

Chapter 1

INTRODUCTION



1.1 Background of the Research

Transportation of agricultural products from those too far plantation areas to the markets or for treatment at the factories nowadays are very essential considerations for agricultural countries. Some kinds of agricultural products which are moved in large quantities, such as-rice, maize, cassava, sugar cane , etc., have to be transported by using a large number of trucks and require too many line haul routes. Especially, for the sugar cane delivery, sudden transportation to the mills for processing treatment is very important, because this kind of agricultural product yields large quantities and rapidly deteriorate physically. In order to keep the desire properties of these sugar canes, good transportation systems must be planned carefully, and paying great attention to their modes or other facility needs are essential.

National incomes of Thailand are mostly resultant from an export of agricultural products, rice, maize, cassava, sugar cane, etc. About 80 per cent of agricultural area are used for plantations. Large amounts of money were spent to improve the transportation systems by constructing new line haul routes to deliver the crops from farm agricultural areas to the markets or to the mills. The cost of transportation for such agricultural products comprises of labour cost, transport cost, treatment cost, etc.

Therefore, the precautions taken in the care of this business must be considered precisely.

For sugar cane plantations, as much implicated in this research, they are planted in various parts of Thailand, such as in the north, in the northeast, in the central and in the southern regions. As for the central region, it could be divided into two portions, e.g, the eastern region and western region. The plantation area in the western region which is the primary study area of this research and sugar mill locations for the whole kingdom are shown in Fig.1 and Fig.2 respectively.

In the western region, most of sugar cane plantations are in the area of four Changwats, namely, Kanchanaburi, Nakhon Pathom, Suphan Buri and Ratchaburi. The sugar canes production for the years 1976-1977 are 16,880,888 metric tons which is about 65 per cent of the whole kingdom.

Details of plantation area by Changwats in this region are illustrated in Table 1.

Amount of the sugar cane and plantation area for the whole kingdom for the years 1966 to 1978 is shown in Table 2. Table 3 represents the sugar cane production in each region of the whole kingdom for the production years 1976-1977.

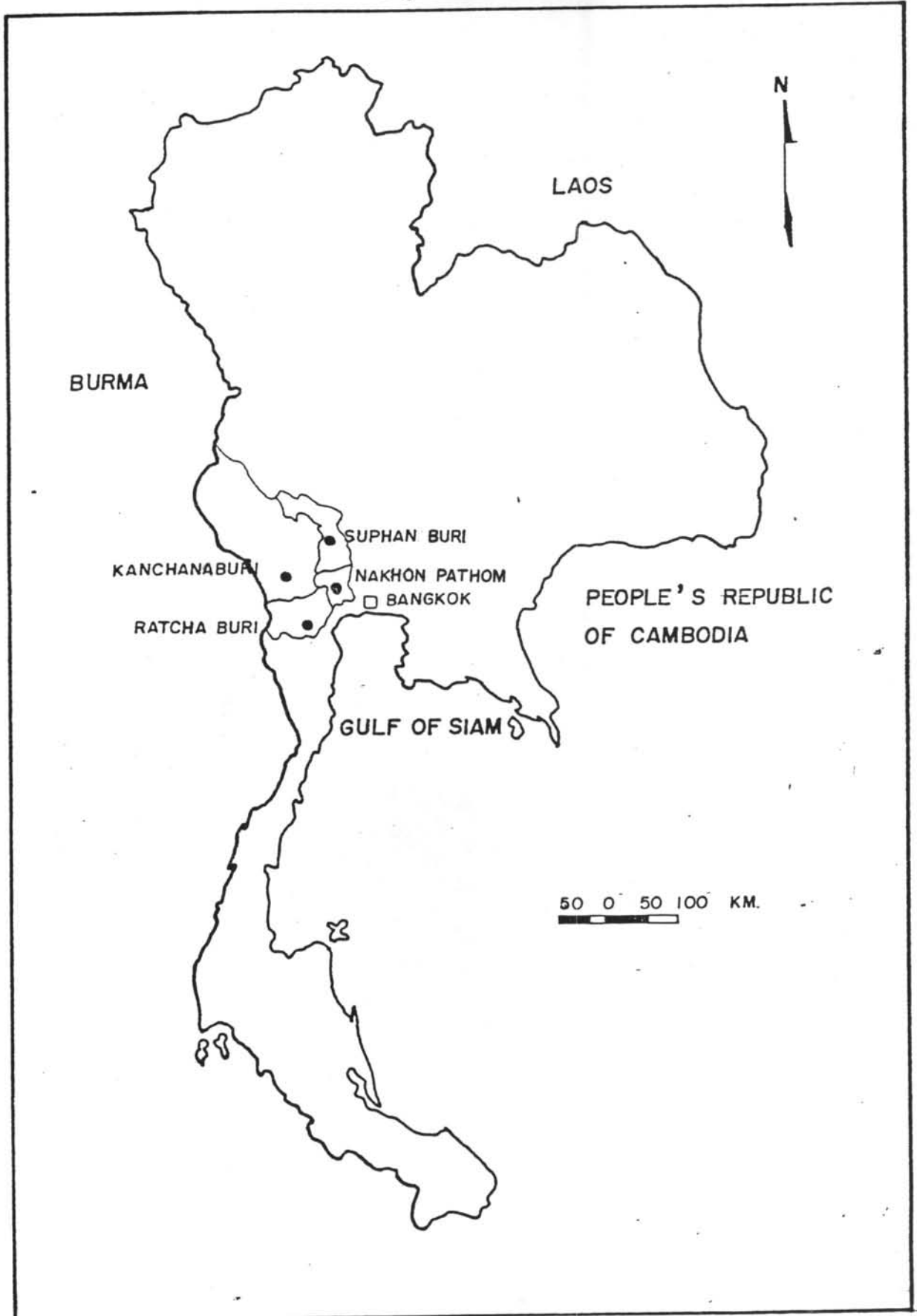


FIG. 1 MAP OF THAILAND SHOWING THE STUDY AREA

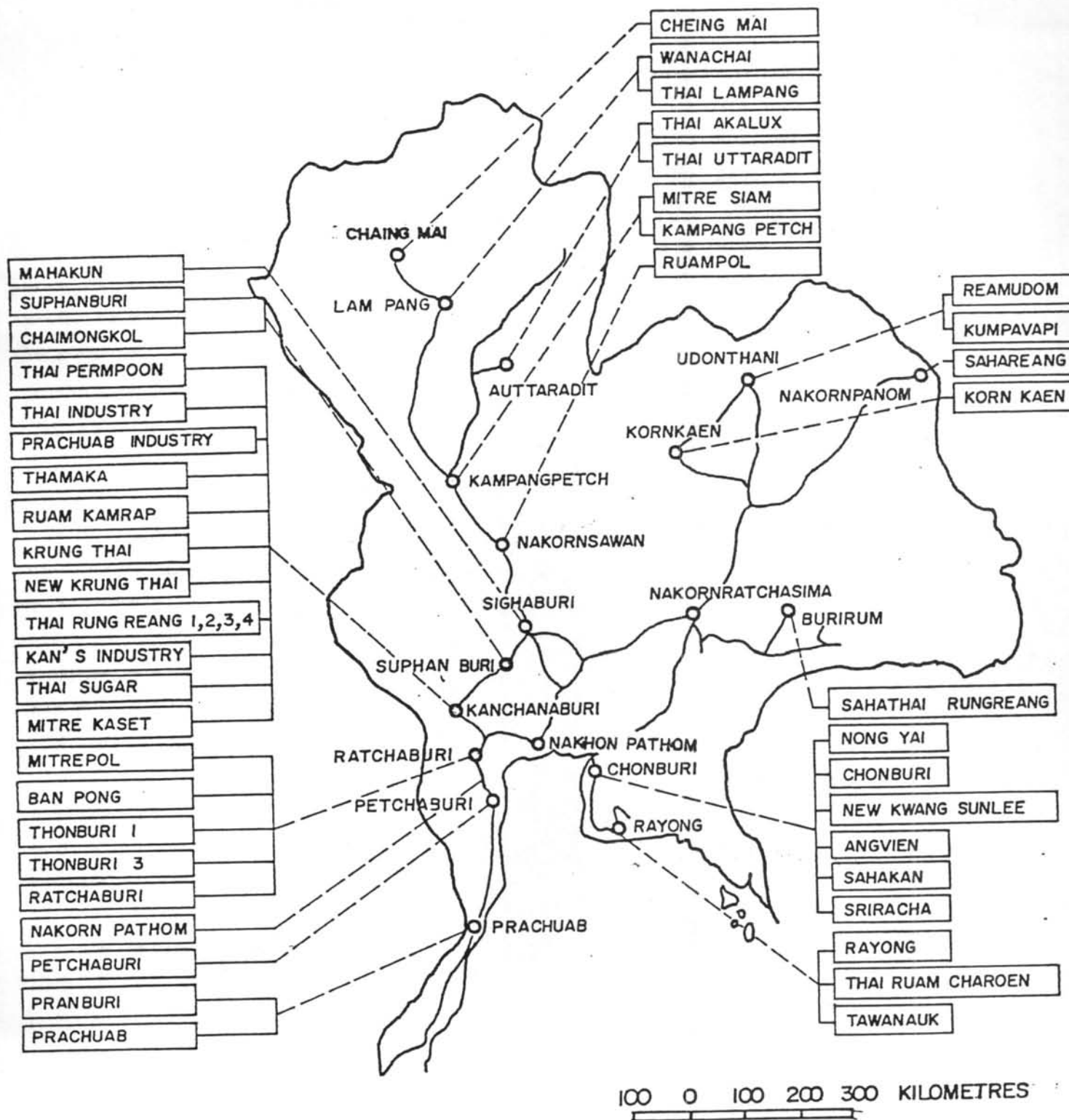


FIG2 NUMBER OF SUGAR MILLS WITHIN WESTERN REGION AND THE WHOLE KINGDOM

SOURCE : THE SUGAR INSTITUTE (1977)

Table 1 Sugar Cane Plantation Areas in western region by changwats, years 1976-1977.

Changwats	Sugar Cane Plantation Area (Rai*)	%	Whole Area (Rai*)	%	% Area
Kanchanaburi	1,000,000	54.74	12,178,675.0	60.95	8.21
Ratchaburi	226,666	12.41	3,154,517.5	15.80	7.18
Nakhon Pathom	240,000	13.14	1,300,000.0	6.51	18.46
Suphan Buri,	360,000	19.71	3,343,125.0	16.74	10.77

Sources: The Sugar Institute (1977).

* 1 Rai = 1,600 Square metres = 0.16 hectare.

1.2 Nature of Problems

It is a known fact that sugar cane is an agricultural product, in which the processing can not be delayed for any reasons. It must be cut and transported to the sugar mills for crushing as fast as possible to serve the sugar cane production within the limit of time in each period of harvesting season. Otherwise the cane will deteriorated in weight and quality with time and this result in the mill owners will not accept to buy the sugar cane at as reasonable price as it should be. Therefore, the farmers cannot sell their products, and repayment of their bank loans will be impossible. Consequently, the farmers must spend more money for cutting these waste sugar canes, which in-turn effects the failure of economic development for the locality and hence the country.

Table 2, Amount of Sugar Cane and Plantation Area for the whole Kingdom.

Production Year	Planted Area Rai	Amount of S.C. MT.	Amount of S.C. in Four-Changwats MT.	Ratio*	Amount of Farm Area in Four-Changwats Rai	Ratio*
1966-1967	413,537.000	2,834,290.000	N.A.	-	N.A.	-
1967-1968	453,200.000	2,855,200.000	N.A.	-	N.A.	-
1968-1969	699,494.000	4,657,360.000	2,007,648.220		N.A.	-
1969-1970	801,394.000	5,463,960.000	2,573,723.545	0.471	332,983.00	0.416
1970-1971	861,806.000	6,585,860.790	4,090,152.505	0.621	491,982.00	0.571
1971-1972	872,494.000	5,925,566.313	3,752,326.000	0.633	593,697.00	0.680
1972-1973	1,133,439.000	9,512,794.216	6,129,052.070	0.44	642,213.00	0.567
1973-1974	1,616,304.000	12,694,491.605	7,115,116.04	0.560	918,858.00	0.539
1974-1975	1,935,253.000	13,109,534.000	7,707,081.210	0.588	1,043,500.00	0.539
1975-1976	2,347,950.000	18,961,677.550	11,002,675.410	0.581	1,239,190.00	0.528
1976-1977	3,118,689.000	26,094,452.900	16,880,888.180	0.647	1,826,666.00	0.586
1977-1978	-	18,622,698.484	10,371,207.595	0.557	-	-

Source : The Sugar Institute (1977).

*Ratio of Four - Changwat / Thailand of S.C.

**Ratio of Four - Changwat / Thailand of Planted Area.



Table 3 Sugar Cane Plantation and Production in each Region of Thailand

Production Years, 1976 - 1977

Province	Planted Area (Rai)	%	Amount of S.C. MT.	%
1. In the North	323,237	10.36	2,742,205.501	10.51
2. In the East	436,815	14.01	3,780,484.833	14.49
3. In the North - East	216,925	6.96	1,167,635.300	4.47
4. In the Central Region				
<u>In the Western Provinces</u>				
Kanchanaburi	1,000,000		Assembled for	
Ratchaburi	226,666		Four Changwats	
Nakhon Pathom	240,000			
Suphan Buri	360,000			
Total	1,826,666	58.57	16,880,888.180	64.69
<u>*Other Provinces</u>	315,046	10.10	1,523,239.09	5.84
Total	2,141,712		18,404,127.270	
The whole Kingdom	3,118,689	100.00	26,094,452.900	100.00

Source: The Sugar Institute (1977).

*Consist of; Singburi, Ang Thong, Uthaitani, Chainat,
Petchburi, Prajuab Kirikhan.

The sugar cane transportation in this region is very interesting because of various factors concerned. For examples, mode of transportations, negotiation of transport cost, line haul route conditions, the distance between plantation areas and sugar mills, method of loading and unloading, delay and waste of time characteristics, and etc. In order to investigate these factors, careful consideration should be paid to the behavior of each parameter concerned.

1.3 Purpose and Scope

The present research is an attempt to deal with the sugar cane transportation in the western region which comprise of Kanchanaburi, Ratchaburi, Nakhon Pathom, and Suphan Buri Provinces. The major objectives of the study are to investigate the sugar cane trucks operating cost (CTOC) and the characteristics of the truck traffic. The minor objective is to study the characteristic of the factors concerned with the cane transportation. However, some related problems which are not included in this research are accidents, and delays of cane trucks at the mills. Also, other traffic delay that caused by cane trucks while travelling and waiting for unloading at the mills are omitted.

1.4 Defined Study Area

The study area in associate with the cane plantation areas are located in the western part of Thailand which are covered by four changwats: Kanchanaburi, Suphanburi, Nakorn Pathom, and Ratchaburi. The surrounding terrain is extremely flat. The distance of this areas ranging between 50-200 kilometres from Bangkok by land. The total plantation areas are 1,826,666 rai which is about 59 percent of the whole kingdom. The existing

transportation systems within the study region are classified into 3 categories as follows:-

1.4.1 Highway System

The highway route No. 323, which is Kanchanaburi to Ban Pong passes through the sugar mill area in western region. This route is the main line haul route to serve the cane transportation to the mills. There are five major collectors as the minor line haul routes access to this route.

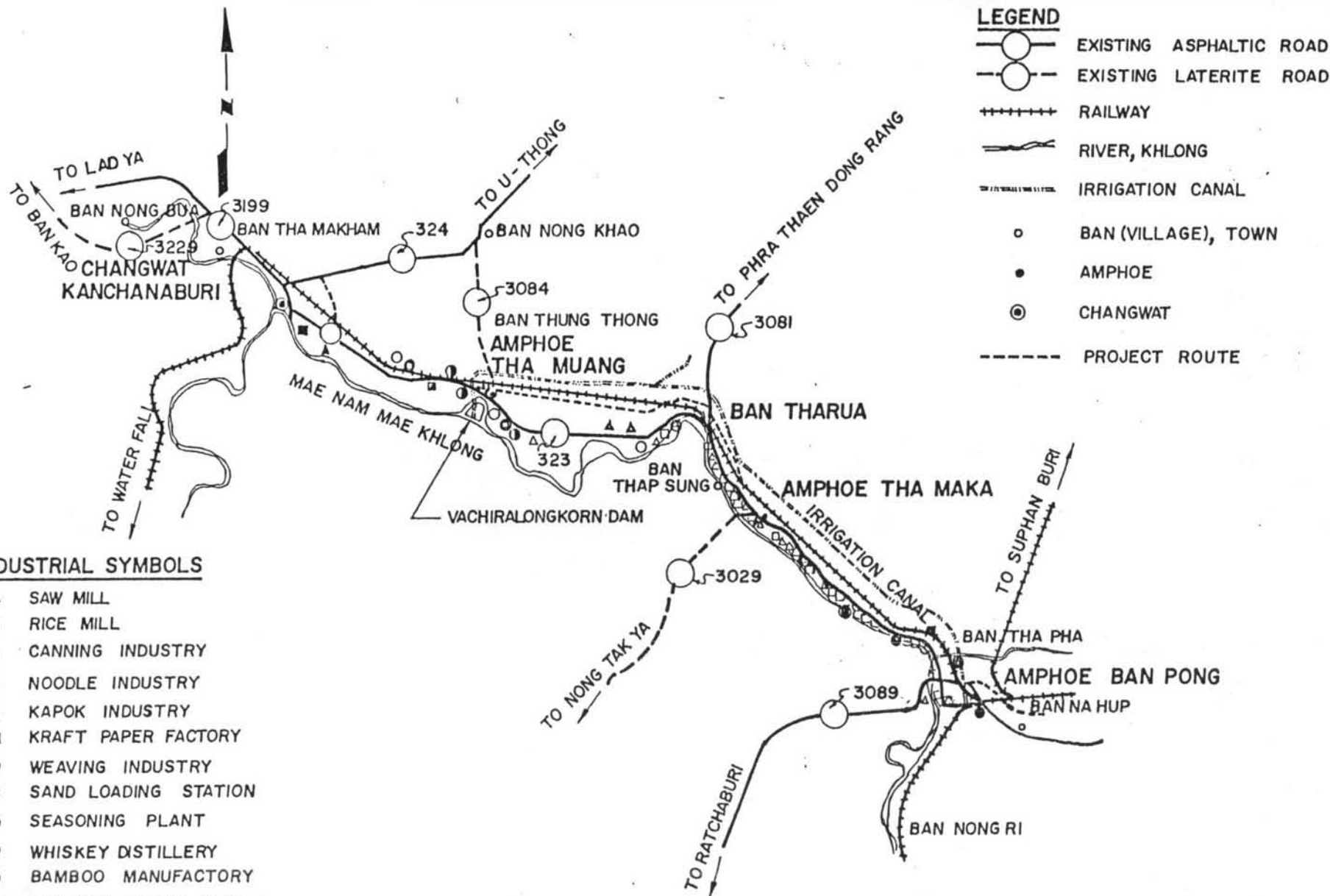
1.4.2 Waterway System

The Mae Klong River which is originated from merging of the Kwai Yai and Kwai Noi rivers in Kanchanaburi Province passes through the study area to the gulf of Thailand. There are three ferries and three bridges to serve the cane transportation in the region.

1.4.3 Railway System

The western railway line from Bangkok to Kanchanaburi runs through the study area, but this mode of transportation has little effect to this research because the cane transportation in this region is performed by only highway system. Thus, the main function of the railway line is for passenger and other freight transportation only.

The location of the transportation systems in the region is shown in Fig.3.



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To serve the purpose of this research, the truck traffic characteristics using the route No. 323 are investigated. This reasoning is based on the ground that such route is the main line haul route serving all cane traffic to deliver the sugar cane from farm areas to the mills.

The location of defined study area and the sugar mills are illustrated in Fig.4 and Fig.5.

1.5 Literature Review

The study deals with the sugar cane transportation, transport routes, within the western region of Thailand, no research publication has ever been done straight to a point on this topic. Therefore, it is necessary to rely primarily on the former researchs and reports with similar emphasis either in transporation or line haul routes individually.

KIRAKUL K. (1975), mentioned that the sugar cane transportation admissions were given by quotamen* sponsored by sugar mills owners with an adequate quantity for sugar production each day within crushing season. Quotamen, usually by the truck owners, will give transport cards to drivers for permission to transport the sugar cane from their farm brought up to the sugar mills within punctually time stated in the card.

* Quotamen are the middlemen who negotiate between the cane owners and the sugar mills. They take the cane from the cane owners to the mills according to the quota account obtained from the mills.

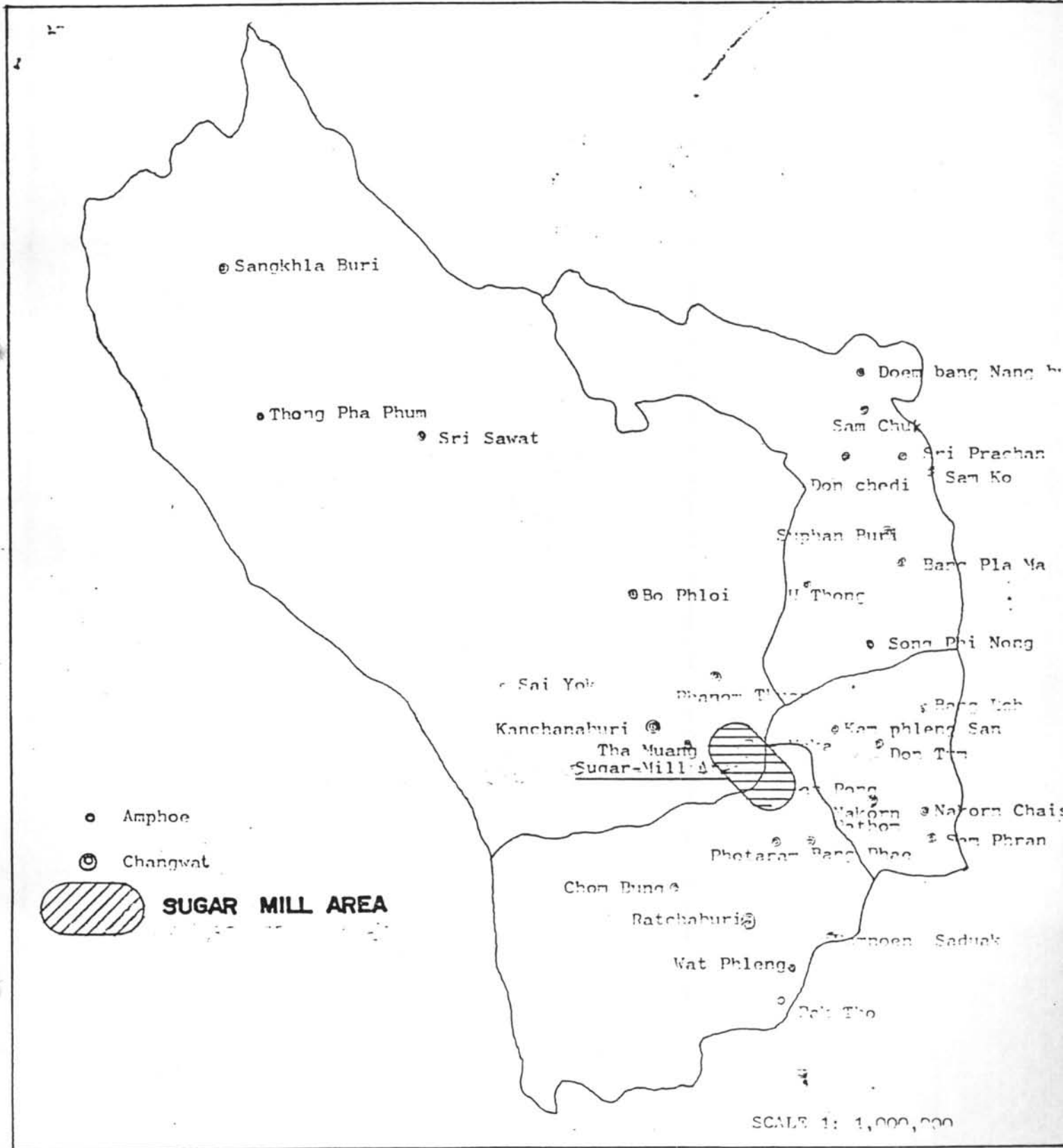


FIG.4. MAP OF 4 CHANGWATS SHOWS CANE GROWING AREA DISTRICTS AND—

SUGAR MILL AREA

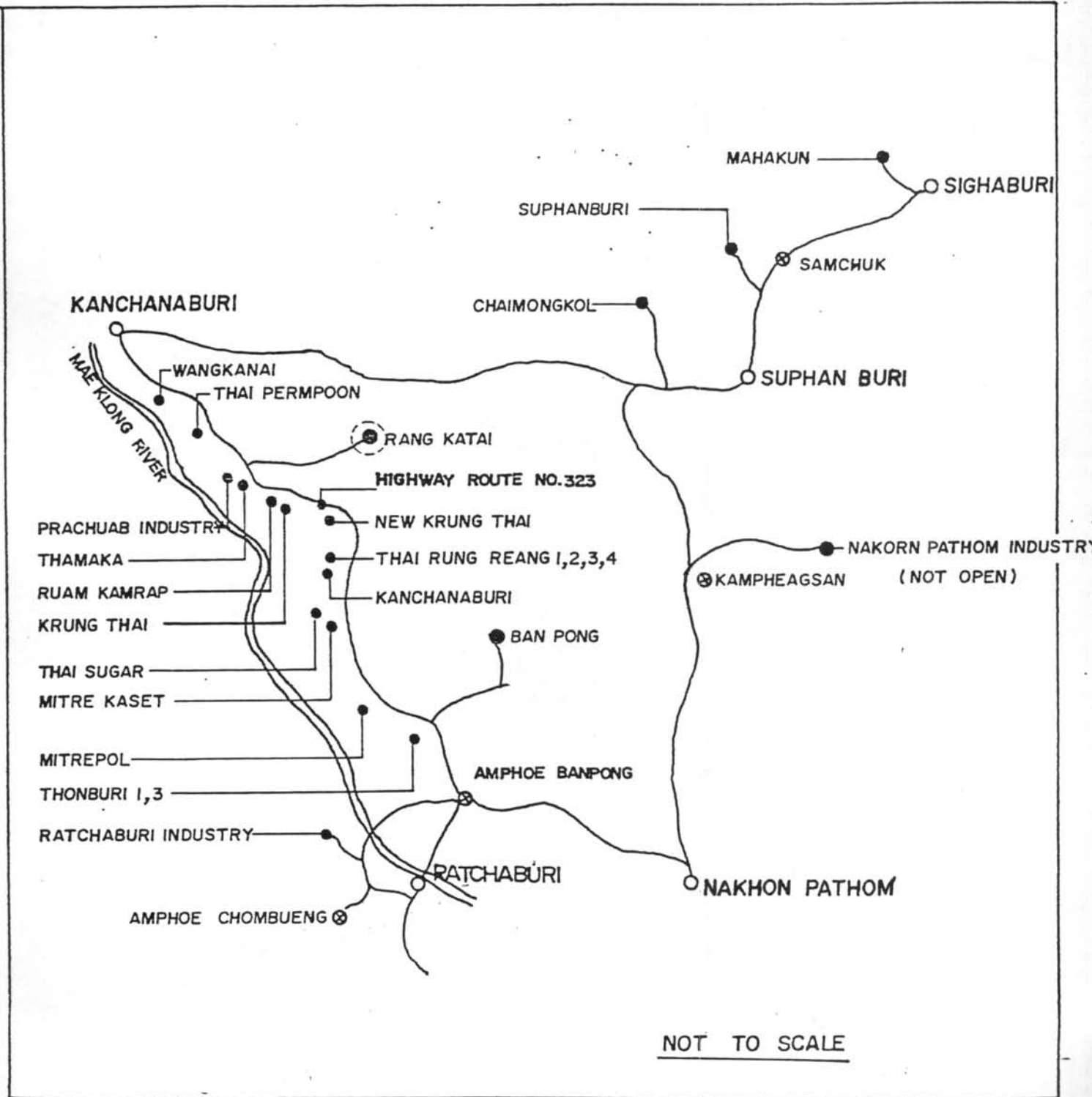


FIG5. LOCATION OF SUGAR MILLS WITHIN THE STUDY AREA



Transport costs interactions from various parts of growing area to the mills were made by sugar mills and The Sugar Cane Plantation Association of the Seventh Part.

SNOWY MOUNTAIN ENGINEERING CORPORATION (1975). The study dealt with Engineering and economic appraisal of Kanchanaburi-Petchkasem highway route No. 14 which is route No. 323 for existing one. The route is that which the cane is brought to the mills along the route No. 14 from five neighboring changwats; namely, Ratchaburi, Kanchanaburi, Nakorn Pathom, Prajuab Kirikhan, and Suphanburi. The distance of transportation varies from 20-150 kilometres. All transport was usually made by heavy 10-wheel trucks with the normal carrying capacities fo cane varying from 15-20 ton trip. However, the study has found that mostly trucks were grossly over loaded up to 25 tons per trip.

Along the routes, the total of traffic generation was about 3,000 trucks per day for 75,000 cane-ton-day. They also referred that, route No. 14 follows an important established route corridor which is level, low lying and flood prone from Ban Pong to Kanchanaburi paralleling the middle course of the Mae Klong river on its southern boundary and the railway line from Bangkok through Kanchanaburi towards Nam Tok station on its northern boundary. The Fourth Five Year Highway Plan (1976- 1981) provides for its upgrading to a 2 lanes divided highway of class 1 according to the Department of Highways Standard. The volume of traffic using is largely determined by national and export markets; and strictly local agricultural and labour markets have little effects in determining that research. It was expected that there will be little diversion of

traffic from existing parallel railway or waterway, additionally, some traffic were expected to be generated because of the relief of congestion on the road, again, it was expected to be dominated by the growth of the major industries along the routes, and not by the local consideration.

VALENTINE LAURIE & DAVIES, R.O.P. (1977). The vehicle operating cost (VOC) of heavy trucks (10-wheel triple axle diesel engine trucks) which a gross laden weight ranging between 18,000 and 22,000 kilograms were studied precisely from each type of vehicles to present as a standardization for preparing economic evaluation of road project in connection with feeder roads in Thailand over the last three years (1975-1977) for the Highway Department, engaged on World Bank. They stated that, these vehicles in the markets of Thailand are almost completely dominated by the ISUZU with over 90 per cent of the market. Hino have most of the remainder of the market, with other makes being sold in negligible quantities.

The selling prices of the two makes together with an estimate of locally constructed body work in June 1976 were as follows;

ISUZU TWD 80 HJ

004108

Engine, Chassis and Windscreen	฿	264,800.00
Timber Cab and Body Work	฿	<u>80,000.00</u>
Total	฿	<u>344,800.00</u>

HINO KT 920

Engine, Chassis and Cab	฿	289,700.00
Timber Body Work	฿	<u>60,000.00</u>
Total	฿	<u>349,700.00</u>

Those selling prices contain an element of taxes, duties, registration and license fees, all of which are paid to the government.

As part of the VOC for heavy trucks comprise of fuel consumptions oil and lubricants, tyres and tubes, repairs and maintenance, and depreciation costs. These depreciated components were individually calculated with different speeds of trucks and classes of roads in August, 1975 by using computer.

WONGTONGLUA K. (1976), employed a relation of agricultural areas and farm routes. He stated that new inauguration farm routes would make higher production rates both in neighboring and adjacent areas to the routes. Such research have found to guide the amount of land use based on distance between line haul routes and the way to display the land use value which could be done by computing the radius of actual cultivated area to the expected total cultivated area.

The analysis of land use in cultivated area within good condition farm routes found that within cultivation areas between one to five kilometres apart from both sides of routes, the effectiveness of land use were in range 75-100 per cent, for the cultivated areas of about 15 kilometres or more from routes, the effectiveness of land use will be 40 per cent. Therefore, the area within five kilometres from both sides of routes will be mostly affected by the new routes. Furthermore, he recommended that the following standard of such routes would be feasible; 6-m roadway width for heavy trucks, 0.15 to 0.30 - m thick for subbase with 95 per cent Modified Proctor Compaction and CBR not less than 20 per cent, 7-m width of bridges. Finally, he suggested that, the interval of 10 kilometres routes provided would give the good economic development for agricultural requirements.