.46	0	0	0	0	0	0.28	72.20						
12	N. RAYA	0	0	0	0	0	0.18	0	0.02	0.12	0	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0.11	0	0	0	0	0	0.08	0.55						
13	T. PONG	0	0	0	0	0	0.15	0	0	0	0	0	0	0.05	3.85	2.43	0.03	1.19	0.03	0.24	0.33	0.10	1.25	0.10	0	0	0	0.40	3.58	4.54	18.27							
14	T. KUP	0	0	0	0	0	0.37	0	0	0	0	0	0	0.05	0	0.08	0.05	0.02	10.50	0.07	0.99	1.38	0.31	4.28	0.24	0	0	0	11.77	10.32	22.53	62.95						
15	W. KATHA	0	0	0	0	0	0.34	0	0	0	0	0	0	4.60	0.12	0	3.98	0.08	13.60	0.06	0.69	0.96	0.24	4.36	0.26	0	0	0	2.93	9.01	19.42	60.64						
16	W. TAKHE	0	0	0	0	0	0.20	0	0	0.10	0	0	0	3.62	0.21	4.56	0	2.75	12.76	0.07	1.29	1.77	0.36	5.76	0.15	0	0	0	4.12	7.83	24.20	69.76						
17	H. YAE	0	0	0	0	0	0.15	0	0	0	0	0	0	0.11	0.08	0.17	2.24	0	3.11	0.05	0.38	1.24	0.16	1.93	0.10	0	0	0	0.66	5.76	6.35	22.49						
18	N. B. RAVE	0	0	0	0	0	0.16	0	0	0	0	0	0	0.11	4.62	4.34	3.28	0.12	0	0.12	7.92	10.55	0.97	11.02	0.11	0	0	0	3.10	11.39	16.84	74.66						
19	N. AO	0	0	0	0	0	0.21	0	0	0	0	0	0	0.01	0.02	0.01	0.01	0.01	0.55	0	0.87	0.20	0.10	2.19	0.17	0	0	0	0.33	1.08	13.41	19.20						
20	N. PUAI	0	0	0	0	0	0.11	0	0	0	0	0	0	0.03	0.12	0.06	0.03	0.01	9.15	0.25	0	1.04	0.51	11.86	0.09	0	0	0	2.68	4.95	42.94	73.84						
21	N. B. BAN	0	0	0	0	0	0.20	0	0	0	0	0	0	0.05	0.19	0.09	0.05	0.12	12.15	0.07	1.13	0	6.45	6.96	0.15	0	0	0	3.34	28.93	14.68	74.55						
22	T. KAE	0	0	0	0	0	0.20	0	0	0	0	0	0	0.02	0.08	0.03	0.02	0.01	2.56	0.06	1.03	8.20	0	13.62	0.16	0	0	0	0.60	12.67	30.31	69.57						
23	B. KHVAO	0	0	0	0	0	0.12	0	0	0	0	0	0	0.03	0.12	0.10	0.06	0.03	13.91	0.15	12.92	1.73	11.74	0	0.09	0	0	0	2.84	8.19	51.27	103.30						
31	N. SAVAN	0.93	0.12	0.06	0.21	0.20	0.85	0.05	0.03	0.41	0.01	0.02	0	0	0.01	0.01	0	0	0.02	0.01	0.01	0.02	0.01	0.02	0	2.21	7.04	2.75	0.05	0.07	0.16	15.29						
32	C. SAENG	7.05	0.29	0.10	0.16	0.08	0.82	0	0	0.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.28	0	1.11	1.69	0	0	0.16	20.97						
33	T. TAKO	8.47	0.23	0.17	0.47	0.45	1.69	0	0	0.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25.44	1.25	0	21.42	0	0	0.20	60.25						
34	P. SARI	9.11	0.15	0.07	1.69	0.85	2.76	0.03	0.03	0.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10.97	2.15	24.78	0	0	0	0.23	53.47						
35	B. NARONG	0	0	0	0	0	0.85	0	0	0.33	0	0	0	0.02	0.53	0.02	0.05	0.01	0.52	0.03	0.23	0.33	0.10	1.14	0.28	0	0	0	5.76	5.59	15.80							
36	CHATTURAT	0	0	0	0	0	0.53	0	0	0.19	0	0	0	0.02	0.26	0.05	0.07	0.05	2.10	0.05	0.41	9.71	0.67	2.02	0.23	0	0	0	3.64	0	19.49	39.47						
37	CHAITAPHUM	0.03	0.01	0.02	0.03	0.02	0.25	0.02	0.02	0.12	0.01	0.01	0	0.09	0.24	0.15	0.09	0.06	1.65	0.26	9.06	1.14	1.40	12.08	0.19	0.05	0.06	0.06	1.06	9.51	0	37.71						

TABLE 7A-4

Table 7A-4 TRAFFIC ZONES

Zone Code	Name of Zone Center	Related Administrative Divisions		
		Changwat ^{1/}	Amphoe	Tambon (% of whole Tambon)
1	Nong Bua	N.S.	Nong Bua	(Amphoe Nong Bua (68%))
2	Nong Phai	N.S.	Nong Bua	Nong Bua (55%), Than Thaham (50%)
3	Khlong Kumlung	N.S. P.	Nong Bua Nong Phai	Nong Klap (30%) Ban Phat (28%)
4	Nong Ngu Luam	P. P.	Nong Phai Bung Sam Phun	Ban Phat (72%) Sap Mai Daeng (41%)
5	Wang Phikun	N.S. P.	Phai Sali Bung Sam Phun	Wang Nam Lat (50%) Sap Mai Daeng (22%)
6	Sap Samo Thot	P.	Bung Sam Phun	Sap Samo Thot (100%), Nong Chaeng (100%), Sap Mai Daeng (17%)
7	Sap Bon	P.	Bung Sam Phun	Kan Chu (100%)
8	Khok Prong	P.	Wichian Buri	Khok Prong (100%)
9	Wichian Buri	P.	Wichian Buri	Tha Rong (100%), Sam Yaek (100%)
10	Sa Khao	P.	Wichian Buri	Nam Ron (56%)
11	Nam Ron	P.	Wichian Buri	Nam Ron (44%)
12	Na Raya	C.	Nong Bua Daeng	Chan Thong (100%)
13	Tha Pong	C. C.	Nong Bua Rawe Thep Sathit	Wang Takhe (28%) Nayang Klak (24%)
14	Tha Kup	C.	Chatturat	Tha Kup (100%)
15	Wang Katha	C. C.	Nong Bua Rawe Thep Sathit	Wang Takhe (31%) Nayang Klak (5%)
16	Wang Takhe	C.	Nong Bua Rawe	Wang Takhe (13%)
17	Kuai Yae	C.	Nong Bua Rawe	Wang Takhe (28%)
18	Nong Bua Rawe	C.	Nong Bua Rawe	Nong Bua Rawe (100%)
19	Nong Ao	C.	Ban Khwao	Chi Bon (100%)
20	Nong Puai	C.	Ban Khwao	Talat Raeng (100%)
21	Nong Bua Ban	C.	Chatturat	Nong Bua Ban (100%)
22	Tha Kae	C.	Ban Khwao	Lum Lam Chi (100%)
23	Ban Khwao	C.	Ban Khwao	Ban Khwao (100%)
31	Nakhon Sawan	N.S.	Nakhon Sawan	-
32	Chum Saeng	N.S.	Chum Saeng	-
33	Tha Tako	N.S.	Tha Tako	-
34	Phai Sali	N.S.	Phai Sali	-
35	Bannet Narong	C.	Bannet Narong	-
36	Chatturat	C.	Chatturat	-
37	Chaiyaphum	C.	Chaiyaphum	-

Note: 1/ N.S. : Nakhon Sawan
P. : Phetchabun
C. : Chaiyaphum

Table 7A-5 ROAD LINK CHARACTERISTICS

ROAD LINK (NODE NO.)	LENGTH (km)	ROAD CONDITION								PASSENGER FARE ¹ (Bahts/person)				FREIGHT CHARGE ² (Bahts/ton)			
		WITHOUT PROJECT CASE				WITH PROJECT CASE				WITHOUT PROJECT CASE		WITH PROJECT CASE		WITHOUT PROJECT CASE		WITH PROJECT CASE	
		RAINY SEASON		DRY SEASON		RAINY SEASON		DRY SEASON		RAINY	DRY	RAINY	DRY	RAINY	DRY	RAINY	DRY
		GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON
1-2	13.0	16	2	15	10	10	54	10	54	15.0*	10.0*	3.5	3.5	179.4	89.7	39.0	39.0
1-3	21.4	16	2	15	10					20.0*	15.0*			295.3	147.7		
1-32	32.0	14	22	13	30					10.0*	8.0*			147.2	112.0		
1-33	39.0	14	22	13	30					10.0*	10.0*			179.4	136.5		
1-51	27.0	1	86	1	86					5.1	5.1			10.8	10.8		
1-63	38.0	1	86	1	86					7.2	7.2			15.2	15.2		
2-4	11.4	17	-	17	-	10	54	10	54	-	-	3.1	3.1	-	-	34.2	34.2
3-4	13.6	15	10	14	22					5.0*	7.0*			93.8	62.6		
4-5	14.6	14	22	13	30					7.0*	7.0*			67.2	51.1		
4-52	9.3	17	-	17	-	10	54	10	54	-	-	2.5	2.5	-	-	27.9	27.9
4-53	13.3	15	10	15	10					8.0*	8.0*			91.8	91.8		
5-34	25.9	14	22	13	30					8.0*	8.0*			119.1	90.7		
5-54	12.3	13	30	13	30					6.0*	6.0*			43.1	43.1		
6-53	11.4	14	22	14	22					5.0*	5.0*			52.4	52.4		
6-54	7.3	13	30	13	30					4.0*	4.0*			25.6	25.6		
6-55	5.5	1	86	1	86					3.0*	3.0*			2.2	2.2		
6-56	13.4	1	86	1	86					3.0*	3.0*			5.4	5.4		
7-8	9.5	7	70	7	70					3.0*	3.0*			24.7	24.7		
7-10	14.5	17	-	16	2					-	15.0*			-	200.1		
7-12	29.9	17	-	17	-	12	30	12	30	-	-	9.3	9.3	-	-	104.7	104.7
7-57	5.3	7	70	7	70					2.0*	2.0*			13.8	13.8		
8-9	11.5	7	70	7	70					5.0*	5.0*			29.9	29.9		
9-11	18.0	14	22	14	22					8.0*	8.0*			82.8	82.8		
9-56	7.4	4	78	4	78					3.0*	3.0*			3.0	3.0		
11-12	28.0	17	-	16	2					-	30.0*			-	386.4		
12-13	17.7	17	-	17	-	12	30	12	30	-	-	5.5	5.5	-	-	62.0	62.0
13-15	9.0	17	-	15	10	11	42	11	42	-	3.0*	2.6	2.6	-	62.1	29.7	29.7
14-35	27.3	13	30	13	30					8.5	8.5			95.6	95.6		
14-58	10.0	13	30	13	30					3.1	3.1			35.0	35.0		
15-16	6.0	13	30	13	30	11	42	11	42	2.0*	2.0*	1.7	1.7	21.0	21.0	19.8	19.8
16-17	9.0	17	-	15	10					-	5.0*			-	62.1		

Table 7A-5 ROAD LINK CHARACTERISTICS (Cont'd)

ROAD LINK (NODE NO.)	LENGTH (km)	ROAD CONDITION								PASSENGER FARE ^{1/} (Bahts/person)				FREIGHT CHARGE ^{2/} (Bahts/ton)			
		WITHOUT PROJECT CASE				WITH PROJECT CASE				WITHOUT PROJECT CASE		WITH PROJECT CASE		WITHOUT PROJECT CASE		WITH PROJECT CASE	
		RAINY SEASON		DRY SEASON		RAINY SEASON		DRY SEASON		RAINY	DRY	RAINY	DRY	RAINY	DRY	RAINY	DRY
		GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON
16-18	19.0	13	30	13	30	11	42	11	42	3.0*	3.0*	3.0	3.0	66.5	66.5	62.7	62.7
18-20	8.0	15	10	14	22	11	42	11	42	4.6	3.2	2.3	2.3	55.2	36.8	26.4	26.4
18-21	15.0	13	30	13	30					3.0*	3.0*			52.5	52.5		
18-58	11.0	13	30	13	30					3.4	3.4			38.5	38.5		
19-59	33.0	13	30	13	30					10.0*	10.0*			115.5	115.5		
20-59	6.0	13	30	13	30	10	54	10	54	1.0*	1.0*	1.0	1.0	21.0	21.0	18.0	18.0
21-22	3.5	14	22	13	30					1.4	1.1			16.1	12.3		
21-36	12.0	13	30	13	30					4.0*	4.0*			42.0	42.0		
22-23	12.0	13	30	13	30					4.0*	4.0*			42.0	42.0		
23-37	14.5	4	78	4	78					3.0*	3.0*			5.8	5.8		
23-59	5.0	4	78	4	78					1.0*	1.0*			2.0	2.0		
31-32	35.0	13	30	13	30					10.9	10.9			122.5	122.5		
31-33	45.1	4	78	4	78					10.0*	10.0*			18.0	18.0		
33-51	10.7	13	30	13	30					3.0*	3.0*			37.5	37.5		
34-51	9.8	13	30	13	30					2.0*	2.0*			34.3	34.3		
35-60	22.0	4	78	4	78					4.8	4.8			8.8	8.8		
35-67	75.0	5	62	5	62					19.5	19.5			210.0	210.0		
36-37	39.0	4	78	4	78					8.6	8.6			15.6	15.6		
36-58	21.5	13	30	13	30					6.7	6.7			75.3	75.3		
36-60	19.0	4	78	4	78					4.2	4.2			7.6	7.6		
37-68	100.0	4	78	4	78					22.0*	22.0*			40.0	40.0		
51-64	31.0	1	86	1	86					5.9	5.9			12.4	12.4		
52-53	4.0	14	22	13	30					1.6	1.2			18.4	14.0		
52-55	13.6	17	-	17	-	11	42	11	42	-	-	3.9	3.9	-	-	44.9	44.9
53-54	6.0	14	22	13	30					2.4	1.9			27.6	21.0		
55-57	12.8	17	-	15	10	10	54	10	54	-	5.0*	3.5	3.5	-	88.3	38.4	38.4
55-72	56.0	1	86	1	86					10.6	10.6			22.4	22.4		
56-67	52.0	1	86	1	86					9.9	9.9			20.8	20.8		
61-62	38.0	1	86	1	86					7.2	7.2			15.2	15.2		
61-70	108.0	2	70	2	70					25.9	25.9			280.8	280.8		
62-63	42.0	1	86	1	86					8.0*	8.0*			16.8	16.8		
63-72	55.0	5	62	5	62					14.3	14.3			154.0	154.0		

Table 7A-5 ROAD LINK CHARACTERISTICS (Cont'd)

ROAD LINK (NODE NO.)	LENGTH (km)	ROAD CONDITION								PASSENGER FARE/1 (Bahts/person)				FREIGHT CHARGE/2 (Bahts/ton)			
		WITHOUT PROJECT CASE				WITH PROJECT CASE				WITHOUT PROJECT CASE		WITH PROJECT CASE		WITHOUT PROJECT CASE		WITH PROJECT CASE	
		RAINY SEASON		DRY SEASON		RAINY SEASON		DRY SEASON		RAINY	DRY	RAINY	DRY	RAINY	DRY	RAINY	DRY
		GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	GRADE	SPEED (Km/h)	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON	SEASON
64-65	38.0	1	86	1	86					7.2	7.2			15.2	15.2		
65-66	30.0	4	78	4	78					6.6	6.6			12.0	12.0		
66-67	21.5	4	78	4	78					4.7	4.7			8.6	8.6		
68-69	12.5	4	78	4	78					2.8	2.8			5.0	5.0		
69-70	105.0	2	70	2	70					25.2	25.2			273.0	273.0		
70-71	39.0	1	86	1	86					7.4	7.4			15.6	15.6		
71-72	21.1	1	86	1	86					4.0*	4.0*			8.4	8.4		

Note: /1 Passenger fares with * mark are obtained from the bus terminal interview survey, and others are estimated based on the road length and transportation cost shown in 6-4-2.

/2 Freight charges are estimated based on the road length and transportation cost shown in 6-4-2.

TABLE 7A-6

Table 7A-6 POPULATION PROJECTION BY ZONE

(person)

ZONE	CENTER OF ZONE	WITHOUT PROJECT				WITH PROJECT		
		1979	1984	1990	1998	1984	1990	1998
1	Nong Bua	40,911	44,500	47,800	52,600	44,500	47,800	52,600
2	Nong Phai	14,143	16,400	18,900	22,800	17,800	25,100	29,400
3	Khlong Kumlung	11,273	13,100	15,100	18,300	13,100	15,100	18,300
4	Nong Ngu Luam	24,855	28,800	33,200	40,100	30,700	36,600	43,700
5	Wang Phikun	13,507	15,700	18,100	21,900	16,200	19,900	23,800
6	Sap Samo Thot	29,362	31,900	34,300	37,700	32,500	35,200	38,600
7	Sap Bon	10,983	12,700	14,600	17,700	13,200	16,900	20,200
8	Khok Prong	9,335	10,800	12,500	15,100	11,200	14,000	16,700
9	Wichian Buri	23,544	25,600	27,500	30,300	25,600	27,500	30,300
10	Sa Khao	4,385	5,600	7,300	9,200	6,500	11,400	13,500
11	Nam Ron	3,445	4,400	5,700	7,200	4,400	5,700	7,200
12	Na Raya	4,901	6,300	8,200	10,400	7,700	14,400	17,000
13	Tha Pong	3,284	4,200	5,400	6,800	5,500	11,700	14,100
14	Tha Kup	3,127	4,000	5,200	6,600	4,000	5,200	6,600
15	Wang Katha	2,389	3,000	3,900	4,900	4,200	9,600	11,100
16	Wang Takhe	880	1,100	1,400	1,800	1,700	4,300	4,900
17	Huai Yae	1,896	2,400	3,100	3,900	2,500	3,700	4,600
18	Nong Bua Rawe	12,109	15,500	20,100	25,500	16,600	23,000	28,500
19	Nong Ao	6,370	8,100	10,500	13,300	8,200	10,700	13,500
20	Non Puai	11,202	13,000	15,000	18,100	13,300	15,600	18,700
21	Nong Bua Ban	14,888	17,300	19,900	24,100	17,300	19,900	24,100
22	Tha Kae	8,814	10,200	11,800	14,300	10,200	11,800	14,300
23	Ban Khvao	19,578	21,300	22,900	25,200	21,300	22,900	25,200
	Sub Total	275,181	315,900	362,400	427,800	328,200	408,000	476,900
31	Nakhon Sawan	204,029	234,400	276,700	345,400	234,400	276,700	345,400
32	Chum Saeng	79,134	76,200	72,800	68,500	76,200	72,800	68,500
33	Tha Tako	71,610	69,000	66,000	62,200	69,000	66,000	62,200
34	Phai Saii	53,944	58,800	65,300	75,000	58,800	65,300	75,000
35	Bannet Narong	45,777	48,200	51,200	55,600	48,200	51,200	55,600
36	Chatturat	92,752	98,100	105,000	114,800	98,100	105,000	114,800
37	Chaiyaphum	153,826	184,600	229,600	307,300	184,600	229,600	307,300
	Sub Total	701,072	769,300	866,600	1,028,800	769,300	866,600	1,028,800
	Total	976,253	1,085,200	1,229,000	1,456,600	1,097,500	1,274,600	1,505,700

TABLE 7A-7

Table 7A-7 PASSENGER O/D IN 1990 (TOTAL)

(persons/day)

DESTINATION ORIGIN	(persons/day)																															
	1 NONG BUA	2 HONG PHAI	3 KHLONG KUMJONG	4 HONG NGULUAM	5 WANG PHIKUN	6 SAP SAMO THOT	7 SAP BON	8 KHOK PRONG	9 WICHIAN BURI	10 SA KHAO	11 NAM RON	12 NA RAYA	13 TEA PONG	14 TEA KUP	15 WANG KATHA	16 WANG TAKHE	17 HUAI YAE	18 NONG BUA RAWE	19 NONG AO	20 NON PUA I	21 NONG BUA BAN	22 TEA KAE	23 BAN KHVAO	31 NAKHON SAWAN	32 CHUMSAENG	33 TEA TAKO	34 PHAI SARI	35 BANGNETNARONG	36 CHATTURAT	37 CHAIYAPHUM	TOTAL	
1 N. BUA	-	472	12	184	10	251	10	3	43			1										1	323	518	575	548			20	2,973		
2 N. PHAI	960	-	20	405	8	375	5	3	34			1												113	269	260	249			11	2,713	
3 K. KUMJONG	54	18	-	183	19	308	6	3	42			1												14	21	26	16			7	719	
4 N. N. LUAM	794	94	59	-	87	459	21	10	296	1		2	1					1					1	81	45	60	154	3	9	35	3,345	
5 Y. PHIKUN	97	7	10	355	-	451	3	2	32			1												78	11	183	401			9	1,641	
6 S. S. THOT	80	32	23	475	37	-	70	34	715	5	6	8	3	1	2	1	1	6	1	2	3	2	6	69	32	31	42	10	18	46	1,760	
7 S. BON	11	3	2	70	2	492	-	144	820	2	5	3	1					1		1	1		1	10	5	5	5		6	25	1,615	
8 K. PRONG	5	2	1	69	2	298	224	-	991		5	5						1			1		1	7	5	3	3			8	1,631	
9 Y. BURI	9	5	2	54	5	653	229	231	-	2	5	6	1			1		1		1	1		1	36	8	8	9	3	9	41	1,321	
10 S. KHAO		1		2		21	5	1	19	-														5						6	60	
11 N. RON	2	1	1	3	1	84	7	8	299		-	1												2						3	414	
12 N. RAYA	3	1	1	6	1	56	8	9	115		1	-	19		2	2		9		2	3	1	3	8				5	16	59	332	
13 T. PONG		1		2		25	2	1	15			20	-	1	72	46		26		6	7	2	28	6				7	69	167	504	
14 T. KUP						2			2					-	1			55		6	7	1	25	2				59	52	125	338	
15 Y. KATHA				1		15	1	1	9			3	64	1	-	37	1	122	1	9	10	2	45	3				27	87	200	642	
16 W. TAKHE				1		5			5			2	24	1	21	-	12	56		8	8	1	29	1				18	34	63	290	
17 H. YAE						3			2				1		1	9	-	11		1	5		8	1				2	19	23	87	
18 N. B. RAWE				2		18	1	1	14			2	7	106	111	85	3	-	3	182	237	21	249	3				71	255	442	1,815	
19 N. AO						3												7	-	9	2	1	24	2				3	12	144	208	
20 N. PUA I						3			5			1	1	2	2	1		146	3	-	20	8	182	2				45	86	650	1,158	
21 N. B. BAN						7	1	1	8			1	2	3	2	1	2	249	1	28	-	128	136	5				66	562	284	1,486	
22 T. KAE						5							1	1	1			33	1	12	96	-	159	2				7	148	353	819	
23 B. KHVAO	1			1		14	1	1	9			1	2	3	3	2	1	324	3	295	38	266	-	3				70	184	1,150	2,375	
31 N. SAVAN	26	8	2	8	6	24	1	1	11	1	1	1	1					1		1	1	1	1	-	61	195	76	1	2	7	440	
32 C. SAENG	52	6	1	3	1	12			3															68	-	8	12			2	169	
33 T. TAKO	56	5	1	5	3	11			3															168	8	-	141			2	405	
34 P. CARI	59	4		11	6	18			5															71	14	162	-			2	350	
35 B. NARONG						5			1					2				3		1	1		7	1				-	29	29	80	
36 CHATTURAT				1		8			3				1	2	1	1		24		6	102	7	21	3				38	-	205	424	
37 CHAIYAPHUM	2	1	1	3	1	17	3	1	14			3	5	6	6	3	1	47	6	211	26	33	278	7	2	2	2	2	25	219	-	926
TOTAL	2,214	660	138	1,845	190	4,773	599	456	3,515	11	21	66	136	131	227	191	23	1,124	20	782	571	475	1,207	1,096	998	1,518	1,658	461	1,817	4,118	31,038	

TABLE 7A-8

Table 7A-8 AGRICULTURAL PRODUCTS TO BE SHIPPED FROM PRODUCTION ZONES

(ton)

ZONE	1984						1990						1998					
	RAINY SEASON			DRY SEASON			RAINY SEASON			DRY SEASON			RAINY SEASON			DRY SEASON		
	TOTAL	MAIZE	OTHER CROPS	TOTAL	PADDY	OTHER CROPS	TOTAL	MAIZE	OTHER CROPS	TOTAL	PADDY	OTHER CROPS	TOTAL	MAIZE	OTHER CROPS	TOTAL	PADDY	OTHER CROPS
2	9,290	8,790	500	2,350	1,370	980	16,280	15,420	860	3,420	1,720	1,700	19,120	18,100	1,020	3,880	1,870	2,010
3	16,980	16,150	830	6,560	5,310	1,250	17,050	16,230	820	6,650	5,390	1,260	17,120	16,290	830	6,740	5,480	1,260
4	53,590	52,540	1,050	3,630	0	3,630	56,330	55,210	1,120	3,840	0	3,840	57,380	56,230	1,150	3,930	0	3,930
5	22,490	21,500	990	3,620	2,300	1,320	25,410	24,280	1,130	4,000	2,490	1,510	27,300	26,090	1,210	4,230	2,600	1,630
6	11,010	10,300	710	1,970	0	1,970	11,490	10,750	740	2,060	0	2,060	11,740	10,970	770	2,120	0	2,120
7	9,790	9,500	290	7,640	6,800	840	12,590	12,220	370	8,270	7,190	1,080	13,760	13,360	400	8,620	7,440	1,180
8	8,760	7,470	1,290	7,940	4,610	3,330	10,070	8,580	1,490	8,600	4,780	3,820	10,590	9,020	1,570	8,920	4,880	4,040
10	4,800	4,520	280	1,060	280	780	9,370	8,820	550	1,800	300	1,500	10,960	10,320	640	2,080	300	1,780
12	12,030	7,460	4,570	2,260	0	2,260	21,750	14,180	7,570	3,410	0	3,410	27,310	17,170	10,140	4,280	0	4,280
13	9,320	2,520	6,800	2,650	0	2,650	20,840	9,280	11,560	4,400	0	4,400	27,460	11,850	15,610	5,730	0	5,730
15	6,130	780	5,350	1,980	0	1,980	26,510	3,770	22,740	7,730	0	7,730	39,410	4,840	34,570	11,160	0	11,160
16	3,420	110	3,310	1,330	0	1,330	15,140	430	14,710	5,560	0	5,560	22,880	540	22,340	7,890	0	7,890
17	8,790	330	8,460	3,880	260	3,620	12,760	450	12,310	5,390	280	5,110	16,410	550	15,860	6,710	290	6,420
18	38,040	280	37,760	17,100	3,520	13,580	54,640	350	54,290	22,450	3,830	18,620	70,910	380	70,530	27,020	3,980	23,040
19	4,270	70	4,200	3,390	1,180	2,210	7,460	120	7,340	5,030	1,230	3,800	11,370	180	11,190	7,010	1,270	5,740
20	12,920	200	12,720	12,800	6,310	6,490	16,820	240	16,580	14,660	6,770	7,890	21,580	270	21,310	16,480	7,030	9,450
21	11,910	70	11,840	25,630	19,550	6,080	12,330	70	12,260	26,350	20,160	6,190	12,940	70	12,870	27,040	20,710	6,330
Total	243,540	142,570	100,970	105,790	51,490	54,300	346,830	180,390	166,440	133,620	54,140	79,480	418,240	196,220	222,020	153,830	55,850	97,980

TABLE 7A-9

TABLE 7A-9 FUTURE TRAFFIC BY TYPE OF TRAFFIC (1990)

(vehicles/day)

VEHICLE TYPE	TYPE OF TRAFFIC	ROAD LINKS (Node No.)												
		1-2	2-4	4-52	52-55	55-57	57-7	7-12	12-13	13-15	15-16	16-18	18-20	20-59
P/C	N + D	53	29	66	66	77	28	4	2	3	6	8	20	30
	DV	12	7	7	7	5	5	3	2	4	6	7	5	5
	I	34	36	26	26	8	8	10	4	5	5	5	3	3
	Total	99	72	99	99	90	41	17	8	12	17	20	28	38
L/B	N + D	269	128	348	348	455	173	28	3	6	10	13	33	48
	DV	72	43	44	44	27	27	21	2	6	10	11	8	7
	I	207	213	157	157	51	51	59	7	7	7	7	6	6
	Total	548	384	549	549	533	251	108	12	19	27	31	47	61
H/B	N + D	29	14	38	38	118	29	5	15	22	37	46	118	172
	DV	8	4	5	5	3	3	2	8	21	35	40	27	27
	I	23	23	17	17	6	6	6	23	27	26	25	20	19
	Total	60	41	60	60	127	38	13	46	70	98	111	165	218
L/T	N + D	132	60	187	205	150	106	34	24	38	57	75	172	245
	DV	37	20	21	22	31	31	22	14	25	49	64	68	70
	I	96	98	72	72	23	23	27	23	26	25	25	20	18
	Total	265	178	280	299	204	160	83	61	89	131	164	260	333
M/T	N + D	56	26	77	85	59	44	14	11	16	24	32	73	103
	DV	16	8	9	10	12	12	9	5	11	20	27	28	30
	I	39	41	30	30	10	10	11	9	11	11	10	8	8
	Total	111	75	116	125	81	66	34	25	38	55	69	109	141
H/T	N + D	21	14	25	27	22	13	5	4	6	8	10	20	28
	DV	3	2	2	2	3	3	2	2	2	6	7	7	8
	I	9	9	7	7	2	2	3	2	3	3	3	2	2
	Total	33	25	34	36	27	18	10	8	11	17	20	29	38
Sub-Total	N + D	560	271	741	769	881	393	90	59	91	142	184	436	626
	DV	148	84	88	90	81	81	59	33	69	126	165	143	147
	I	408	420	309	309	100	100	116	68	79	77	75	59	56
	Total	1,116	775	1,138	1,168	1,062	574	265	160	239	345	424	638	829
H/C	N + D	310	147	409	400	155	155	32	32	51	91	115	300	438
	DV	83	49	51	51	32	32	24	21	55	91	103	71	69
	I	238	245	180	180	59	59	68	59	70	68	65	51	49
	Total	631	441	631	631	246	246	124	112	176	250	283	422	556
Total	N + D	870	418	1,141	1,369	1,036	548	122	91	142	233	299	736	1,064
	DV	231	133	139	141	113	113	83	54	124	217	268	214	216
	I	646	665	489	489	159	159	184	127	149	145	140	110	105
	Total	1,747	1,216	1,769	1,799	1,308	820	389	272	415	595	707	1,060	1,385

Note:
 N : Normal Traffic
 D : Diverted Traffic
 DV: Developed Traffic
 I : Induced Traffic

FIGURE 7A-1

FIGURE 7A-1 FLOW CHART OF TRAFFIC FORECAST

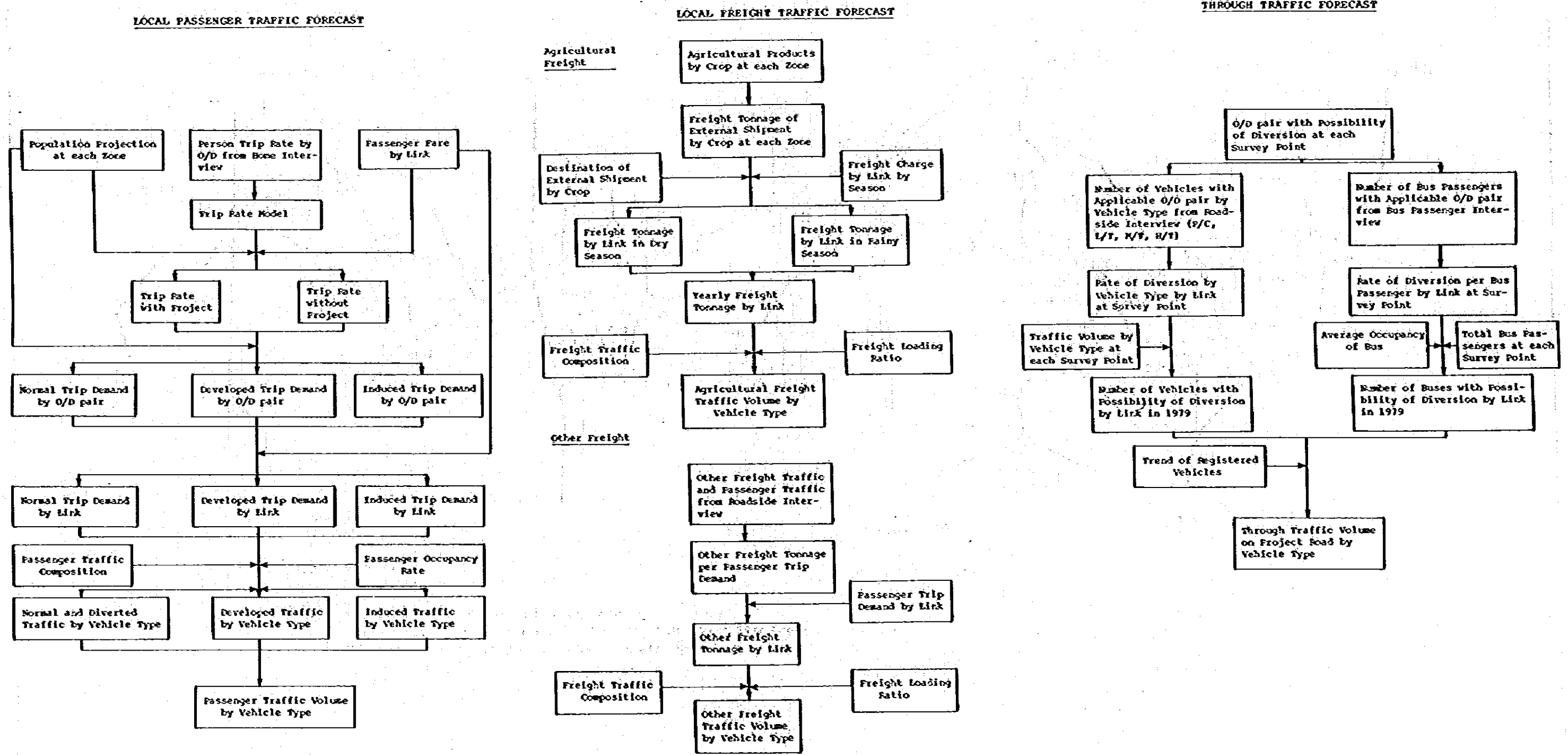
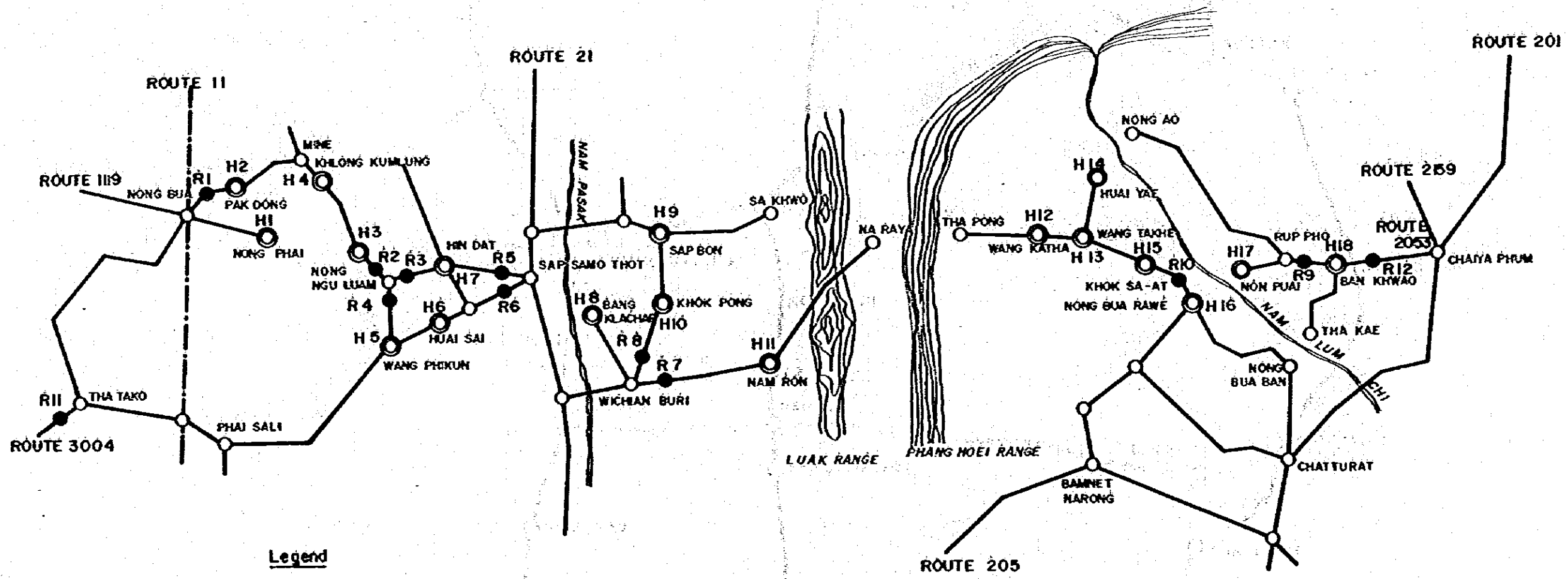


FIGURE 7A-2 TRAFFIC SURVEY FOR LOCAL TRAFFIC

TRAFFIC SURVEY FOR LOCAL TRAFFIC

FIGURE 7A-2



Legend

- : Home Interview
- : R1~R4, R7~R10 ----- Roadside Interview, 8hr Manual Traffic Count
- : R5, R6 ----- Roadside Interview, 8hr Manual Traffic Count, 24hr Automatic Traffic Count
- : R11, R12 ----- 8hr Manual Traffic Count, 24hr Automatic Traffic Count

FIGURE 7A-3 TRAFFIC SURVEY FOR THROUGH TRAFFIC

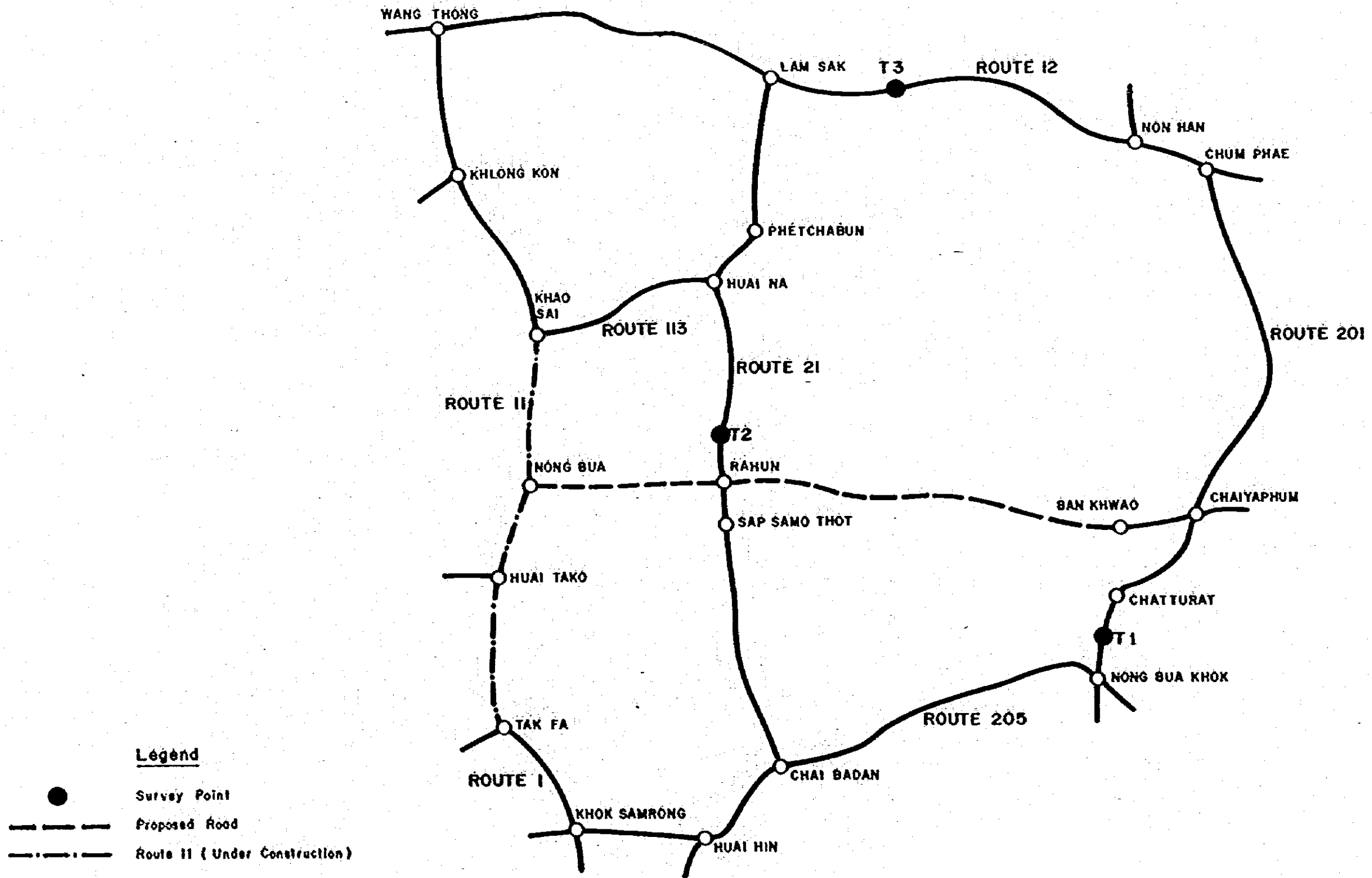


Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 10 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.2200	0.0523	0.0083	0.0333	0.2371	-	0.5510
	Gravel	0.2570	0.0650	0.0136	0.0400	0.2680	-	0.6436
	Earth	0.2994	0.0786	0.0257	0.0667	0.3629	-	0.8333
P/C	As-con	0.5490	0.0411	0.0206	0.1145	0.7830	-	1.5082
	Gravel	0.6419	0.0511	0.0335	0.1373	0.8848	-	1.7486
	Earth	0.7475	0.0618	0.0629	0.2290	1.1980	-	2.2992
L/B	As-con	0.5758	0.0425	0.0442	0.1850	1.8520	-	2.6995
	Gravel	0.6574	0.0528	0.0717	0.2503	2.2735	-	3.3057
	Earth	0.7679	0.0744	0.1350	0.3701	2.9262	-	4.2736
H/B	As-con	2.1119	0.0986	0.1576	0.5885	4.8374	1.1022	8.8962
	Gravel	2.7900	0.1233	0.2556	0.7963	5.6871	1.1022	10.7545
	Earth	3.3792	0.1726	0.4813	1.1771	7.3637	1.1022	13.6761
L/T	As-con	0.5758	0.0425	0.0442	0.1810	2.0371	-	2.8806
	Gravel	0.6574	0.0528	0.0717	0.2449	2.5006	-	3.5274
	Earth	0.7679	0.0744	0.1350	0.3619	3.2187	-	4.5579
H/T	As-con	1.8234	0.0930	0.1256	0.4133	3.8505	0.6017	6.9075
	Gravel	2.4087	0.1166	0.2037	0.5592	4.5269	0.6017	8.4165
	Earth	2.9175	0.1628	0.3836	0.8266	5.8614	0.6017	10.7536
H/T	As-con	2.0509	0.0930	0.1766	0.4714	4.1629	0.6799	7.6347
	Gravel	2.7094	0.1163	0.2863	0.6378	4.8941	0.6799	9.3238
	Earth	3.2816	0.1628	0.5391	0.9429	6.3369	0.6799	11.9432

Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC OPERATING COST; MID 1979)

SPEED VALUE 16 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1945	0.0453	0.0083	0.0349	0.2371	-	0.5201
	Gravel	0.2266	0.0565	0.0136	0.0421	0.2680	-	0.6068
	Earth	0.2639	0.0678	0.0246	0.0697	0.3558	-	0.7818
P/C	As-con	0.4856	0.0355	0.0206	0.1197	0.7830	-	1.4444
	Gravel	0.5658	0.0446	0.0335	0.1444	0.8848	-	1.6731
	Earth	0.6587	0.0534	0.0601	0.2395	1.1745	-	2.1862
L/B	As-con	0.5278	0.0367	0.0442	0.1958	1.4446	-	2.2491
	Gravel	0.5998	0.0459	0.0717	0.2639	1.6113	-	2.5926
	Earth	0.7006	0.0644	0.1290	0.3918	2.1206	-	3.4064
H/B	As-con	1.7785	0.0912	0.1576	0.6232	3.6706	0.7873	7.1084
	Gravel	2.3455	0.1110	0.2556	0.8395	4.3503	0.7873	8.6892
	Earth	2.8456	0.1599	0.4596	1.2464	5.8004	0.7873	11.2992
L/T	As-con	0.5278	0.0367	0.0442	0.1916	1.5889	-	2.3892
	Gravel	0.5998	0.0459	0.0717	0.2581	1.7723	-	2.7478
	Earth	0.7006	0.0644	0.1290	0.3833	2.1325	-	3.6098
M/T	As-con	1.5354	0.0860	0.1256	0.4377	2.9217	0.4297	5.5361
	Gravel	2.0250	0.1047	0.2037	0.5896	3.4627	0.4297	6.8154
	Earth	2.4568	0.1508	0.3663	0.8753	4.6171	0.4297	8.8960
H/T	As-con	1.7270	0.0860	0.1766	0.4991	3.1587	0.4856	6.1330
	Gravel	2.2776	0.1047	0.2863	0.6726	3.7436	0.4856	7.5704
	Earth	2.7634	0.1508	0.5147	0.9984	4.9916	0.4856	9.9045

Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 24 km/hr

		(Baht/km)						
VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1742	0.0410	0.0088	0.0369	0.2371	-	0.4980
	Gravel	0.2029	0.0512	0.0141	0.0441	0.2680	-	0.5803
	Earth	0.2335	0.0617	0.0250	0.0738	0.3485	-	0.7425
P/C	As-con	0.4349	0.0322	0.0216	0.1268	0.7830	-	1.3985
	Gravel	0.5067	0.0403	0.0345	0.1515	0.8848	-	1.6178
	Earth	0.5828	0.0485	0.0611	0.2537	1.1511	-	2.0972
L/B	As-con	0.4750	0.0333	0.0464	0.2067	1.0741	-	1.8355
	Gravel	0.5422	0.0416	0.0740	0.2803	1.2270	-	2.1651
	Earth	0.6239	0.0584	0.1312	0.4135	1.6251	-	2.8521
H/B	As-con	1.4673	0.0839	0.1658	0.6578	2.5830	0.5904	5.5482
	Gravel	1.9342	0.1045	0.2637	0.8915	3.1381	0.5904	6.9224
	Earth	2.2786	0.1469	0.4677	1.3156	4.2710	0.5904	9.0702
L/T	As-con	0.4750	0.0333	0.0464	0.2023	1.1815	-	1.9385
	Gravel	0.5422	0.0416	0.0740	0.2741	1.3496	-	2.2815
	Earth	0.6239	0.0584	0.1312	0.4046	1.7876	-	3.0057
M/T	As-con	1.2668	0.0791	0.1321	0.4620	2.0559	0.3223	4.3182
	Gravel	1.6698	0.0986	0.2101	0.6260	2.4978	0.3223	5.4246
	Earth	1.9673	0.1387	0.3727	0.9239	3.3997	0.3223	7.1246
H/T	As-con	1.4248	0.0791	0.1858	0.5269	2.2227	0.3642	4.8035
	Gravel	1.8783	0.0986	0.2954	0.7141	2.7005	0.3642	6.0511
	Earth	2.2128	0.1387	0.5238	1.0539	3.6754	0.3642	7.9688

TABLE 8A-1

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 32 km/hr

		(Baht/km)						
VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1573	0.0368	0.0100	0.0385	0.2371	-	0.4797
	Gravel	0.1827	0.0457	0.0161	0.0462	0.2680	-	0.5587
	Earth	0.2080	0.0551	0.0261	0.0770	0.3414	-	0.7076
P/C	As-con	0.3927	0.0289	0.0245	0.1321	0.7830	-	1.3612
	Gravel	0.4560	0.0360	0.0395	0.1586	0.8848	-	1.5749
	Earth	0.5194	0.0434	0.0640	0.2642	1.1276	-	2.0186
L/B	As-con	0.4271	0.0298	0.0526	0.2177	0.8705	-	1.5977
	Gravel	0.4846	0.0372	0.0846	0.2938	0.9630	-	1.8632
	Earth	0.5519	0.0525	0.1372	0.4354	1.2918	-	2.4688
H/B	As-con	1.2005	0.0765	0.1877	0.6924	2.1185	0.4428	4.7184
	Gravel	1.5561	0.0957	0.3018	0.9348	2.6283	0.4428	5.9595
	Earth	1.8563	0.1337	0.4894	1.3849	3.4553	0.4428	7.7624
L/T	As-con	0.4271	0.0298	0.0526	0.2129	0.9574	-	1.6798
	Gravel	0.4846	0.0372	0.0846	0.2874	1.0593	-	1.9531
	Earth	0.5519	0.0525	0.1372	0.4258	1.4209	-	2.5883
H/T	As-con	1.0364	0.0721	0.1494	0.4862	1.6863	0.2418	3.6722
	Gravel	1.3436	0.0902	0.2406	0.6565	2.0921	0.2418	4.6648
	Earth	1.6026	0.1261	0.3901	0.9725	2.7504	0.2418	6.0835
H/T	As-con	1.1658	0.0721	0.2101	0.5546	1.8230	0.2731	4.0987
	Gravel	1.5111	0.0902	0.3381	0.7488	2.2618	0.2731	5.2231
	Earth	1.8027	0.1261	0.5483	1.1093	2.9734	0.2731	6.8329

TABLE 8A-1

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 40 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1471	0.0352	0.0113	0.0405	0.2371	-	0.4712
	Gravel	0.1708	0.0442	0.0181	0.0487	0.2680	-	0.5498
	Earth	0.1954	0.0531	0.0270	0.0810	0.3296	-	0.6852
P/C	As-con	0.3673	0.0278	0.0277	0.1392	0.7830	-	1.3450
	Gravel	0.4265	0.0347	0.0445	0.1674	0.8848	-	1.5579
	Earth	0.4856	0.0418	0.0661	0.2784	1.0884	-	1.9603
L/B	As-con	0.4079	0.0287	0.0595	0.2285	0.7408	-	1.4654
	Gravel	0.4606	0.0357	0.0954	0.3075	0.8565	-	1.7557
	Earth	0.5278	0.0502	0.1419	0.4571	1.0648	-	2.2418
H/B	As-con	1.0670	0.0704	0.2121	0.7270	1.7900	0.3562	4.2227
	Gravel	1.3894	0.0883	0.3398	0.9780	2.1978	0.3562	5.3495
	Earth	1.6006	0.1233	0.5058	1.4541	2.9681	0.3562	7.0081
L/T	As-con	0.4079	0.0287	0.0595	0.2235	0.8148	-	1.5344
	Gravel	0.4115	0.0357	0.0954	0.3007	0.9421	-	1.7854
	Earth	0.5278	0.0502	0.1419	0.4472	1.1713	-	2.3384
M/T	As-con	0.9212	0.0665	0.1690	0.5105	1.4248	0.1944	3.2864
	Gravel	1.1996	0.0832	0.2708	0.6869	1.7493	0.1944	4.1842
	Earth	1.3819	0.1163	0.4031	1.0212	2.3625	0.1944	5.4794
H/T	As-con	1.0362	0.0665	0.2375	0.5824	1.5404	0.2197	3.6827
	Gravel	1.3494	0.0832	0.3807	0.7835	1.8914	0.2197	4.7079
	Earth	1.5544	0.1163	0.5664	1.1648	2.5542	0.2197	6.1758

TABLE 8A-1

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 48 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1438	0.0338	0.0130	0.0426	0.2371	-	0.4703
	Gravel	0.1657	0.0424	0.0207	0.0513	0.2680	-	0.5481
	Earth	0.1860	0.0509	0.0282	0.0851	0.3201	-	0.6703
P/C	As-con	0.3589	0.0266	0.0316	0.1462	0.7830	-	1.3463
	Gravel	0.4138	0.0334	0.0505	0.1762	0.8848	-	1.5587
	Earth	0.4645	0.0401	0.0691	0.2924	1.0571	-	1.9232
L/B	As-con	0.4079	0.0275	0.0678	0.2394	0.6435	-	1.3861
	Gravel	0.4558	0.0344	0.1083	0.3237	0.7501	-	1.6723
	Earth	0.5182	0.0482	0.1480	0.4789	0.8936	-	2.0869
H/B	As-con	1.0003	0.0665	0.2420	0.7616	1.5634	0.2951	3.9289
	Gravel	1.3005	0.0834	0.3962	1.0300	1.9372	0.2951	5.0324
	Earth	1.5005	0.1165	0.5275	1.5233	2.3564	0.2951	6.3193
L/T	As-con	0.4079	0.0275	0.0678	0.2343	0.7078	-	1.4453
	Gravel	0.4558	0.0344	0.1083	0.3167	0.8250	-	1.7402
	Earth	0.5182	0.0482	0.1480	0.4685	0.9829	-	2.1658
M/T	As-con	0.8683	0.0627	0.1928	0.5348	1.2444	0.1611	3.0594
	Gravel	1.1228	0.0786	0.3077	0.7233	1.5419	0.1611	3.9354
	Earth	1.2954	0.1097	0.4204	1.0698	1.8757	0.1611	4.9321
H/T	As-con	0.9714	0.0627	0.2710	0.6101	1.3453	0.1821	3.4426
	Gravel	1.2629	0.0786	0.4325	0.8251	1.6671	0.1821	4.4483
	Earth	1.4571	0.1097	0.5909	1.2203	2.0278	0.1821	5.5879

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 56 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1455	0.0324	0.0145	0.0446	0.2371	-	0.4741
	Gravel	0.1647	0.0407	0.0233	0.0539	0.2680	-	0.5533
	Earth	0.1843	0.0489	0.0298	0.0892	0.3083	-	0.6605
P/C	As-con	0.3631	0.0255	0.0356	0.1532	0.7830	-	1.3604
	Gravel	0.4181	0.0321	0.0569	0.1850	0.8848	-	1.5769
	Earth	0.4603	0.0385	0.0730	0.3066	1.0180	-	1.8964
L/B	As-con	0.4174	0.0264	0.0762	0.2503	0.5741	-	1.3444
	Gravel	0.4655	0.0331	0.1221	0.3374	0.6620	-	1.6201
	Earth	0.5182	0.0464	0.1564	0.5006	0.7639	-	1.9855
H/B	As-con	0.9893	0.0616	0.2719	0.7963	1.3594	0.2539	3.7324
	Gravel	1.2893	0.0770	0.4351	1.0733	1.6993	0.2539	4.8279
	Earth	1.4783	0.1079	0.5574	1.5926	1.9598	0.2539	5.9499
L/T	As-con	0.4174	0.0264	0.0762	0.2449	0.6315	-	1.3964
	Gravel	0.4655	0.0331	0.1221	0.3300	0.7282	-	1.6789
	Earth	0.5182	0.0464	0.1564	0.4897	0.8402	-	2.0509
M/T	As-con	0.8540	0.0581	0.2167	0.5592	1.0821	0.1385	2.9086
	Gravel	1.1131	0.0726	0.3467	0.7563	1.3527	0.1385	3.7772
	Earth	1.2763	0.1019	0.4443	1.1184	1.5600	0.1385	4.6394
H/T	As-con	0.9607	0.0581	0.3046	0.6378	1.1699	0.1566	3.2877
	Gravel	1.2521	0.0726	0.4867	0.8597	1.4623	0.1566	4.2900
	Earth	1.4357	0.1019	0.6244	1.2758	1.6866	0.1566	5.2810

TABLE 8A-1

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 64 km/hr

		(Baht/km)						
VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
H/C	As-con	0.1505	0.0310	0.0166	0.0467	0.2371	-	0.4819
	Gravel	0.1725	0.0387	0.0266	0.0559	0.2680	-	0.5617
	Earth	-	-	-	-	-	-	-
P/C	As-con	0.3757	0.0245	0.0406	0.1603	0.7830	-	1.3841
	Gravel	0.4308	0.0304	0.0650	0.1920	0.8848	-	1.6030
	Earth	-	-	-	-	-	-	-
L/B	As-con	0.4414	0.0252	0.0869	0.2612	0.4953	-	1.3100
	Gravel	0.4943	0.0315	0.1396	0.3537	0.5926	-	1.6117
	Earth	-	-	-	-	-	-	-
H/B	As-con	1.0225	0.0567	0.3099	0.8309	1.2688	0.2224	3.7112
	Gravel	1.3338	0.0709	0.4976	1.1196	1.5294	0.2224	4.7737
	Earth	-	-	-	-	-	-	-
L/T	As-con	0.4414	0.0252	0.0869	0.2555	0.5449	-	1.3539
	Gravel	0.4943	0.0315	0.1396	0.3459	0.6519	-	1.6632
	Earth	-	-	-	-	-	-	-
H/T	As-con	0.8828	0.0534	0.2470	0.5835	1.0099	0.1213	2.8979
	Gravel	1.1515	0.0670	0.3966	0.7901	1.2174	0.1213	3.7439
	Earth	-	-	-	-	-	-	-
H/T	As-con	0.9930	0.0534	0.3472	0.6656	1.0918	0.1372	3.2882
	Gravel	1.2952	0.0670	0.5573	0.9014	1.3161	0.1372	4.2742
	Earth	-	-	-	-	-	-	-

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 72 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1590	0.0296	0.0188	0.0487	0.2371	-	0.4932
	Gravel	0.1843	0.0370	0.0300	0.0584	0.2680	-	0.5777
	Earth	-	-	-	-	-	-	-
P/C	As-con	0.3970	0.0234	0.0459	0.1674	0.7830	-	1.4167
	Gravel	0.4603	0.0291	0.0733	0.2008	0.8848	-	1.6483
	Earth	-	-	-	-	-	-	-
L/B	As-con	0.4799	0.0241	0.0984	0.2721	0.4630	-	1.3375
	Gravel	0.5422	0.0300	0.1571	0.3673	0.5371	-	1.6337
	Earth	-	-	-	-	-	-	-
H/B	As-con	1.1116	0.0522	0.3507	0.8655	1.1328	0.1967	3.7095
	Gravel	1.4673	0.0650	0.5601	1.1685	1.4047	0.1967	4.8623
	Earth	-	-	-	-	-	-	-
L/T	As-con	0.4799	0.0241	0.0984	0.2662	0.5093	-	1.3779
	Gravel	0.5422	0.0300	0.1571	0.3594	0.5907	-	1.6794
	Earth	-	-	-	-	-	-	-
M/T	As-con	0.9596	0.0493	0.2795	0.6078	0.9017	0.1074	2.9053
	Gravel	1.2668	0.0614	0.4464	0.8205	1.1181	0.1074	3.8206
	Earth	-	-	-	-	-	-	-
H/T	As-con	1.0795	0.0493	0.3928	0.6933	0.9749	0.1214	3.3112
	Gravel	1.4248	0.0614	0.6274	0.9360	1.2089	0.1214	4.3799
	Earth	-	-	-	-	-	-	-

Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)
SPEED VALUE 80 km/hr

		(Baht/km)						
VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND INTEREST	OVERHEAD	TOTAL
M/C	As-con	0.1691	0.0282	0.0216	0.0513	0.2371	-	0.5073
	Gravel	0.1979	0.0352	0.0346	0.0616	0.2680	-	0.5973
	Earth	-	-	-	-	-	-	-
P/C	As-con	0.4222	0.0222	0.0530	0.1762	0.7830	-	1.4566
	Gravel	0.4940	0.0278	0.0847	0.2113	0.8848	-	1.7026
	Earth	-	-	-	-	-	-	-
L/B	As-con	0.5278	0.0230	0.1137	0.2830	0.4259	-	1.3734
	Gravel	0.5998	0.0287	0.1816	0.3809	0.4953	-	1.6863
	Earth	-	-	-	-	-	-	-
H/B	As-con	1.2337	0.0493	0.4052	0.9001	1.0196	0.1771	3.7850
	Gravel	1.6228	0.0616	0.6472	1.2117	1.2801	0.1771	5.0005
	Earth	-	-	-	-	-	-	-
L/T	As-con	0.5278	0.0230	0.1137	0.2768	0.4685	-	1.4098
	Gravel	0.5998	0.0287	0.1816	0.3727	0.5449	-	1.7277
	Earth	-	-	-	-	-	-	-
M/T	As-con	1.0652	0.0465	0.3229	0.6321	0.8115	0.0967	2.9749
	Gravel	1.4010	0.0581	0.5157	0.8509	1.0189	0.0967	3.9413
	Earth	-	-	-	-	-	-	-
H/T	As-con	1.1981	0.0465	0.4538	0.7210	0.8774	0.1091	3.4059
	Gravel	1.5756	0.0581	0.7249	0.9707	1.1015	0.1091	4.5399
	Earth	-	-	-	-	-	-	-

TABLE 8A-1

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Table 8A-1 VEHICLE OPERATING COSTS (ECONOMIC COST, MID 1979)

SPEED VALUE 88 km/hr

(Baht/km)

VEHICLE TYPE	ROAD CLASS	FUEL	OIL	TYRES	REPAIR AND MAINTENANCE	DEPRECIATION AND MAINTENANCE	OVERHEAD	TOTAL
M/C	As-con	0.1810	0.0299	0.0252	0.0528	0.2371	-	0.5260
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
P/C	As-con	0.4518	0.0235	0.0615	0.1814	0.7830	-	1.5012
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
L/B	As-con	0.5758	0.0243	0.1320	0.2938	0.3889	-	1.4148
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
H/B	As-con	1.3338	0.0577	0.4704	0.9348	0.9289	0.1614	3.8870
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
L/T	As-con	0.5758	0.0243	0.1320	0.2874	0.4278	-	1.4473
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
M/T	As-con	1.1515	0.0544	0.3749	0.6565	0.7394	0.0880	3.0647
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-
H/T	As-con	1.2952	0.0544	0.5268	0.7488	0.7994	0.0994	3.5240
	Gravel	-	-	-	-	-	-	-
	Earth	-	-	-	-	-	-	-

TABLE 8A-2

Table 8A-2 SUMMARY OF VEHICLE OPERATING COSTS ON LEVEL TANGENT ROAD

		(Bahts/km)										
VEHICLE TYPE	ROAD CLASS	SPEED VALUE (km/hr)										
		10	16	24	32	40	48	56	64	72	80	88
M/C	As-con	0.5510	0.5201	0.4980	0.4797	0.4712	0.4703	0.4741	0.4819	0.4932	0.5073	0.5260
	BST	0.5649	0.5331	0.5103	0.4916	0.4830	0.4820	0.4860	0.4939	0.5059	0.5208	-
	Gravel	0.6436	0.6068	0.5803	0.5587	0.5498	0.5481	0.5533	0.5617	0.5777	0.5973	-
	Earth	0.8333	0.7818	0.7425	0.7076	0.6852	0.6703	0.6605	-	-	-	-
P/C	As-con	1.5082	1.4444	1.3985	1.3612	1.3450	1.3463	1.3604	1.3841	1.4167	1.4566	1.5012
	BST	1.5443	1.4787	1.4314	1.3933	1.3769	1.3782	1.3929	1.4169	1.4514	1.4935	-
	Gravel	1.7486	1.6731	1.6178	1.5749	1.5579	1.5587	1.5769	1.6030	1.6483	1.7026	-
	Earth	2.2992	2.1862	2.0972	2.0186	1.9603	1.9232	1.8964	-	-	-	-
L/B	As-con	2.6995	2.2491	1.8355	1.5977	1.4654	1.3861	1.3444	1.3100	1.3375	1.3734	1.4148
	BST	2.7094	2.3006	1.8849	1.6375	1.5089	1.4290	1.3858	1.3553	1.3819	1.4203	-
	Gravel	3.3057	2.5926	2.1651	1.8632	1.7557	1.6723	1.6201	1.6117	1.6337	1.6863	-
	Earth	4.2736	3.4064	2.8521	2.4688	2.2418	2.0869	1.9855	-	-	-	-
H/B	As-con	8.8962	7.1084	5.5482	4.7184	4.2227	3.9289	3.7324	3.7112	3.7095	3.7850	3.8870
	BST	9.1749	7.3455	5.7543	4.9046	4.3917	4.0944	3.8967	3.8706	3.8824	3.9673	-
	Gravel	10.7545	8.6892	6.9224	5.9595	5.3495	5.0324	5.8279	4.7737	4.8623	5.0005	-
	Earth	13.6761	11.2992	9.0702	7.7624	7.0081	6.3193	5.9499	-	-	-	-
L/T	As-con	2.8806	2.3892	1.9385	1.6798	1.5344	1.4453	1.3964	1.3539	1.3779	1.4098	1.4473
	BST	2.9776	2.4430	1.9900	1.7208	1.5721	1.4895	1.4388	1.4003	1.4231	1.4575	-
	Gravel	3.5274	2.7478	2.2815	1.9531	1.7854	1.7402	1.6798	1.6632	1.6794	1.7277	-
	Earth	4.5579	3.6098	3.0057	2.5883	2.3384	2.1658	2.0509	-	-	-	-
M/T	As-con	6.9075	5.5361	4.3182	3.6722	3.2864	3.0594	2.9086	2.8979	2.9053	2.9749	3.0647
	BST	7.1339	5.7280	4.4842	3.8211	3.4211	3.1908	3.0389	3.0248	3.0426	3.1199	-
	Gravel	8.4165	6.8154	5.4246	4.6648	4.1842	3.9354	3.7772	3.7439	3.8206	3.9413	-
	Earth	10.7536	8.8960	7.1246	6.0835	5.4794	4.9321	4.6394	-	-	-	-
H/T	As-con	7.6347	6.1330	4.8035	4.0987	3.6827	3.4426	3.2877	3.2882	3.3112	3.4059	3.5240
	BST	7.8881	6.3486	4.9906	4.2674	3.8365	3.5935	3.4380	3.4361	3.4715	3.5760	-
	Gravel	9.3238	7.5704	6.0511	5.2231	4.7079	4.4483	4.2900	4.2742	4.3799	4.5399	-
	Earth	11.9432	9.9045	7.9688	6.8329	6.1758	5.5879	5.2810	-	-	-	-

TABLE 8A-3

Table 8A-3 TIME COST (B/km) (ECONOMIC COSTS, MID 1979 PRICE)

SPEED (km/hr)	VEHICLE			TYPE			
	H/C	P/C	L/B	H/B	L/T	M/T	H/T
10	0.7969	3.5357	5.5776	17.3304	1.8923	1.9421	1.9920
16	0.4980	2.2098	3.4860	10.8315	1.1827	1.2138	1.2450
24	0.3320	1.4732	2.3240	7.2210	0.7885	0.8092	0.8300
32	0.2490	1.1049	1.7430	5.4157	0.5914	0.6069	0.6225
40	0.1992	0.8839	1.3944	4.3326	0.4731	0.4855	0.4980
48	0.1660	0.7366	1.1620	3.6105	0.3942	0.4046	0.4150
56	0.1423	0.6314	0.9960	3.0947	0.3379	0.3468	0.3557
64	0.1245	0.5525	0.8715	2.7079	0.2957	0.3035	0.3113
72	0.1107	0.4911	0.7747	2.4070	0.2628	0.2697	0.2767
80	0.0996	0.4420	0.6972	2.1663	0.2365	0.2428	0.2490
88	0.0906	0.4018	0.6338	1.9694	0.2150	0.2207	0.2264

TABLE 8A-4

Table 8A-4 ADDITIONAL CURVE COSTS (% of Level Tangent Costs)

Motor Cycle (M/C) and Passenger Car (P/C)

SPEED (km/h)	RADIUS (m)								
	1 500	750	500	375	300	250	200	150	100
16	1.58	3.03	4.20	5.14	5.99	6.81	8.26	9.79	12.86
24	2.21	4.25	5.86	7.22	8.73	9.64	12.46	15.30	21.39
32	2.43	4.58	6.63	8.63	10.54	12.40	16.18	20.50	29.58
40	2.60	5.03	7.38	9.76	12.25	14.85	20.48	26.98	42.42
48	2.75	5.41	8.51	11.14	14.44	18.10	26.01	35.61	63.02
56	3.05	6.33	10.47	13.84	19.76	23.82	33.95	49.28	90.48
64	3.97	8.11	13.56	18.47	25.69	32.37	50.53	72.51	124.18
72	5.32	10.97	18.04	24.60	34.45	44.12	72.12	99.55	166.57
80	6.98	14.65	23.51	32.55	45.17	57.49	91.49	125.92	202.85
88	9.23	19.17	30.47	42.48	58.37	74.12	112.44	152.21	-

Heavy Bus (H/B) and Medium Truck (H/T)

SPEED (km/h)	RADIUS (m)								
	1 500	750	500	375	300	250	200	150	100
16	2.52	4.62	6.30	7.57	8.33	9.00	11.71	14.35	19.68
24	3.48	6.32	8.39	9.87	12.08	14.22	18.60	22.92	31.93
32	3.55	6.36	9.42	12.46	15.49	18.29	24.10	29.97	42.41
40	3.71	6.57	10.89	14.41	18.04	21.38	28.47	35.90	53.68
48	3.84	8.06	12.01	15.90	20.01	23.82	32.13	44.11	88.25
56	4.11	8.29	12.40	16.58	21.02	26.43	45.74	69.31	127.16
64	4.18	8.54	14.87	22.61	32.02	42.56	67.98	98.26	171.44
72	6.31	14.00	23.11	33.70	46.01	59.69	91.54	128.90	-
80	9.05	19.65	31.62	45.16	60.52	77.30	116.13	161.11	-
88	11.98	25.41	40.49	51.99	75.66	96.02	-	-	-

Light Bus (L/B) and Light Truck (L/T)

SPEED (km/h)	RADIUS (m)								
	1 500	750	500	375	300	250	200	150	100
16	1.82	3.38	4.43	5.27	5.97	6.63	8.25	10.11	14.04
24	2.45	4.53	6.12	7.36	8.70	10.42	13.59	16.76	22.65
32	2.75	4.93	6.14	9.04	11.45	13.63	18.36	22.47	31.53
40	2.93	4.93	7.43	10.56	13.19	15.74	21.73	28.34	43.00
48	3.26	6.05	9.61	12.92	16.05	19.53	27.64	37.16	60.17
56	3.87	7.69	12.27	17.05	21.71	26.88	38.86	52.89	87.07
64	4.75	9.59	15.16	21.47	28.52	36.33	54.21	75.07	125.78
72	5.99	12.57	20.13	28.69	38.80	50.17	73.65	101.27	172.21
80	7.53	14.76	23.77	34.50	46.91	60.84	93.13	130.69	217.17
88	9.37	19.90	31.31	44.50	59.41	75.96	114.22	166.14	-

Heavy Truck (H/T)

SPEED (km/h)	RADIUS (m)								
	1 500	750	500	375	300	250	200	150	100
16	4.33	7.98	10.93	13.14	14.53	15.75	20.52	25.07	34.20
24	6.29	11.28	15.06	17.62	21.62	25.44	33.27	41.05	57.15
32	6.49	11.61	17.26	22.73	28.30	33.45	44.07	54.87	77.69
40	6.96	12.32	20.50	27.03	33.82	40.08	52.04	67.36	100.54
48	7.29	15.33	22.88	30.22	38.08	45.40	61.27	84.09	168.17
56	7.98	16.10	24.08	32.15	40.68	51.32	88.82	134.44	246.03
64	8.16	16.78	29.14	44.29	62.76	83.36	133.09	192.07	333.79
72	12.47	27.80	45.80	66.81	91.29	118.15	180.81	254.10	-
80	18.12	39.24	63.26	90.25	120.76	153.96	230.34	318.29	-
88	24.20	51.20	81.38	104.39	151.64	191.70	-	-	-

TABLE 8A-5

Table 8A-5 ADDITIONAL UPHILL GRADE COSTS (% of Level Tangent Costs)Motor Cycle (M/C) and Passenger Car (P/C)

SPEED (km/h)	GRADE (%)						
	1	2	3	4	5	6	7
16	4.36	9.08	14.04	19.14	23.73	30.11	36.46
24	5.06	10.60	16.28	22.07	28.37	34.86	42.18
32	5.47	11.54	17.71	24.00	30.74	37.83	45.97
40	6.67	13.01	19.54	26.19	33.26	40.92	49.69
48	6.04	12.49	19.22	26.01	33.26	41.13	50.27
56	5.98	12.40	19.19	26.09	33.46	41.63	50.95
64	5.85	12.13	18.81	25.86	33.40	41.59	50.93
72	5.61	11.93	18.36	25.28	32.78	41.12	50.58
80	5.47	11.52	17.79	24.64	32.00	40.32	49.82
88	5.33	11.08	17.18	23.84	31.19	39.41	48.87

Heavy Bus (H/B) and Medium Truck (M/T)

SPEED (km/h)	GRADE (%)						
	1	2	3	4	5	6	7
16	4.33	8.90	14.00	19.64	25.98	33.15	41.57
24	5.21	10.80	17.29	24.26	32.20	41.35	52.27
32	6.16	12.75	20.53	29.20	39.06	51.09	66.39
40	7.10	14.65	24.08	34.68	48.45	63.93	88.34
48	8.15	16.76	27.74	41.35	60.59	77.87	-
56	9.26	19.17	31.85	49.76	73.66	-	-
64	10.48	21.90	36.29	60.97	-	-	-
72	11.85	24.79	41.04	-	-	-	-
80	13.43	27.36	45.71	-	-	-	-
88	14.24	29.74	-	-	-	-	-

Light Bus (L/B) and Light Truck (L/T)

SPEED (km/h)	GRADE (%)						
	1	2	3	4	5	6	7
16	3.76	7.94	12.55	17.72	23.54	30.31	38.27
24	4.39	9.20	14.54	20.45	27.20	34.90	44.05
32	4.93	10.17	15.99	22.54	29.84	38.34	48.32
40	5.21	10.81	17.07	23.95	31.89	40.88	51.39
48	5.42	11.44	18.03	25.31	33.47	44.63	53.97
56	5.73	11.96	18.83	26.42	34.97	45.13	56.20
64	6.00	12.45	19.56	27.34	36.15	46.22	58.15
72	6.26	13.04	20.35	28.38	37.45	47.80	60.37
80	6.52	13.49	21.09	29.42	38.79	49.82	63.57
88	6.75	14.00	21.82	30.46	40.30	51.12	65.24

Heavy Truck (H/T)

SPEED (km/h)	GRADE (%)						
	1	2	3	4	5	6	7
16	8.65	17.22	25.67	33.98	42.40	50.33	58.64
24	12.15	24.27	36.51	48.79	61.16	73.45	87.27
32	14.61	29.37	44.77	60.81	77.61	95.49	116.07
40	16.52	33.38	51.65	71.92	95.29	120.57	-
48	17.99	36.68	57.80	83.37	-	-	-
56	19.62	40.21	64.52	97.25	-	-	-
64	20.05	42.49	70.22	-	-	-	-
72	20.87	45.29	-	-	-	-	-
80	22.12	-	-	-	-	-	-
88	23.10	-	-	-	-	-	-