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RESEARCH REPORT SERIES

Number 8

An Economic History of the Chao Phya Delta
1850-1890

by
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Number 9

Employment Effects of Small-and
Medium-Scale Industries in Thailand

by

Somsak Tambunlertchai

คณะเศรษฐศาสตร์
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Content

Preface

The study covers the changes in the rice Economy of the Chao Phya Delta from 1850-1890. It seeks to describe the response of the cultivators, the landlords and the government to the expanded rice trade, which has resulted in the expansion of cultivable land. It also attempts to relate the expansion to the pressure on land and labour in the Chao Phya Delta and the emerging pattern of farming organization at the turn of the Century. The study is based mainly on four sets of documents.

- The Collection of Law (Prachoom Kod Mai Pracham Sok PKPS)
- The Proclamation of Rama IV (Prachoom Prakad Rachakarn thi see) (PPRIV).
- British Consular Reports - from 1856-1893 (B.C.R.)
- National Archives Collection - Rama III, and IV reign. (N.A.)

Other documents are cited in the text.

Among those assisting the author in data collection were Miss Patarada Limpasut, Mr. Charoenkieti Tanasuktavorn, Mr. Laiad Silanoi and Miss Sunthree Asawai. Katherine Bowie also assisted the author in the editing of the earlier draft. Dr. Ammar Siamwalla gave a number of valuable suggestions. The author is however, responsible for all the errors and omissions that occur in the text.

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CHAPTER ONE

The Chao Phya Delta

The Chao Phya drainage basin comprises three continguous areas: the Northern Valleys, the Flood Plains and the Delta. The mountain areas form a horseshoe arc embracing the flood plain. The terrain is of high elevation and steep slope forming the drainage conducts. Between a series of mountains lie flat valleys, through which major tributaries traverse, providing water for intensive cultivation. Flash floods accurs during the heavy monsoonal rain but are quickly drained to the lower plain. Among the major valleys are Chiangmai, Lampang , and Nan. These valleys are known to have been well sett rly as the 11th century.

The Flood Plain extends from the lower mountain terrace area to the lower reach of the Chao Phya distributaries, just above the area subjected to tidal influence. The Flood Plain is subject to annual monsoonal inundation of prolonged period due to the flatness of the area. The terrain is characterized by a series of river levee and depressed backswamp area along the old and new river channels. This is caused by the high siltation of alluvium carried by the flood and the changes of river channels. This is found along the Yom and Nan tributaries and below the confluences of these tributaries at Nakorn Sawan to about 80 kilometers from the estuary of the Chao Phya.

The delta area covers the lowest part of the drainage basin and is flat and low lying. The elevation is not more than 3 meters above means

sea level with the slope of less than 1:10.000. The area is subject to monsoonal inundation. During the dry season, the entire delta dries up and as such was not hospitable to ancient settlement, until canals were built to provide drainage, water supply and transport network in the area.

In both the flood plain and the delta, the major distributaries retain the water throughout the year due to the strong influence of the coastal tide. This provides major sources of water supply in the dry season and facilitates all year round means of transportation.

The study of the development of the Chao Phya Plain covers the area from the confluence of the tributaries to the coastal area bordering the Gulf of Thailand. This upside down fan-shaped area covers the lower portion of the Flood Plain and the whole Delta area. The area is about 300 kilometers in latitude and about 250 in longitudes.

In the study area three types of topography and water regimes can be distinguished - the levee-basin area, the delta, and the lower hill terrace.

The levee-basin area coincide with the major portion of the present Great Chao Phya Project under the Royal Irrigation Department. The details of the agronomic zone for this area are provided by Takaya[1/] and elaborated by Small.[2/] This area covers the major part of the upper

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1/ Takaya. (1975).

2/ Small (1973).

plain from Bangsai to Nakorn Sawan and are classified by Small into a number of agronomic zones. For our purpose the areas with old settlements are found in Small's C.B. (Central Broadcasting Region) and some N.W. (Northewest Zone). The C.B. area covers the eastern part of Singburi, Eastern Angthong, Northern part of Saraburi and Western part of Lopburi as well as the Northern section of Ayuthya. This region shows a very well developed levee-basin pattern with elevation differences of up to 3 meters on the left bank of the Chao Phya.

The river basin themselves are relatively flat and couple with the high ground water table, this resulted in the formation of lakes during part or overall of the year in the lowest areas. These basins are subject to annual flooding of up to three meters. The river levee also shows considerable differences in elevation due to the erosion of channels and other features associated with the annual flood. Differences in elevation are due to the erosion of channels and other features associated with the annual flood. Differences in elevation of 0.5 meters over distance less than 50 meters have been reported.

The N.W. region extends from the levee of the Noi River on the East, across the river basin between the Noi and the Suphan Rivers, to the levee of the Suphan River on the West. In Addition there are many other channels, which have their own levee and river basin. The difference between the levee and its basin is not great and in any given lacitude, the land in this region is higher than in the East (C.B.). Besides, because of the large number of channels which area are scattered throughout

the area, a very complex topographical pattern emerges in which low basin areas are intermixed with the higher area. By implication, this area could not have been densely settled due to the lack of natural water distribution system.

The delta area lies South of Ayuthya to the Gulf and can be delineated from just above the confluence of the Noi and the Main Chao Phya distributaries. This is the **flattest** of all the regions. It does not exhibit much of the levee - basin pattern. The North-South Slope is on the order of one meter per 20-25 kilometers, which is a half of those in the flood plain. This lack of levee-basin pattern means poor natural distribution and drainage system and deep flooding prevails. This area coincides with the "West Bank" area in the irrigation project and is known to have been brought into cultivation only in late 19^{th} century.

The lower part of the Delta also reveals similar pattern right through to the Gulf, except the area near Bangkok which shows strong tidal effect and as such water level was in the extent of one meter. In the same latitudes the Eastern bank shows higher elevation and as such the area is relatively drier than in the lower delta.

The lower hill terrace region coincide with Small's E.T. (Eastern Terrace) and W.T. (Western Terrace) area. The terrain is of semi-recent terrace and is somewhat higher than the adjoining flood plain. As a result this region is seldom flooded and cultivation is dependent on rainfall.

Early Settlement and Rice Culture

The relics of ancient settlements are found on the fringe of the flood plain between the flood plain and the lower hill terrace. Thi includes the Tavarawadi towns such as Pong Tuk, Uthong, Sree Thep, Lavo which could be dated back to the 10th century. No ancient sites of the same period are found in the flood plain or the deltas except the town of Ayodhya which preceded the 14th Century Ayuthya on the nearby site. But then even Ayodhya, could not have been older than the aformentioned towns in the lower hill terrace.

Before the fourteenth century living settlements was seen and the pattern can be identified from the Annals of Ayudhya[1/] and confirmed by the recent work of Huan Pintupan.[2/] The known settlements included the Lopburi area, Suphan River area, and the Maenam Noi and Main Chao Phya area. This last mentioned area reveals relatively well settled towns such as Chainat, Praek Sree Racha and Ayuthya itself. All these areas lie in the flood plain. Settlement, however, was not limited to the flood plain of the Chao Phya. The later records from the Annals reveals such place names as Petburi, Chachoengsao, Prachin, Nakorn Nayok Rajburi. These could have been settled before the 14th Century but were probably too small to be of administrative and logistic significance till the later period.

1/ Pra Rach Pongsawadan Krung Sree Ayuthya - Chabap Pra Ponarat.

2/ Huan Pintupan: Ang Thong Noi Adeet (2513).

These settlements demonstrate one ecological characteristic, that is, they were located in the levee-basin region where natural distribution and drainage system were suitable to rice cultivation. These areas were also endowed with abundant fish supply together with ready means of transportation. The levee also provided ready site for homsteads.

The Delta, however, is not known to have been settled with large population till about the sixteenth century, with the establishment of the towns of Nakorn Chaisree and Nonthaburi, following a Burmese siege during the Reign of King Chakkapat. (1556 a.d.)

Rice is known to have been cultivated before the fourteenth century, but we have no description of early rice culture. As of 1588 the Annals[1/] gave distinction between "light" rice and "heavy" rice, the short and long maturing varieties. This, in the present context confirms that the varieties have been well selected to suit the water regime prevailed in the flood plain. From the above evidence we can conjecture that both broadcast and transplanting methods were practiced depending on the area. As the early settlements are found in the levee-basin pattern of land, it could be expected that broadcasting methods, which is more suitable for such terrain, would have been predominant. For lack of further narration the basic pattern of agriculture can be conjectured as being of a single crop grown in Wet season to be harvested after the water receded in December or January.[2/] The timing of agricultural activities

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1/ P.P.S.D. Ayuthya, Chabap Panchantanumas pp. 265.

2/ P.P.S.D. Ayuthya-Chabap Panchantanumas, Anno 1588, pp. 262-263.

varied mainly according to the methods of planting used. In the broadcasting areas ploughing is done in March and April, followed by the broadcasting of seeds shortly after the first rains. Flood water begins to rise in late August or September reaching their peak in October. Harvesting of the crops takes place after the flood have receded. Several varieties are planted in the areas which are the last to drain after the flood waters recede.

In the lower hill terrace, which were known to have been sparingly populated, this could have been transplant rice area. In these areas the nurseries are usually planted between May and July, with transplanting generally completed by the end of August. Harvesting takes place from November to Early January. This area posed quite great risk to the farmers, among which are the crop loss through flood and drought. Drought damage usually occurs in the period between broadcasting the seeds and the rise of the flood waters. If this happens the farmers have to replant their crop and if the replanting is too late relative to the time of flood water rise, the young plants may be drown.

The delta area is known to have been cultivated only recently and in the low lying area, floating rice varieties are grown, invariably by broadcasting methods. This is necessitated by the lack of water early in the season followed by high annual flood.

Settlements and Rice Cultivation till the 19th Century.

The development of the Chao Phya Plain from the 14th Century to the early 19th century can be characterized by the concentration of rice cultivation in the flood plain, with later expansion to the delta in response to foreign trade.

The early settlement was seen in the levee-basin land along the distributaries north of the City of Ayuthya. The rural population could have been expanded as there were continuous flows of war slaves to the plain during the 14th and 15th century, which resulted in the consolidation of the power of Ayuthya over the Northern flood plain in the Yom and Nan basin. Reports of war captives families being removed from the North and Cambodia appears in the Annals.[1/]

In time of peace, rice surplus was seen and exports to Malacca was already observed by the early Portuguese accounts of Asian Trade.[2/] Yet, for lack of records of early canal building, we can expect that the early Ayuthya period, settlement would only be along the natural river channels, between the Noi and the main Chao Phya distributaries and around the city of Ayuthya itself.

1/ PRPD Ayuthya ....

2/ Pires (1548) , cited in Meilink Roelofsz, Asian Trade and European Influence, pp. 72-73 (1962).

From the early sixteenth century to about the second decades of the seventeenth century, the state of regular war with Burma set in, together with the expansion of foreign trade during interim peace time. The wars themselves had an irreversible effect on population and settlement pattern as well as agriculture. The conduct of war, was by mass movement of army invading the adversary's territory, resulting in the abandonment of settlement en route for fear of looting or capture. The people were recruited in the army and moved on foot, and in long siege the state of desolation set in. In the end both the victor and the conquered suffered. This state of affairs lasted till about 1588 when relative peace was restored. The impact of this long wars was great. The population in the plain could at best remain static, while population in other areas had to be removed to the Chao Phya plain to replenish the loss. This was quite evidenced in the abandonment of the Yom and Nan settlements to defense Ayuthya.[1/] Eventhough these people were allowed to return after peace was restored, many could have remained in the central plain around Ayuthya.

Following this series of war also saw changes in settlement. The towns along the war routes were abandonned for fear of being marooned or used as garrison for enemies. This happened to the towns such as Suphan and Nakorn Nayok, which were abandonned. And population later were to be concentrated near Ayuthya.

1/ PRPK Ayuthya (King Naresuan Reign).

Besides, the wars made it compulsory for citizens to be strictly tied to the "Nai" to facilitate future recruitment. Van Vliet's chronicle[1/] specifically mentioned that King Ekatosros (1605-1670) proclaimed that citizens, and new settlers were to be classified under the "Nai" (master) and would always remained under their control.

This concentration of settlements and the strict control over citizen had its impact on agriculture in that movement of citizen to new area was controlled. It is not surprising then to see the later emergence of settlements which gains townships - such as Moung In, Moung Prom, Moung Sing, Moung San - all in the flood plain North of Ayuthya. These towns could have served the function of administration under the new strict social organization.

From the 17th century to the last days of Ayuthya (1767), the period experienced no major war, but fearce power struggles, sometime bloody, were quite regular. This, however, did not affect the general population, except that movement of population was still restricted for fear of revolt. The normal relationship between the court and citizen was only through regular conscription to serve in public works and in most peace time this was somewhat relaxed.

Foreign trade opportunities during the period, could have more impact on the settlement pattern and cultivation. Rice and provisions

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1/ Van Vliet Chronicle, p.

became again an export items after peace was restored, eventhough its significance was overshadowed by high value items such as deerskin, sappan woods, pepper, and saltpetre.

The dutch paper reveals[1/] that rice was exported to Java in large quantity to meet the shortage during the 1624-1626, but intermittently hence. The 17th century trade of Ayuthya was mainly as entrepot for the Moors, the European on the one hand, and the Chinese and the Japanese on the others. In the latter period, till the end of Ayuthya, rice has emerged as one of the major and regular items of trade - destined mainly to China. Sarasin Veeraphol's study of Sino-Siames Trade confirms that regular trade had replaced the tributary trade by the 18th century and the Chinese Court openly encouraged rice import from Siam. By 1750 rice has become the top foreign exchange earners for Siam, exporting several hundred thousands picul to China (Kwangtung).[2/]

The lucrative trade, conducted not only by the court but also by the mandarin and merchant, provided opportunity for commercial production and as such the demand for labour had increased. As early as 1686, the Iranian emissary[3/] observed that debt slaves were abound and possessing

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1/ Dutch Paper, cited in G.V. Smith p. 239.

2/ Sarasin Veeraphol, "Rice & Sino Siamese Trade in the 18th Century", paper presented to 7th conference of IAHA. 1977, Bangkok.

3/ John O'Kane, (Translation) Ship of Sulaiman 1686 p. 131.

debt slaves was the only means by which the enterprising people enriched themselves. Naturally, the growing incidence of debt slaves could have been in response to opportunity for production geared for trade and which could have accounted for rice increase during the later period.

By the 18th Century the opportunity open for trade has stimulated the further growth of settlements along the river banks in the lower reach of the Delta. The town of Nakorn Chaisree and Nonthaburi were established for logistic reasons during the 16th century. But by the 18th these have grown in size and importance. As much as 30,000 corvée labour were conscripted for canal building from these lower delta dwellers in 8 provinces which were found along the river banks.1/

The foreign trade also stimulated a major public development namely transport canals.

From the 18th century, Ayuthya had became one of the most significant trading centre. As the main channels linking the city of Ayuthya and town along the lower reaches of the Chao Phya Delta, channels were improved and shortened to facilitate transportation. At least ten such short cut were undertaken and formed the greater part of public work during the period.

Besides the shortcut channels, there were a number of transverse canals - namely Klong Samrong, (since 1498) which runs from the east bank

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1/ PPSD K. Ayuthya, King Chao Sua.

of Chao Phya toward the Bang Pakong river and the Mahachai (1704) from the West Bank to the Prachin River. This could have been built for logistic purpose to links the provincial towns with the City.

By 1767 a discription of settlement and rice cultivation could be extracted from the Haw Loung Paper.[1/]

Ayuthya was discribed as a busy trading post for both inland and overseas trade. Inland trade comprises sugar cane juice, tobacco, bees wax from the Nan River; coconu, mangrove wood, salt from the coast, lacquer, bees wax, birds feather, clothes, dry meat, lac, silk, etc. from Northeast and Cambodia (by ox-carts). Fish and fish products came from Petburi.

As for rice, abundant rice came from Angthong, Lopburi, Moung In, Moung Phrom, Moung Sing, Moung San, Moung Supan, all in the flood plain. Rice related industries were also active - rice milling, distilleries, milling for export on chinese junk, pig raising, vermicelli plants.

After the fall of Ayuthya in 1767, the population seemed to have scattered all over the area. When peace was again restored, the ruling elites found it more advangageous to establish the administrative seat on the lower reach of the delta in Bangkok, some 30 kilometers from the mouth of the river.

1/ Talang Ngan Pravatsat, Ekasan Boran Kadee, Vol. 3, No. 1, January, B.E. 2512.

The early development of Bangkok was mainly urban construction, but canal buildings were also quite active prior to the opening of the country to foreign trade in 1855. The characteristic of canal development was different from these upstream in earlier periods. This later effort was mainly to ameliorate tidal influence affecting ricefields. In this period, saw such improvement as blocking a shortcut canal carrying brackish water (Klong Lad Po.) and the blocking of Klong Samrong, Banghia etc. against salt water intrusion.

A number of lateral canals were dug during the late 18th and early 19th century but there were mainly to serve military purposes - i.e. mobilization of troops and supports as well as for revenue collection. Fortification of coastal towns such as Samut Prakarn, Samut Sakorn, Samut Songkarm etc. were made at junction of the existing canals. Meanwhile the beligerency over Cambodia encouraged canal construction from Bangkok to the East, the Saen Saep canal (1837). This canal running in a straight line on the delta high region to the east of the capital. This canal was to became a springboard for future development of the lower part of the delta in the 19th century.

As for settlement, it was noted earlier that eventhough, in response to trade, settlement in the lower reach of the delta were established. But these were mainly concentrated along the major rivers and served more as trading posts rather than as a rice producing area. The provinces in the lower reach were not at the time of Ayuthya, rice surplus area. Rather they served as trading post, fortress or centre for non-rice provision.

The 18-19th century settlements pattern in the lower delta was influenced mainly by the migration from outer area to the Chao Phya Plain. Among the significant groups were the Malay from Kedah and Pattani, settled in East of Bangkok, and Ayuthya; the Vietnamese, in Ayuthya and Bangkok; the Mon in Pratoom, Bangkok and Pra Pradeang; the Loas from Loung Prabang - settled in number of higher area especially in the lower terrace land in Prachin, Nakorn Nayok, Saraburi (Sao Hai), Lopburi (Banmi), Moung Phrom, Banrai (Uthai thani), Supan River area, Rajburi and Petburi. There were a number of Cambodian but they were gathered outside the central plain. It is very difficult to enumerate the number of the new migrants but they should have been hundreds of thousands by 1855.

Description of Settlement

Crawfurds (1823) mentioned the population of Siam to be about 5.14 million but this could have included the outher area such as Northeast, North and South Thailand. Ethnically, the Siamese and Laos were about 4.2 million, while the Mon, Cambodian, and Malay comprised 42,000*, 50,000 and 15,000 respectively. The Chinese, however, were the largest alien group comprising 700,000 souls.

Among the crops grown in 1823 were rice, sugar, pepper and tobacco. Rice was grown in the flood plain. Sugar were introduced about 1870 and by 1824 the industry was able to export about 80,000 picul of refined sugar. Pepper were grown in Chonburi area and 60,000 picul

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* Crawfurd: to Swinston 27/June 1823. This figure in confirmed by Thai Source: (1815) See Damrong PPR Rama II Reign, pp. 224-227.

were exported. In 1803 tobacco was introduced and were available for export. The central plain was also known for its high quality salt.

Finally, the settlement pattern as of 1855 was described by Harry Parkes of the British Survey Team accompanying the embassy of Crawfard. Parkes described the central plain to be rich in rice, indigo, corn, fruits, vegetables, cotton, sugar cane, pepper and spices. The area beyond the central plain was isolated and inaccessible. The settlement comprised of Bangkok and Ayuthya as the main community and town of significant size of 14, with numerous villages. Among the settlement narrated by Mr. Parkes, four areas can be distinguished:

1. The flood plain area. This area stretched from Moung Phrom to about Bangsai with densed settlement along the main Chao Phya river. Among the names mentioned which can still be identified today were Pra Ngarm, Chaiyo, Saket, Angthong Champalow, Phong Pheng, Bangklong, Ayuthya, Kohrien, Bang Paeng, Bang Pa-In. In the Maenam Noi area saw settlement such as Phakhai-Talan, Ban Changlek, Chowchet and Sikuk. On the Lopburi river area and Pahsak river, these included Maharaj, Nakornluang, Rakam, Pakchan and Ta Rua.

2. The delta of Bangkok. It is interesting to observe from Parkes' maps that the area on both sides of the Chao Phya from Bangsai to about the present Rangsit canal, there was very sparsed settlement. From Pakkred to the mouth of the

river the map again showed densed settlement including Ban Krachaeng, Bangpood, Taladkwan, Bangkok, Paklad and Paknam.

3. The strips along the lateral canals. By 1855 four majors canals, two on each side of the Chao Phya river have been constructed to connect the Bang Prakong river to the East and the Tahchin river to the West.

On the Eastern side saw the Sansap canal stretching from Bangkok to Padriew. On both sides of the canal, Vietnamese, Malay and Mon settlements were found.

Near the coast line saw the ancient Samrong canal on which settlement such as Bangplee, Hua Takae are located.

On the West bank found Klong Yang (presently Klong Mahasawad) connceting the Tahchin river at Nakornchaisri. This area is reported to have been at that time sparingly populated.

The Southern side the Mahachai which was built during Ayuthya period connecting Bangkok to Sakornburi and extended to the Mae Klong river. On this latter route strips of villages were mapped.

4. The outer area. Along the Mae Klong, Tahchin and the Bang Prakong rivers, settlement had been seen but they were sparsed and concentrated near river junction or administrative centres. In all cases, the settlement lie along the river courses.

It must be noted that in the low terrace area which is known to have been dwelled by the Laotian war captives were not well indicated in Parkes' map. The number of villagers must have been numerous but because of inaccessibility this might have been neglected by Parkes.

As of 1855 the rice growing area concentrated mainly in the old flood plain area between Mae nam Noi and Mae nam Chao Phya. The lower part of the delta, which can be delineated into 4 areas, remained to be developed during the latter half of the 19 century. These were :-

1. The Klong Sansap - Samrong area.
2. The lower West bank area (Nonburi-Nakornchaisri).
3. The Rangsit area.
4. The Chao Phya West bank.

In the present study concentration will be given to the expansion of rice cultivation in these areas.

CHAPTER II

The Rice Economy of Chao Phya Plain in Early 19th Century

Up to about 1855 rice was cultivated principally for domestic consumption, eventhough reports of export to China and Malay Coasts existed since the early 18th century, while sparodic export to Java were recorded since 17th century. In the early 19th century, state of war and military situation coupled with the growing segment of non-rice growing population meant that rice export surplus was not available in large quantity. As of 1849, Malloch reported export of rice of some 200,000 picul destined for China. This amounted only to 2.7% of total export of Siam, and rice ranked as the fifth export earners behind sugar cotton, sappan wood, and tin.[1/] Malloch, however, mentioned that export could be had in abundant and at cheap price. (18 ฿ Kwien of milled rice)

The low level of export could be explained by rice being a controlled commodity,[2/] and as such rice price was low and there was no incentive for farmers to grow rice on commercial scale. Much of the land were left unclutivated, especially those inaccessible area in the Plain.

In 1849 major rice growing area lied in the flood plain area around the old capital of Ayuthya. In the area permanently occupied land

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1/ Malloch, Statistical Appendix.

2/ Ibid. p. 7.

(Na Tra Daeng), accounted to about 320,000 rai[1/] which tallies with Crawfurd (1823) figures, while those held under annual cultivation could have accounted for much more. The Tra Daeng area covers old settled land in Ayuthya, Angthong, Lopburi and Supanburi. In the other areas, in the lower delta near Bangkok, the rice land were held under semi-permanent tenureship and tax was collected only on the crop produced. This in practice suggests semi-permanency in crop production in the lower delta.

As of 1849, the old flood plain still continued to play vital role in providing surplus rice to feed the deficit area of Bangkok, as the cultivated land in the Delta was limited to only accessible area.

There is no figure available for the area under cultivation in 1849. But from the number of population and the amount of rice actually exported, we can estimate the rough area cultivation.

Malloch extimated that the total population of Siam as comprising about 3.653 million. But these were the population of the whole Kingdom. From the breakdown of ethnic groups and their likely settlement we can estimate the population in the Central Plain - comprising Krungkow, Krungthep (Bangkok), Prachin, Nakornchaisree, Rajburi and lower part of Nakornsawan as follows.

1/ N.A. No. 55 J.S. 1200#

Population

	Siam 1849	% in Central Plain	Number in Central Plain
Siamese	1,500,000	80%	1,200,000
Chinese	1,100,000	60%	660,000
Laos	700,000	-	50,000
Cambodian	130,000	-	10,000
Peguan	40,000	100%	40,000
Burmese	7,000	-	7,000
Others	14,050	-	14,050
Malay	170,000	-	10,000
Total	3,563,150	-	2,200,000

Source: Malloch, p. 73

With the population of 2,200,000, the annual paddy consumption per head was reported to be about $\frac{1}{3}$ of a kwien each.[1/] Then domestic consumption would amount to 666,666 kwien a year. Malloch also reported export of some 8,000 kwien of white rice of 13,333 kwien paddy, and 150 kwien of paddy. Thus total demand would be about 680,000 kwien. If we allow a margin of 3% for seeds, then the total production would be about 700,000 kwien. Assuming that the supply just met the

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1/ Calculated from 1 tanan per head of milled rice consumed per day see N.A. J.S. 1224 # 1706: To convert to paddy: $\frac{365}{20} \times \frac{1}{460} = 30.42$ Sad.

demand and at the average of 3 rai needed to produce one kwien,[1] then the area under cultivation would have been about 2,100,000 rai altogether.

It was earlier established that the Na Tradaeng in Krungkao, itself accounts for some 320,000 rais the other 1.8 million rais was then the Fang Loi area, which were located both in the old flood plain and the Bangkok delta and other riverine area. Judging from the new area which have been open up through a series of canal and reclamation of at least 2.3 million rais all located in the Bangkok delta,[1] it could be conjectured that the Bangkok delta area itself, could hardly have been widely cultivated, except the area near the existing water course, which were limited in area. Thus we would again conjecture that the bulk of 1.8 million rais would again concentrated in old flood plain areas, and other-riverine settlements, leaving the Bangkok delta area with few hundred thousand rais of cultivated land.

The farm practice was very much dictated by the water regime prevailed in each area. From scattered description farming method in the old flood plain was overwhelmingly by broadcasting, except in the area bordering the lower terrace land such as Kwang Pasak in Ayuthya, where some 20,000 rais were cultivated by transplanting method[2]. Judging from the topography one would guess that most of Saraburi, Nakornnayok,

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1/ Taweesin (1978).

2/ N.A. J.S. 1212 No. 22.

Banomsarakarm and some parts of Supanburi and Lopburi would have been under transplanted rice as well.

In the Bangkok delta, however, the area in Bangkok, Nonburi, Patoom, Kuen Kan, and Samut Prakarn were reported to be under transplanted rice.[1/]

The size of holding varied with the farm hand at the disposal of the farmer. In Bangkok area this ranged from 10 to 70 rais for common citizen and for the noble, 100 to 300 rais. While in the old flood plain, where land belonged more to common citizen, the holdingssize would have been smaller.[2/]

As we have no record of holding size for the period, we may use the statistics of average area for 1907[3/] which give the average holding size as follows:-

Monton	Number of Holding	Area (000 rais)	Average Holding Size
Bangkok	85,700	2,466	28.77 rais
Krungkao	196,747	3,035	15.427 rais
Nakornchaisri	77,105	1,552	20.128 rais
Prachin	77,229	2,134	27.637 rais
Rajburi	61,634	625	10.15 rais

1/ N.A. J.S. 1205, No. 37.

2/ See N.A. J.S. 1205 No. 37 and J.S. 1220 No. 106.

3/ Twentieth Century Impression of Siam, (1908) page 126.

Judging from the above table and assuming that there was very small change in holding size in the area around Ayuthya from 1849, then the average holding size would have been less than 20 rais. For Nakornchaisri and Prachin which include the newly opened land in the late 19th century, the figure of holding size would have been some what larger Given the evidence provided by Taweesin,[1/] as distribution of land was highly uneven, the average holding size in new area opened by new canals would raise the average to higher figure.

The yield per rai is obscured. For computation of tax base, it was generally accepted that the average of $\frac{1}{3}$ kwien per rai would have been normal[2/] however, the yield might vary according to the method of cultivation and the relative fertility of the land. Generally speaking per rai yield for transplanted rai would be higher than broadcast rice and the figure of $\frac{2}{5}$ kwien per rai was possible.

Land tenure system

The land tenure system in old Siam was inherited until this period. The tenure system was quite elaborated. The old law[3/] reflected the policy of encouraging the cultivation and avoiding dispute over land right. The law shows great concern for registration mainly for tax purpose. (Article 45).

1/ Taweesin SuebWattana 2521 p. 38.

2/ See N.A. Rama III J.S. 1212 No. 22.

3/ พระอัยการ ลักษณะกู้หนี้ และ พระอัยการเบ็ดเสร็จ

In general the right to occupy a piece of land in the Kingdom had to be given the states recognition. The right over land was classified into various types according to the right and obligation over the land and the duration of tenureship. The Na Tradaeng gave the right for free holding and as such it was treated as a private property of the individual and was inheritable and alienable. The owner had the obligation to pay annual tax and to organize cultivation. The tenureship is considered perpetual so long as he could organize farming of the land whether by himself or somebody else. In case where he had to depend on tenant farmer or sharecropper the latter's right was also protected. After three consecutive years the tenant had the right to hold out the land for his lifetime but without property right.[1/]

The Na Trachong. These are lands with semi permanent tenureship. The right was very much similar to the free hold land but for tax purpose tax was collected based on the actual area under cultivation in any particular year. The owner had the obligation to see to it that the land was not left fallow for more than three consecutive years otherwise the lands had to be returned.[2/] In the newly settled area around Bangkok this type of tenureship was widely seen during the period.

This system in fact worked in favour of small holders with family labour, or those that had command of manpower in the old social structure.

1/ พระอัยการเบ็ดเสร็จ มาตรา ๕๗ (ยกเลิกเมื่อปี ๑๙๐๔)

2/ พระอัยการเบ็ดเสร็จ มาตรา ๔๓, ๔๕, ๖๓ใ

On the other hand this would have limited the size of holding to his status in society. In order to circumvent this regulation and to hold on to larger plot than necessary, extensive cultivation was widely practiced. This was very much a concern of the government. King Chulalongkorn in his early reign remarked that because of the glut in acquiring land too many people held on to the land without cultivating it to the full. So he proclaimed that for future allocation of land following completion of new Klongs farming ability of the owner had to be checked carefully.[1/]

Social Structure and Agricultural Practice

In the old Siam of the early 19th Century the social structure was inherited more or less along the line of Ayuthya period. The social structure was complicated and is still not quite clear to the author. Nevertheless attempt is here made to reconstruct from scattered evidence.

Generally speaking, the various groups of people can be classified according to three kind of status: birth, official position and private relations.

1. Birth: this was classified into Royal family and Non Royal family. The former held ascribed status since birth and were put in separate class. Those that held official position could acquire dual status at the same time.

1/ PKPS - RS 96: ประกาศคลองนครเนื่องเขต

2. Official position: This was a major classification governing the whole social framework. The society was organized for administrative reason into various Krom headed by top rank officials most of whom were members of the Royal family or old nobility. The krom had juridiction over mobilization of manpower for war or public work. Within each krom there were series of descending echelon of official from krom, Kong, to mūu. All the official holding such position were attached their sakdina rank again in descending order.

Of concern to our study is the place of the common citizen in the social set up. In theory each citizen had to be attached to a certain Chao Mūu on whom he can be accounted for his whereabout and to perform his obligation to the state. This class of people was generally called prai.

The prai were again classified according to their attachement Those that were war captives, mainly the Laos and Cambodians, were placed under prai luang status which meant they had not been allocated to the official and were obliged to serve in the royal function. Apart from the Laos and Cambodian war captives, there were also Thai ethnics who for one reason or other had inherited such status. During the early of 19th century the prai luang were obliged to be conscripted for serving the royal function for three months a year while the free men were to serve one month each.

According to the record during Rama III reign [1] altogether the prai luang comprised less than 40,000 of the whole two millions population. The reference cited reveals one incident when the King wished to build up rice stock. He ordered Lek Huamuang to procure at free of charge $\frac{1}{3}$ of kwien of rice from each family. He demanded only his men which included the prai luang and phrai attached to officials (Tanai and Som). Altogether in that year he obtained paddy from 6150 families of whom 3820 were prai luang.

Thus it could be asserted that the bulk of the population were more or less free citizen with the obligation to provide corvee labour for one month a year. The rest of the time were at their own disposal.

It is to be noted that about 1849 the prai luang which were conscripted to serve royal function range from 886 to 924 for any particular month. If we allow the rotation by multiplying factor of 4 (one to serve three month a year), the total conscripted would be about 3,600 which tallies with the number of Prai Luang families cited earlier. The work performed by the Prai Luang was mainly regular royal service such as palace guard, rice farming on the King's land and to a limited extent in sugar milling. In the dry season more were conscripted for public work such as temple, palace and fortress building while in the water season they might have been used as oarsman for royal barge.[2]

1/ N.A. J.S. 1194, No. 40.

2/ N.A. J.S. 1202 No. 156, 157, 158.

3. Private Status: Apart from the ascribed and acquired status mentioned earlier, there were also another social status resulted from private relationship. Any citizen might alienate his right and obligation to become slave of other people. In so doing he lost his own free labour to become protegee of his master in the same way as wife and children, who had no right of their own and were possession of the master.[1/]

In this category of people some of the bondage were inherited and some were bonded by debt. According to the law a man could pawn himself, his wife and children whereby his or their labour could be used by the master as they wished, subject to the law. Redemption could only be made if the financial obligation had been met as agreed in the terms of contract. The majority of the cases were the contract whereby labour was used in lieu to interest accrued and the principle remained to be paid in full. Of relevant to our study is the regulation concerning the time of redemption. It was prohibited to redeem slave during ploughing and harvesting period.[2/]

Farming Organization

In order to understand the farming organization we have an evidence suggesting the type of farm organization prevailed in the period from Prince Narathip letters to Chao Phya Aphai Raja.[3/]

1/ พระอัยการทาส มาตรา ๑, ๒

2/ พระอัยการทาส มาตรา ๑๖

3/ N.A. Rama V ก.ษ. ๓.๒/๒๘ ๓๐ เมษายน ร.ศ. ๑๑๗ (ค.ศ. ๑๙๐๒)

The situation in 1902, when the land had been overwhelmingly acquired by the landlord, five types of farming organization were observed.

1. Those with adequate means of farming but had no land of their own: they would rent the land and pay only the rental fees.

2. Those with inadequate means and with no land of their own: they had to borrow from the land owner;the proceed from farming went to the tenant who paid rents and interest on capital borrowed.

3. Those without means and land and were past debt slave redeemed by the landowner: the proceed was splitted by half and half until the debt and the redemption was repaid in full and thence converted to pure tenant (type 1 above).

4. Landlord managed his own farming with employed farmhand: the employee received provision and clothing and fixed wage.

5. The landlord organized his farming using his own slave: the slave received provision, clothing and redemption allowance of half the wage of normal employee until full redemption and thence converted to normal employee.

While this situation were prevailing in 1902 the situation in 1849 were less elaborated. It must be remembered that there were very few free labour around as citizen were subjected to corvee,[1/] and land were available for reclamation. Thus the only means for large landlord

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1/ Crawford ๒๗ มิถุนายน ๑๘๒๓ หัวข้อ ๗๔ใ

to organize farming was through their procession of slave. Thus in the author's judgement there were only two kinds of farming organization.

1. Free farmers with their own land with their own means or borrowed capital.

2. The nobility with large plot of land of 100 to 300 rais usually acquired through royal grant, using their slaves as farmhand. The farmhand received subsistence allowance with or without provision for redemption.

The distribution of rice

It has been mentioned earlier that about a little over 2 millions rais were cultivated in the central plain and the bulk of which lied in the upper flood plain. As demographic pattern changed to be more densely concentrated in the Bangkok delta, it was likely that the flow of rice would be in **southwards** direction. Ayuthya was still the main supplyer for Bangkok and other areas.

As of 1849 Malloch[1/] reported Bangkok population to be about 160,000 and other towns in the plain accounted for 52,000 and this brought the total urban population to 212,000. Besides there were a number of rural area with large concentration of non-rice growing people especially in sugar cane, fruit growing, salt farming and fishing area which altogether

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1/ Malloch Siam 1852 p. 70.

could have accounted for no less than 100,000. These people had to be supplied with rice. In this case assuming that surplus rice were obtained mainly from the old flood plain area then the surplus generated therefrom would have to be around 100,000 kwien.

This surplus would have come from the small holder with the average of 15 rais holding with some 2 to 3 kwien surplus from each holding.

The urban consumers obtained their rice from various sources. If they were land owning classes and practiced sharecropping of some form, they would receive rice directly from their tenant and even had surplus for sale. The rest had to purchase from merchants. The author believes that some itinerant traders would have acted as by buyer and seller as we have seen in the late Ayuthya period.[1/]

For the royal service itself the King obtained rice through land taxation either in the form of cash or kind. The tax in kind was practiced until at least 1824[2/] at the rate of 2 tang per rai for use in the royal service. This would bring in about 7,500 kwien from the Na Kuko alone. This would be adequate to feed an army and monks of over 130,000 or to provide stock in time of famine or war. It is known that the King himself would distribute out of his stock to sell cheaply to the people during the time of poor crop.[3/]

1/ คำให้การของหลวงวัดประดู่ทรงธรรม จดหมายเหตุหอหลวง แถลงงานประวัติศาสตร์ เอกสารโบราณคดี ปีที่ ๓ เล่ม ๒ เดือน พฤษภาคม ๒๕๑๒.

2/ ประชุมกฎหมายประจำศก ร.ศ. ๔๓ พระราชกำหนดให้เรียกเข้าคำนารายคด ๒ ถัง คง ๒ ถัง

3/ N.A. Rama III J.S. 1206 No. 65.

Apart from this the King could always extract extra surplus for immediate need but usually this had to be bought.[1/]

As regard rice price, the on going price in the normal year in Bangkok would be about 8 to 10 Baht per kwien. The price, however, varied with the localities and the timing of purchase and the weather condition. For example in the year 1838 (J.S. 1200) rice price was reported to be about 10 Baht per kwien but in the year 1840 (J.S. 1202) the price went up to 20 Baht due to poor harvest. The fluctuation in rice price was vividly explained by the proclaimation of Rama IV which reads:

> "In the past the King prohibited exportation of rice and only allowed just enough for provision. Those who were not farmers were comfortable because they could obtain rice at 4 Baht, 5 Baht or 6 Baht but the farmers did not like it because they could not obtain enough income. So many seek to desert the land or returned the land to the government in tens of 1,000 rais to earn living elsewhere. The merchants did not like it either because they had to smuggle it out.....
> ....for the buyers; they could not store rice for a long time because it would get rotten so they bought only little for storage. When the rain stopped for 9 or 10 days there was mad ruch to buy up rice for fear of high price. The farmers saw the oppor- [illegible] raise the rice price to 40 Baht in no time.....[2/]

1/ See จดหมายหลวงอุดมสมบัติ ฉบับที่ ๑ หน้า ๗๑ เดือน ๔ ขึ้น ๑๓ ค่ำ พ.ศ. ๒๓๘๑ และ N.A. Rama III J.S. 1206 No. 29, และ No. 58.

2/ PKPS Vol. 5, p. 283.

The government policy on rice cultivation and trade.

In general the main concern of the government was to maintain adequate supply of rice throughout the Kingdom especially to stock up rice in time of emergency such as mobilization for war. Therefore the longtime policy was to settle as many people as possible in the Central Plain. It can be seen that throughout the whole early 19th Century war captives and refugees were settled in tens of thousand around the plain. On the other hand Chinese were encouraged to trade and enter production of sugar pepper and public work contract. This policy have paid high dividend to the royal treasury in the form of tax revenue.

In regard to rice cultivation the government was concerned about extracting surplus rice from the farmers. As early as 1811[1/] King Rama II sent out land officers to survey and issue the Tra daeng to the citizen and collect tax in rice. The area around Bangkok were to be taxed for 2 tang a rai plus forced purchase of 2 tang, whereas the outer area no forced purchase was imposed. For those remote area far from Bangkok tax of $\frac{1}{4}$ Baht a rai were imposed. For the migrants' and the officials' land with the certificate of exemption, they were not taxed. This regulation was abolished and replaced by Rama the Third in 1824 (J.S. 1186) by universal tax of 2 tang for every rai of land and forced purchase was terminated.

As for production there was no distintive development policy as such. Until the reign of Rama the Third the main concern was with rice production in the old flood plain where most of the rice came from

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and very little attention was paid to lower delta areas. As production was subjected to the rainfall and the supply fluctuation resulted therefrom had caused scarcity and high price condition, the King paid closed attention to the water regime. When any sign of bad weather arrived, He would instruct report to be sent to Him two or three times a month until the end of the crop year.[1/] If the crop turned bad he would instruct the local official to perform public work such as erecting weirs preventing the water in the rice field from draining into the main river to maintain the water level in the field. This was the case in J.S. 1205[2/] which resulted in reduction of damage considerably. And after the year, He encouraged the second crop to be grown where possible.[3/]

We could see that in the circumstances where the water control system was still primitive there was not very much the government could do to help the farmer. In the last resort the government would have to relieve the citizen of the tax, as in J.S. 1205[4/] after a poor crop year; even the Tra daeng land which was affected were exempted from tax.

1/ See N.A. Rama III J.S. 1205 No. 53, No. 137 J.S. 1212 No. 22, J.S. 1203 No. 20, J.S. 1206 No. 65.

2/ N.A. Rama III, J.S. 1205 No. 37.

3/ N.A. Rama III, J.S. 1205, No. 61.

4/ N.A. Rama III, J.S. 1205, No. 54.

As against the earlier policy of Rama II, King Rama III in fact was not relying on land tax as a major source of revenue. Crawfard, for example, mentioned that land tax was slightly more than 10 percent of the total revenue. In fact the King himself proclaimed that he was not concerned so much with revenue as with the welfare of the people.[1/] Even his own stock of rice was to be reduced in favour of market distribution by postponing his own purchase for the year. If this measure was not enough he would still bring out his own rice for sale so that there would be adequate supply.[2/] Such statement revealed that rice policy was to ensure adequate supply and distribution rather than as primary revenue earning at least during the reign of Rama III.

In international trade policy rice was strictly controlled, and high export tax was imposed at the rate of 2 to 4 Baht a kwien.[3/] The strict control over export was a diehard policy despite the insistance of the European envoys to allow free export of rice. This resistance could be understood if we consider the prevailing situation of the days namely the situation of war and the risk of poor harvest. It was just unthinkable that the King would take such risky venture.

1/ N.A. Rama III, J.S. 1205, No. 54

2/ Ibid.

3/ N.A. Rama III, J.S. 121.. No. 122.

Yet He was seriously considering the reason given by Brooke, the British envoy, about allowing rice to be exported but the treaty had to be postponed because of the King's illness.

Summary

The economy of Siam up to 1855 was already expanding due to the growth in international trade especially of sugar, pepper, boat building, tobacco, but these activities were mainly accounted to for by the continuous migration of Chinese. Rice production was by and large domestic crop producing for home consumption as well as to supply the urban and non rice growing population. The rice area were still concentrated mainly in the old flood plain area.

The limited market outlet served to depress rice price, and as such commercial scale production could not have been encouraged. Whatever the marketable surplus available came from small holder farmers. The land system itself posed no limitation on expansion as land acquisition was quite liberal. The limitation, however, lied in the availibility of manpower as there were no free labours available as such. The only labour that could be acquired for rice farming were the debt slaves but if Crawford was correct the slave price was already at 150 Baht which means that an annual labour cost would be at least 21 Baht. With the on going rice price of 8 Baht p[illegible] K[illegible] and the productivity of labour of 20 rais or 6 [illegible] per head, the labour cost was well over 44 percent of [illegible] cost. Besides, with tax of 7.5 Baht and other subsistance allowance

for living then alltogether rice was naturally uneconomical to grow on commercial scale, even by using debt slaves.

In the new era the liberalization of rice trade served to stimulate the rice price and production in the later period. It is the contention of the author that this change in trade and production system have had more for reaching impact on the Thai society than any other single reform to be imposed by the ruling elite.

Chapter III

Expansion of Rice Cultivation

(1850-1890)

Background

The picture derived from contemporary observers shows that the Chao Phya Delta had vast potential for expansion. Crawfurd in 1824 mentioned that there was vast rice land which was inundated. This area was extremely fertile and large amount of rice could be had with minimum labour. Nowhere would rice be grown more cheaply than in Siam.[1/]

From 1824 to 1838 we have no records of the changes in rice cultivation, except to conjecture that rice land would have expanded due to the demand for rice in the state's sector, especially in the mobilization of rice to supply the war in Cambodia. This series of war began on large scale from 1833 to about 1846. These war efforts, required as much as 50,000 men (for the 1833 war) and 33,000 (in 1840) and a few ten thousands during the interim peace when troops were stationed in Cambodia.[2/]

The army however were mainly recruited from the Northeast provinces,but rice and provisions were provided from the Central Plain. In most cases rice were obtained through purchase by the King, as well as from land tax.

1/ Crawfurd to Swinston 1824 (para 15).

2/ เวลลา วอลเตอร์ แผ่นดินพระนั่งเกล้า

This artificial demand from the government served to stabilize domestic rice price; which was maintained in a regular year at 8-10 Baht a kwien[1/] in the Central Plain. If one were to consider a standing army of 40,000, then as much as 10,000 kwien had to be supplied annually.

The end of the war in 1846 resulted in the slow pulling back of troops, of which the last batch comprising men and families from Korat were pull back to Bangkok in 1851[2/] This halt in artificial demand for rice has caused rice price to drop considerably. King Mongkut himself mentioned in 1858 that before liberalization of rice export rice price had dropped to 4, 5, or 6 Baht a kwien[3/] Eventhough he did not give the date but this could have taken place after 1846.

The drop in demand and the resultant drop in rice price caused the decline in rice production. King Mongkut, went on to say that this low price caused the fall in income of the farmer who were found to have deserted the rice land and farmers took other occupation.[4/] Tens of thousands rai were returned to the government.

That this situation was real was found in the drop in land tax collected. For 1838[5/] land tax amounted to 2894, Chang (231,520 Baht)

1/ N.A. Rama II, J.S. 1200 (1838).

2/ N.A. Rama IV, J.S. 1213 (1851 No. 25).

3/ PPR IV, No. 120 ประกาศจ่ายเงินภาษีเข้าบำรุงพระนคร (๑๘๕๘)

4/ Ibid.

5/ .A. Rama III, J.S. 1200 No. 23.

while in 1851 land tax amounted only to 1900 change (152,000 Baht).[1/] This drop in tax of 80,000 Baht meant a drop of some 240,000 rai of cultivated land. The land tax had to be viewed with caution as there were a number of exemption and as the report and collection system was very poor. Nevertheless this serves to demonstrate the decline in rice cultivation prior to opening of trade.

The effect of the fall in rice cultivation on the rice price of the period was to see violent fluctuation, according to the nature of the water regime. King Mongkut described the situation that "when the rain stopped for nine or ten days, there was panick and people rushed to buy up rice. The farmer in their turn raised the price to 40-48 Baht a kwien"[2/] But when there was no panick "people just bought enough for their normal uses, for fear of rice getting rotten"[3/]

After the liberalization of trade in 1855, export was allowed but with export tax of 4 Baht/Kwien, imposed on milled rice and 2 Baht/Kwien on paddy. The government, however, reserved the right to ban export, whenever, poor crop was seen.[4/]

1/ N.A. Rama IV J.S. 1215, No. 88.

2/ PP Rama IV No. 120, ประกาศจ่ายภาษีเข้าบำรุงพระนคร.

3/ Ibid.

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Growth of Rice Production

During the next 35 years (till 1890), rice production continued to expand as high price was received. In order to estimate the area of cultivation expanded during the period, statistics complied from British Consular Reports is given below:-

Export of Price

Years	Exports '000, picul	Index 1857-1860=100
1857-1860	1,169	100
1861-1865	1,965	168
1866-1870	2,144	183
1871-1875	2,110	180
1876-1880	3,413	292
1881-1886	3,558	304
1886-1890	6,167	528

This fivefold increase in export seen from the table above reveals that after 1855-1860 export continued to expand from about one million picul to reach about 2 million picul in 1866, and reached a saturation point about 1875. The next decade again saw a rise to 3 million picul to be increased to 5 million picul after 1886.

Thus to meet export demand alone, the amount of land that had to be brought into cultivation would be about 300,000 rai in 1857-1860, 600,000 rais in 1875, 1,900,000 rais in 1885 and 1,800,000 rais in 1890[1/].

To this must be added the domestic demand for rice. We have estimated in chapter 2 that the population of the central plain was about 2.2 million in 1849; but the population could hardly remained static. Eventhough no demographic study had been attempted, one could conjecture from the figure given by Ingram for the Central Plain to be about 3,267, thousands in 1907. Then the population growth rate would be about .66% per annum.[2/] If we take this projection as correct then the population would have increased to 2,881,589 in 1890 or an increase of 681,089 people.

Thus the total demand for rice would be as follows:-

Year	Domestic Demand*	Export**	Total (kwien)	% Export/Total
1855-1860	568,391	116,900	685,291	17%
1861-1865	587,397	196,500	783,897	25%
1866-1870	607,039	214,400	821,439	26%
1871-1875	627,337	211,000	838,337	22%
1876-1880	648,315	341,300	989,615	34%
1881-1885	669,993	355,800	1,025,793	35%
1886-1890	692,397	616,700	1,309,097	47%

* Average Consumption ¼ kwien, paddy a year.

** 10 picul of milled rice 1 kwien paddy.

1/ **Land required = 10 picul of milled rice = 1 kwien of paddy and one rai produce $\frac{1}{3}$ of kwien.**

2/ This low growth rate may seen surprising, but this was confirmed by know that population was quite stationery (See British Consuler Report 1859).

The figure above tallies with British Consul Report[1/] which estimated the total production to be about 1.2 million tons and export amount to 500,000 tons. We would then consider our estimates as consistent with that of the Consul's.

The pattern of expansion

The growth of production of about 250,000 kwien has been estimated from the above table. To meet the growth of production, would require expansion of cultivable land of some 750,000 rais. This expansion could be accounted for by two series of changes. We have seen earlier that due to the lack in demand following the half of the war in Cambodia, the farmers were found to have deserted the land in favour of other employment. But when export was allowed and price rose to 12 Baht a kwien in 1855, to 18-20 Baht in 1860,[2/] the stimulation from regular floor price would have provided incentive for rice growing.[3/] The extra land of some 600,000 rais to meet the demand, could have been the partly met by the re-use of the hitherto deserted rice land. As of the end of King Mongkut's Reign land tax of some 400,000[4/] Baht in 1868 were collected as against

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1/ Mr. Beckett, 1889.

2/ N.A. Rama IV J.S. 1217 No. 46 and J.S. 1222 No. 36.

3/ Schomburg _____ B.C.R.-1860- "rice cultivation appears to be more popular with the native than any other work."

4/ Tipakornwong. (p.724-725) (1868).

200,000 in 1852. This change of 200,000 Baht is equivalent to about 800,000 rais increase in land cultivated.[1/]

Land Reclamation

For the initial period till 1875. The land brought under cultivation were mainly those in the area of existing rice land, which were more extensively cultivated than in the past. Shomburgh observed that land in the same holding was left fallow and grown in alternate year, but by 1865 they were fully cultivated. Also the land in the vicinity of rivers and canals was mostly taken up.[2/]

To a lesser extent, the period also saw new land being open up for cultivation through a series of canal buildings and reclamation. Eventhough many canals were dug for transport purpose, large land for cultivation were open up there from. Among the known canals dug during 1855-1870 were as follows:[3/]

1.	Chedi Puja	1858 - 22,450	rais
2.	Mahasawas	1860 - 41,040	rais
3.	Damnoensaduak	1868 - 50,400	rais
4.	Premprachakorn	1870 - 110,680	rais
	Total	224,570	rais

1/ Land Tax of 0.25 Baht for Kuko and .375 Baht for Fang Loi more could have been cultivated as tax were exempted for the 1st three years.

2/ BCR 1864 Sir Robert Schomburgh.

3/ Extracted from Taweesin (1978).

The area open up by the new canals, however, could not have been fully cultivated in 1875 due to the speculative nature of holdings. The land were held mainly by the princes and nobility taking up large plots of 300 rais or more and some time even as high as 1,000-2,000 rais each.[1/] Most of these plots was left fallow and small farmers were pre-empted from taking the land.

Thus as an estimate one can assert that the early growth of rice cultivation would account mainly from the extensive use of existing farm land, while the newly open area would account for the growth after 1860 with the opens of Klong Mahasawas, Damnoensaduak and Klong Premprachakorn.

The early growth of cultivation could to a lesser extent be accounted for by the government encouragement through a change in land administration. As early as 1853 the King caused new land registration to be undertaken. As the result it was found that many farmers had returned large areas under Tra Daeng in favour of the Fang Loi land to escape regular land tax. To encourage the farmer to retake the Tra Daeng, the King, through the advice of Chao Phya Sree Suriyawong, reduced the land tax by a third to 0.25 Baht per rai while the Fang Loi land, which was subject to land tax on area actually cultivated remained at 0.375 Baht.[2/] Whether this was attractive proposition to the farmers is not known. One would suspect that the farmers would have to weigh the difference between low regular tax and the high tax, based on actual cultivation.

1/ See PPR IV 1861 # 206, PKPS R.S.96.

2/ PPR IV No. 93 (1856).

The more far reaching change in land administration was the reduction of land tax for newly open land. This deliberate policy aims at encouraging open up new areas. In 1857[1/] the King announced that the new Na Ku Ko area open up would be free of tax for the first year, and subject to a half of normal tax for the next three years and thence full tax. For the Fang Loi land, the first year was also free of tax, but the next three years tax of 0.25 Baht per rai would be and thence 0.375 Baht.

This exemption, couple with the public canal construction programme encouraged the acquisition of land, as tax were exempted and the cost of, obtaining a certificate was minimal (1.50 Baht).[2/] This in itself was adequate to attract the speculators of influence to grap as large a plot as possible, with or without intention to cultivate it to the full. It was found later that many large plot were not fully used. In the 1878 Announcement opening Klong Nakorn Nuangket, King Chulalongkorn mentioned that when Klong Prem Prachakorn was completed, officials and citizens grapped the land as they pleased, and certificates (Bai chong) were issued, but the nobles grapped as much as 1,000-2,500 rais. Their protegees were used to cultivate it but they could not cultivate the whole lot. The Landless citizens would like to hold the land, but were afraid to do so. These land were then left fallow and become unproductive.[3/] In the same year,

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1/ PPR IV No. 125 (1857).

2/ N.A. J.S. 1215 No. 56 (1853).

3/ PKPS, R.S. 96 เรื่อง ประกาศคลองนครเนื่องเขต

He announced that He was going to be strict about the regulation on land holding. Citing the announcement of J.S. 1236, that if land were left fallow for three years, the right of tenure will be nullified.[1/]

This latter cited announcement would serve to stimulate land speculator to attempt to organize farming. This could have accounted more for further expansion.

Manpower

With regards to the manpower for rice cultivation, there did not seem to have been noticeable increase in the population of the central plain. Knox observed in 1859 that the population was quite stationery, and he did not expect great expansion of rice production for some years.[2/] This was quite a reasonable observation as there was no records of forced migration as in the earlier period; only Chinese continued to come, but their number was still small, compared to the later period.

The explanation for the growth in rice cultivation must then be found in the existing population. It has been observed earlier that before the liberalisation of trade in 1855, rice cultivation was in a decline due to lack of demand and poor price obtained by the farmers. The farmers were then just growing for their own subsistence with small market surplus in exchange for other provision. The opening of rice trade served to have

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1/ PRPS, R.S. 96 เรื่อง ประกาศขุดคลอง

2/ B.C.R. 1859 Reports by Mr. Knox on the Trade of Siam.

immediate effect on the new efforts to cultivate the land. Schomburgh in 1860 saw rice to have become more popular with the Thai than any other work. Also as there was increase demand in China, this had already led to an extension and it was doubtless that this would lead to more as the ruling price was already three hundred percent more than before the treaty of 1855.[1/] During the same year, Schomburgh also observed that sugar production was declining because sugar cane cultivation was found to be less profitable than that of rice.[2/] In fact sugar began to decline and ceased to be exportable items in 1878.[3/]

In the early years after the treaty the sources of manpower for cultivation was that of the existing farmhand, putting more efforts to cultivate the land in their existing holdings or the land in their own vicinity.[4/] Yet as of 1868, the newly opened area around Bangkok must have been increasingly cultivated as the Na Suan rice was already exported more than the Na Moung.[5/] As the Na Suan rice were cultivated near Bangkok, the new export would have been the result of the newly reclaimed land.

1/ B.C.R. 1860 Sir Robert Schomburgh and Mr. Henry Alabaster.

2/ Ibid.

3/ B.C.R. 1878 Mr. Knox.

4/ B.C.R. 1869 Mr. Knox to Earl Clarended: Surplus came from extra cultivation on existing land, which can be expanded without difficulty, if there were market.

5/ B.C.R. 1868 Trade Report.

The sources of the manpower for the new area is quite a puzzle. As we have seen earlier there were a number of new canals open up adding another 250,000 rais of land and allocated to the officials and nobles, and wealthy citizens. This area soon became a major source of the Na Suan rice, the bulk of which found its ways to overseas market. As the holding were of large size, it was unlikely that the landholders would have been able to cultivate the land by themselves. Nor could they hire farm labour to cultivate the land as there were no free labour available. The system was such that everyone had to be attached to the Mun Nai in the case of Prai Som or to the Chao Mun In the case of Phrai Loung. The Phrai were subject to corvee labour and as such were not available for hire. Even-though the Chinese came in a considerable number, but they were not prepared to work on the farm as they would prefer to work on fixed regular wage.[1/]

The organization of farming in this situation would then be for the land holders to seek to increase their own command of the labour, either from among their Phrai with no land of their own or without means to cultivate the land, or they would obtain the bondsmen (alia slaves) for cultivation.

Land acquisition

The motive for earlier land acquisition was based on the profit from the sales of rice rather than land price speculation.. Rice price

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1/ B.C.R. 1885 reports that Simese was used to the employment of slaves, and did not care to employ Chinese; the Chinese was not accustomed to slavery and would not enter into it and preferred regular pay.

increase had the effect on the large households because they had to feed many people and it would be a disadvantage to have to buy rice. King Monkut repeatedly appealed to the people to send their Bao-Prai to cultivate the land so that they did not have to suffer high rice price.[1/] Even the King himself allocated large plot of land to his own children, so that they could have the means to earn living by having the land tilled by their own protegees.[2/] The motive for land speculation, however, could not be ruled out. As the rice price became higher it would mean that the land with easy access and were well watered, would command high value.[3/] As early as 1865 land price had already appreciated considerably to the extent disputes over land right became lively public issues. In 1865, there were many cases of land dispute coming to the King for decision. His announcement reads:

> "In the past the majority of free citizen had their own rice or orchard land either through inheritance or given or sold to them. Many had put the land as collateral as land were cheap and it was more worthwhile to sell or mortgage the land than holding on to it. Now the land price

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1/ PKPS Vol. 5 1858. Prakas Thai Ngern Phasi Kao Bamroong Pra Nakorn. King Mongkut said for an individual to think that the rice price was higher than before, he should be industious and resourceful to look for land to be cultivated in rice. There were abundant land still available.

2/ PP, R. 4 # 206, King Mongkut granted 16200 rais to his children and exempt them from tax, as long as the land were not alienated from them.

3/ Van de Heide: "Economical Development of Siam During the Last half century". J.S.S. 1905.

> has increased, because there were more cultivation. Those that mortgaged the land wanted the land back - and alleged that the contract for mortgage and not the outright sales, or the land had not been purchased. They wanted the land back at old price.....[1/]

Yet, it was not until the 1878 when there was enough momentum in rice expansion, that the new kind of speculation set in with the government's encouragement. The profit motive from rice cultivation ruled high in this circumstances. Judging from the rice price and the relatively small fees payable to obtain the holding certificate (1.50 Baht) and hardly any contribution to canal building, it would seem likely that anyone with some control of manpower in any form would seek to enter cultivation.

In the following table, the attempts is made to show the extent of profit from organizing rice cultivation by large landholders.

Assuming that a noble had under his command one slave family, and put them to cultivate 20 rais of land, which was within the capacity of the fmaily to cultivate, then the proceed to the owner would be:-

Total rice production	6.67 Kwien
Farmhands' consumption (family of 5)	1.25 Kwien
Proceed to the master	5.42 Kwien
Rice price in 1860	16 Baht/kwien
Total value of surplus rice	86.70 Baht
Land Tax 0.375/rai	7.50 Baht

1/ PPR IV, J.S. 1228 No. 283 Prakas Roung Chamnam lae kai Fak Kammasit Teedin. (announcement regarding mortgage of land) 1865.

The slave's debt	160	Baht	
Compared with 14% interest, labour cost is equivalent to	22.40	Baht	
Profit	79.20	Baht	(or return of 50% on the lended money)

Yet if compared to the on going urban wage rate of some 0.375 Baht a day, the return could not still justified hiring wage labour, as the on going wage rate was about 10 Baht a month.[1/]

Certainly this would have stimulated those with control of cheap labour to organise farming. It is interesting to note that the response to opportunity of obtaining land cheaply and the profit from farming, cheap labour in the form of debt slave were in great demand. The comtemporary observers were noticing growing debt slavery in Siam during the period.

Debt Slaves

The demand for cheap farm hand would have stimulated more people wanting to take up debt slaves. By 1880 Palgrave reported that slavery existed as yet in full force throughout the Kingdom. This high incidence of slavery was caused by a rise in the price of labour.[2/] Even after the beginning of progressive abolition of slavery in 1874, by 1888, there were still strong movement to modify the law as in that year those slaves born

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1/ Pallegoix 1854

2/ B.C.R. 1880 W. Gifford Palgrave.

in 1868 were due to be freed.[1] From a Thai source, there was also growing demand for slaves.

That slaves were to become valuable assets was revealed in another evidence. A case came to King Mongkut's attention in 1866 of a certain Khun Pinit Woharn a wealthy man of Bang Maew (in Angthong) who had a large number of slaves. The slaves was to be redeemed but he persistently postponed the acceptance of repayment and claimed that the law prohibited redemption in farming seasons. As the King could not do anything to him because he did not breach the law, the King caused the local officers to ostracize him.[2]

This isolate incident reveals however, that slaves was in great demand, and those that had obtained them cheaply earlier would be reluctant to let them be redeemed. On the other hand, there might have been other people bidding for higher price for the existing slaves, as this were allowed in the existing system.

While the demand for cheap labour in the form of slaves could be explained as above, the growing bondage by the people themselves had to be explained further. The British Consuls were convinced that the growing slavery was caused by people becoming indulged in vices such as gambling.[3]

1/ B.C.R. 1888 Mr. Gould.

2/ PPR IV 1866 - Prakas Ham Mai Hai Ka Rachakarn Kob Ha Kub Sestee Bang Maew....

3/ B.C.R. 1880 Mr. Palgrave.

Gould pointed it strongly in 1888 that without controlling of gambling, it would be difficult to abolish slavery.[1/]

King Mongkut recognized the tendency for poor people to pawn children and wife and he wanted to discourage it. He announced that children over 15 and wife could not be pawned unless they agreed to do so and put their signature on the contract.[2/]

Besides, He also set limit on credit rendered by gambling houses to customers, for fear of total loss of property and become slaves.[3/] The advance limit was relatively small compared to the on going price level as the limit was based on old law. Finally, the King set limit on interest rate to be 15% per annum and thus make it easier to redeem slaves.

The fact that there were growing slavery could be explained by the high cost of living resulted from expansion of the economy and the risk involved in farming. In the first incident, the people without means to meet the high cost of living resulted from high rice price, had to borrow money to maintain living. With high interest and inability to pay the debt, they had to pawn themselves or children to became slaves. As for the independent farmers, they were better off as the rice price

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1/ B.C.R. 1888 by Mr. Gould.

2/ PPR IV # 292, and #294, 1867

3/ PPR IV # 262, 1865.

continued to rise. Even though, there are some years of poor crop but they still had other collateral - much as land and houses and did not have to resort to pawning themselves.

The Phrai Corvée

There was a tendency following the expansion of rice trade for the labour cost to rise as opportunity for productive employment was expanded. Between 1857-1890 wages has risen from 5 Baht[1/] a month to about 15 Baht a month.[2/] The increase in rice price and the return to labour would certainly have provided incentive for people with command of labour to hang on to it even more than in the past.

As regards the Phrai Loung there was a tendency for the Chao Mun to withhold corvée labour from the King. In fact throughout the period, the main preoccupation of the King was with growing difficulty in the mobilization of corvée labour. In 1855, King Mongkut caused registration of the Phrai and found that the number of Phrai Loung available was diminishing and corruption were seen in many cases.[3/] The King himself was attempting to increase his own labour force by recalling the Phrai Loung that were granted to officials[4/]

1/ PPR IV # 98, J.S. 1219

2/ B.C.R. 1890.

3/ Eg. PPR IV No. 109 where Phrai Loung in Supan were caught with false tattoos. 1857, and PPR IV #129, # 1859, #329 (1862).

4/ PPR IV J.S. 1219 # 98: where King Mongkut gave reason for his refusal to abolish Phrai System. PPR IV # 218 - he recalled those granted freedom by Rama III to become monks.

The officials on the other hands were pressing for the King to abolish The Phrai System in favour of hired labour. The King retorted against the idea very strongly.[1/]

Besides the diminishing member of Phrai Loung, the Phrai Som, who were subject to one month corvee were found to evade registration, and also many were found to be hided by high officials.[2/]

Among those that were to serve corvee there was more willingness to pay money in lieu to service. But the acceptance of money was more selective and bribery of Chao Mau Mun Nai were practiced.

The Chao Muu and Mun Nai were also willing to hide their men for their own uses, as their own farms had to be cultivated.[3/]

In the end, it became clear that even though there was no formal proclamation changing the Phrai system until 1899, there was already high pressure for the abolition of the system. Cases occurs where the Chao Muu had to allow movement of the Phrai Loung from their own habitat to new rice land. This is the case of Phrai Loung of Inburi to be allowed to settle in Klong San Saeb near Bangkok.[4/] If the Phrai Loung were

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1/ PPR IV No. #1129.

2/ Ibid.

3/ PKPS 1888 R.S. 105.

4/ See PKPS 1222 # 6, (1860).

allowed to do so, it could be expected that the Phrai Som who were treated more leniently would have been allowed to settle freely, as long as the Mun Nai could still keep tract of them. In fact the Chao Muu and the Mun Nai found it difficult to do so, as in the case of Phrai Loung who were allowed to settle in Klong San Saeb; many were found to have deserted their Chao Muu

The result was then that of the dispersal of citizen to settle freely, even though vain attempt to control them were still made.

Farming Organization Since 1874

The farming organization in the early period was very much that of owner-cultivator putting more efforts into expanded cultivation.

As the increasing rice price served to induce more people with means to control manpower to enter rice cultivation, there was a growing tendency for tenant farmers to emerge before 1890.

It may be recalled that new land open up in lower delta were under the possession of influential people. Through the profit motives, they put their capital and slaves to cultivate the land.

However, after 1874, when the King had made it clear that slavery was to be abolished, there were reaction from the vested interest group who asserted that the abolition would put hardship on the people, who would have been deprived of their last resort of credit, and for those

wishing to have labour force, the hired labour were not appropriate to Thai Customs.[1/]

Nevertheless the King's proclamation on eventual abolation of slavery made it difficult to obtain farmhand. Besides in 1877, the King was going to be strict with land holding right,[2/] against those holding the land without means for farming.

Meanwhile, the King still encouraged expansion of land by allowing people with means to reclaim land by canal diggings, and extended the transit period from 3 years to 5 years.

This expansion of land with obligation to cutlivate within 5 years, has stimulated a new system of farming organization. As land was greatly expanded since 1878 and the prospect of organizing farming through own labour became limited, the motives for land holding would be purely speculative, holding on to land for resale or to invite tenant farming.

Prince Narathip's description of landlord-tenants relationship was described in chapter 2. In the author's opinion the farming organization could have taken the following forms.

1. Farmers with limited means put up capital for land, often repurchase from the speculative landholders. Yet because of limited

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1/ จดหมายเหตุสยาม เล่ม ๒ ๑๒๔๕ หน้า ๗๒

2/ PKPS R.S. 96, ประกาศขุดคลอง

working capital they had to rely on money lender, who were mainly officials. That this existed as the first deviation from normal owner-cultivator is confirmed in many documents. Knox observed in 1875 that nothing was done to encourage the cultivators and a system of advances made by officials on the crops was growing up, which eventually took all profit out of their hands.[1/] He mentioned later that he had suggested to the government to prohibit this system of advance but he was doubtful whether the government would pay attention.[2/]

The King however, took the advice seriously and proclaimed that the system of advance was prohibited.[3/] The proclamation reads:

> "Those with capital were exploiting the farming citizen, they advance the money in return for rice. But the price given was lower than the market price - So the King proclaimed that hence forth - those with capital lending money to farmer to be repaid on prevailing market price and the maximum interest to be charged should not exceed 15%. If there were any case to court, this rule will be used in deciding the case".

Yet this was not effective. As of 1890, Mr. Backett reported that the farmers were borrowing capital at high interest to cover the

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1/ B.C.R. Knox 1875.

2/ B.C.R. Knox 1876.

3/ PKPS Vol. 9 R.S. 96, 1878.

expenses during the six months.[1/]

The tendency for farmers to rely on working capital from the money lenders was thus increasing.

2. Farmers without land and capital.

These category of farming usually involves the phrai and nai relationship. The landlords that had obtained the land, either through grant or purchase, would invite tenants to take up the land. The easiest sources of labour would be his protegees (Bao-Phrai). As to the exact relationship is not confirmed, but Prince Narathip mentioned that capital would be advanced to tenants. The proceed went to the tenants, who paid for the rent and interest on borrowed capital.

3. For those who have been former slaves of somebody else, and the landlord had paid money to redeem them. The landlords then provided capital for farming and the proceed was splitted in half, until all the debt has been repaid.

4. For the household slaves, the landlord would send them for farming. The proceed goes to the landlords and the debt is reduced by half the normal wages.

As the system of slavery was to be abolished in due course, the author would suspect that, eventually, the tendency would be for the pure

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1/ B.C.R. Mr. Backett 1890.

tenancy to be increasing, during the period.

Thus the liberalization of the rice trade until 1890 resulted in the staggering expansion of rice cultivation, primarily in the existing rice land with owner-cultivator pattern of farming. After 1865, there was a rapid expansion in cultivation in the new rice land in the lower delta around Bangkok. The profit motive from cultivation seems to be a prime moving force behind this expansion, until about 1875. The old institutions of labour corvée and slavery was to become absolete and ineffective. The later period saw the land price increase as well as growing demand for farm credit. At this juncture, the urban riches moved in to speculate on land and credit advance to farmers. New kind of tenancy emerged. The system of land and capital bondage began to replace old institutional phrai-nai, Ka-chao relationship. The new relationship open another episode of rice cultivation - which were to become more fluctuating as will be seen in the 1890-1910 periods.

CHAPTER IV

Development of the Market System

The establishment of rice export trade following the liberalization of international trade in 1855, has caused the development of domestic marketing system which assumed certain characteristics.

In the past, when rice was more or less a subsistence crop, farmers seldom disposed of the rice until there was certainty of the next crop. Soon after the harvest between December and February certain portion of rice was sold to middlemen who collected the rice in the barge and transported to the towns, where small mills existed for rice milling. The early disposal of rice was mainly to obtain enough money to pay taxes[1/] or to exchange for provisions. However, the bulk of paddy was stored up in barns for home consumption. As the water regime for the next season was highly unpredictable, it was unlikely that the farmers would dispose of their own stock until they were certain of good crop. This, they would not know until September, when the flood reached its high stage, when harzard due to flood had reached its peak. To understand this characteristics, rice farming was subject to two period of uncertainty. During the planting after the first monsoonal rain, the lapse of rain for considerable period would cause the young seedling to starve and new planting had to be made. If the new rain came too late then the rice

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1/ Twentieth Century Impression of Siam p. 145.

crops would not be mature enough when the flood arrived and might become drown. Even if the rice stork was high enough, the speed at which the flood came would still pose another danger to rice crop. Only when the flood reached its height that the farmers would be sure of the good crop, and were willing to dispose of the rice to the market.[1/] In this way, the farmers could await the high rice price before they dispose of it.

With the expansion of export trade there was a great change in the domestic rice marketing system which assumed new characteristics which lasted throughout the nineteenth century and the first half of the 20th century.

In the area where transport system was easy and the market system was well developed the great bulk of the marketable surplus was sold by primary producer immediately after the harvest.[2/] This rapid disposal of crop was due mainly to the development of a new credit system, whereby, the farmers borrowed money from the creditors to cover cultivating or living expenses. Immediately after the harvest the farmers had a number of cash demand. He had to pay his creditor either in cash or in paddy together with the interest charge. He had also to pay the government the land tax which was due immediately after the harvest. If he was to seek to pay capitation tax rather than corvee, this was again

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1/ B.C.R. 1871. Mr. Knox to Earl Granville.

2/ See King Chulalongkorn: เสด็จประพาสคลองมะขามเฒ่า where King Chulalongkorn observed that the people were still storing up rice in barn, while those in Ayuthya area had already disposed of the barn.

due at this time.[1/]

Thus the average farmers, except those wealthy ones who were able to stock up rice for future speculation, would have to dispose of a large portion of the crop soon after the harvest.

The effect of this early disposal meant that he had to dispose of the rice crop during the time when supply was in abundant and as such the price obtained was considerably lower than if he were to dispose of the rice later in the year.

Besides, the credit system emerged meant that the creditors could lay claim on the rice at depressed price. The extent of this system was so great that the government had to proclaim legislation as early as 1881 to prohibit the claim beyond reasonableness. In the proclamation of 1881 the government caused the price negotiated to be that of market price and the interest charged to be fixed at 14% per annum.[2/] It was doubtful, however, whether this legislation was widely or permanently enforced.

We have also seen that after 1870's there was already a development of landlordism as there was an encouragement by the government to grant land to the wealthy and noble to organize farming. In this system, early disposal of rice would have increased as the landlord would collect his share of the crop for disposal.

1/ Twentieth Century Impression of Siam p. 145.

2/ PKPS Vol. VI p. 194-195. ประกาศห้ามมิให้ตกข้าวแก่ชาวนา ร.ศ. ๙๖(A.D.1881).

The Intermediaries

We have very little discription of the early intermediaries, except to note that they would have existed since earlier period. However, the author's grand mother, who conducted collection of rice in Ayuthya in 1910's revealed the local intermediaries were generally a man of means who would advance money to the farmers in return for crop after the harvest.

As late of 1910's the farmers would divide their rice into 4 portions - those for seedling, those for early sales, those for own consumption, and those for daily exchange for provision. The intermediaries, soon after the harvest would rush to the farmers to lay claims on the paddy and transport to his house for storage. Throughout the year he would again take provision to the farmers, to exchange for the remaining rice. It could be noted that as of 1910's there was very little trade of rice in September as prevailed in the mid 19th century.

The local intermediaries were themselves, the dealers and speculators, as they would withhold the paddy till high price prevailed.

From the local intermediaries, the rice would be sold the big intermediaries, usually itinerant dealers, who would travel on boat to buy up rice in various localities and distributed to rice mills.

In the late 19th century, most of the rice collected were destined for Bangkok's big rice mills, as there were few rice mills in the localities, and as land were then newly open up and it was not economical to mill rice locally.

As for the system of purchase of the big mills the following exepts from contemporary observers[1/] could well describe the situation:

"Every description of boat may be seen on the Menam, and there is quite a variety used for carrying paddy. For transport from the places around Bangkok only small boats, carrying 5 to 15 tons are employed, but for more distance places large crafts are engaged, some of which carry from 30 to 35 tons. These boats will sometimes spend three to four weeks on one trip, covering a distance of a hundred and fifty to two hundred miles. Loaded, these large boats draw 6 to 8 feet of water, but when empty only about 2 feet."

"On arrival at the reaches of the river above Bangkok. The boats are met by "runners" from all the different mills - offering to tow the boats down gratis to that particular mill to which the runner belongs. The runner informed the boatmen what is the nature of the demand for paddy and what particular mill is the strongest buyer, and also, it is quite probable, in their anxiety to bring about a "deal", gives good deal of information which is quite untrue. So the wily boat owners when he arrived in the market at Bangkok is fully posted as to the condition of trade prevailing and waits or sells his cargo at once to the highest bidder, according as he judges the situation"

"There are some boats that will go to the same mill trip after trip as the matter of course; the owner accepting the price ruling at

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1/ Twentieth Century Impression of Siam p. 145-147.

that particular mill, which is always understood to be a fair market price." In some instance even the boat are bound to a certain mill because they have received an advance or account of the paddy. Fortunately, however, the advance system is not at all common in Siam at least as far as the paddy crop is concerned".

Rice Mills

The development of rice export trade was followed by the expansion of rice milling industry. In the pre - 1890's most of the rice exported from Thailand was in the form of cargo rice as the rice was mainly destined for China and Singapore. Only after the turn of the century that white rice was more exported in place of cargo rice.

Soon after the opening of the country for rice trade, rice mills were established. In 1864, three steam rice mills were reported to be in business. Between 1876-1878 - 15 more were added. In 1880 fours were seen. By 1893 there were a total of 23 mills in operation in Bangkok and a small number in Padriew. The earlier mills were established by Europeans firms to be followed by a number of Chinese who were affiliated with their counterpart in Hong Kong and Singapore. Among the ones that was established before 1890 were as follows.

	Name	Years of Establishment	Affiliated
1.	The Arracan Co. Ltd.	1887	European
2.	Koh Hong Lee	1874, 1880, 1888	old chinese family
3.	A. Markwald	1886	European
4.	Kwang Hap Seng	1877	Hong Kong
5.	Lit Tit Nguan	1877	Local & Singapore
6.	Kim Cheng	1871	Singapore
7.	Kim Seng See	1881	Hong Kong
8.	Koh Mah Wah Co. Ltd.	1877	Hong Kong
9.	Chop Wong Li	1877	Hong Kong
10.	Chop Low Ban Seng	1882	Singapore

These early mills were generally large; with the milling capacity of 150-200 tons a day. In 1893 there were 23 such mills in Bangkok alone. With the average of 150 tons, the combined capacity would have been well over one million tons. If we take the total export of 800,000 tons for 1893, then there was already excess capacity of mills by 20%.

Price and Margins

The export price obtained till 1893 was very much fluctuating with the means price of milled rice of about 2.50-3.00 Baht a picul with a marked increase in price during poor crop years, and during the time when harvest in Saigon was poor. Between 1870-1890, the fluctuation was still high, but after 1880 the export price remained quite stable as can

be seen in the following figures.[1/]

1866-1870	2.32 Baht/Picul
1871-1875	2.73 "
1876-1880	3.05 "
1881-1885	2.70 "
1886-1890	2.80 "

It must be noted that since 1883 - there was already a drop in international price due to competition from Burma and Saigon. Yet because of the devaluation of the silver, on which the Baht was pegged, the fall in price of the rice was offset by the devaluation and as such, there was no disincentive effect on the part of the cultivator.[2/]

The marketing system thus described points to a number of implications:

1) There was a steady increase in export price till about 1885 when rice price showed some slight drop in price. Yet because of the devaluation domestic price obtained in Baht remained very much steady.

2) Because of the existence of continued market outlet especially with establishment of large number of rice mills, it was likely that competition among the mills would have kept the paddy price high in Bangkok.

1/ B.C.R. converted from export price.

2/ Baht continued to devalue from 8.-฿ ≠ £ to 9,23, 10.00 in 1883, 1885 respectively and remained at 10.00 till 1890 and thence falled again to 19.41 Baht = £ in 1904.

3) That because of this competition, the ruling price upcountry would not have been depressed, except through the growing system of advance to the farmers, the extent to which began to be widely felt since 1868. It was difficult to construct the margin of the middlemen and rice millers in the process. However, from scattered evidence,[1/] the difference between farmgate price and the export price can be constructed:

Year	Export Price Baht/Picul (milled rice)	Equivalence Value in paddy Baht/kwien (10 picul per kwien)	Farmgate Price Baht/kwien	Non-farmers' Margin	% of margin
1860	2.50	42.50	16	26.50	166%
1866	2.83	48.11	16	32.11	201%
1867	1.92	32.64	14	18.64	133%
1889	2.70	45.90	36	9.90	28%
1890	3.00	51.00	38	13.00	34%

It could be seen that paddy price was very much dictated by the degree of competition among rice mills. As we have seen earlier, in 1864 there were three rice mills in operation, but due to high profit margin obtained between 1876-1878, 15 more were added and in 1880's 4 more were put up. The demand for rice to feed the mills would have let to a sustainance of rice price is favour of the farmers.

1/ Export Price from B.C.R. Farmgate price from B.C.R. and PPR IV.

It must be noted that the margin thus constructed includes all the margin from intermediaries to exporters including the government's export tax. While accuracy of the above figure is to be fully checked, it could be asserted that the competition from millers would have created lively bid for higher farm price during the 1890's.

No doubt this keen competition among millers would have stimulated further expansion of rice land in the later period.

CHAPTER V

Conclusion

Price Incentive and Growth of Cultivated Land

In this final section of the study, the author attempts to construct a farm accounting model to explain the dynamics of growth of rice cultivation during 1855-1890. In particular it seeks to explain how the price movement had stimulated expansion of new land.

Here the author proposes to use simple farm account with the farm size of 25 rais which is within the capability of a family with a buffalo to cultivate one crop a year.

The following basis for calculation is assumed:

1) Crop return on farming was assume to be about $\frac{1}{3}$ of a rai to make one kwien or 8.33 kwien for 25 rai.

2) Price of paddy was average farmgate price for each year.

3) Cost of production includes

   3.1 Seedling $\frac{1}{80}$ of a kwien/per rai

   3.2 Buffaloes with 8 years' lives

   3.3 Farmhand are all family farmhand.

4) Average consumption of paddy per family was 1.5 kwien.

5) Land tax was 0.375 ฿/rai or 9.38 ฿

6) Net Return on farming equal, farm profit net of all cost and home consumption.

7) Return on land equals crop return minus consumption of farmers and allowance for land tax. The proceed is divided half and half between landlords and tenants.

Farmer Cultivators

	1870	1890
Gross paddy production	8.33 kwien	8.33 kwien
Home consumption	1.50 "	1.50 "
Reserve for seedling	.31 "	.31 "
Net Marketable rice	6.52 "	6.52 "
On going Price of paddy	16.00 Baht	38.00 Baht
Gross Cash Proceeds	104.32 "	247.76 "
Cost of Buffaloes per annum	3.00 "	5.00 "
	101.32 "	242.76 Baht
Land tax	9.38 "	9.38 "
Net return	91.94 Baht	233.38 Baht
Return per rai	3.68 Baht	9.34 Baht

Landlord organized farming with slaves labour

	1870	1890
Gross paddy production	8.33	8.33
Farm consumption	1.50	1.50
Reserve for seedling	.31	.31
Net Marketable rice	6.52	6.52

	1870	1890
On going paddy price	16.00 Baht	38.00 Baht
Gross cash proceeds	104.32	247.76
Capital cost/(buffaloes)	3.00	5.00
Land tax	9.38	9.38
Net return before deducting farmhand cost	91.94	233.38
Labour cost (14% of 150 Baht)	21.00	40.00*
	70.94	193.38
Return on land per rai	2.84	7.73 Baht

Share cropping

	1870	1890
Gross paddy production	8.33	8.33
Divided 50/50 for yields	4.16	4.16
Gross return to landhand	66.56	158.08
Landlord pays tax	9.38	9.38
	57.18	148.70
Return on land per rai	2.29	5.95 Baht/rai
Gross return to farmers	4.16	4.16
Seedling and home consumption	1.81	1.81
Marketable surplus	2.35	2.35
Value of Rice	37.60 Baht	89.30 Baht
Cost of capital	3.00 Baht	5.00 Baht
Return on labour	34.60 Baht	84.30 Baht

* hired labour.

It can be deducted from the above analysis that in the 1870's, the on going rice price was adequate to provide incentive for the farmers cultivation to put efforts in cultivation as the profit from farming was already high compared to the land cost, which could be liberally acquired. The same goes for the 1890's where return on land was already high.

For landlord organizing farming by slaves, the return on land was very much attractive. As the land acquisition cost was merely a little over 2 Baht per rai to cover the cost of the Klong. Then, the return of 2.84 Baht per annum per rai would provide more than 100% return on land acquisition cost. If slaves were available then, it would mean that the landlord would seek their service rather than hired labour. But as the debt slavery was in the process of being abolished in 1890's, the landlords would have to seek sharecroppers or tenants to cultivate the land. As such the return on land dropped considerably. But even so the return on land was still high enough to encourage further acquisition.

The author then suspects that, with the abolition of slavery, the labour market in Siam and thus the wage rate had become more uniform. As such there was no cheap labour available. The motive for land acquisition then turn to become return on investment in land, which become quite evident in the large land reclamation projects launched before the end of the Century.

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Number 9

Employment Effects of Small-and Medium-Scale Industries in Thailand

by

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EMPLOYMENT EFFECTS OF SMALL-AND MEDIUM-SCALE INDUSTRIES IN THAILAND

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I. Introduction

Like most other developing countries, manufacturing establishments in Thailand are mostly small scale. Statistics from the Ministry of Industry reveal that in addition to a multiplicity of home industries, there were a total of 44,135 registered factories in the country by the end of 1975, and over 90 percent of these were small-scale firms with less than 50 employees.[1] Despite its large number, the importance of small-scale manufacturing enterprises has up until recently been relatively neglected in Thailand's industrialization program.[2] The emphasis of the government industrial investment program has largely placed on the promotion of larger scale, "modern" enterprises, particularly those with foreign capital investment, and numerous smaller scale manufacturing firms have been excluded from the official promotion program.

A study of small- and medium-scale industry SMI was carried out by a group of people from the National Institute of Development Administration (NIDA) and the Faculty of Economics, Thammasat University during 1976-1977.[3] The field survey was conducted in July and August 1976. Stratefied random samples were chosen in 20 provinces in various regions of the country.[4] Since available data on assets of small-and medium-scale manufacturing firms were neither complete nor reliable, small-scale manufacturing firms were defined as those manufacturing enterprises with 10 to 50 workers, and medium-scale firms were those enterprises with employ more than 50 workers but less than 200 workers.[5] In the actual survey, however, quite a few number of establishments with

less than 10 and more than 200 workers were covered.[6] For comparison purposes, the size of the firms was divided into 5 groups according to the number of workers 1) less than 10 2) 10-49 3) 50-99 4) 100-199 5) 200 and over.[7]

This report is made by summarizing the employment effects and related issues of SMI in Thailand contained in the above-mentioned NIDA-Thammasat joint study.[8] The general picture of SMI in Thailand in terms of industrial distribution will first be presented before the discussions of employment-related issues.

II. Industrial Distribution

SMI in Thailand are geographically dispersed and are found in almost every type of manufacturing activity, particularly food products, textiles and related industries, furniture, chemical products, plastics, rubber products, clay-based and other non-metallic mineral products, foundry and metal industries, machine repair and assembly, electrical appliances and transport equipment.

Statistics on manufacturing establishments with different employment sizes from different official sources are inconsistent, although they all show the importance of small-scale firms in terms of number. Table 1 shows the number of manufacturing firms in different employment sizes by geographical region registered with the Ministry of Industry by the end of 1974 (excluding rice-milling, saw milling, printing, and ice-making firms). It is seen that firms with less than 10 workers comprised of 63.3 percent and those with 10-49 workers 30.3 percent

TABLE 1: NUMBER OF FIRMS REGISTERED WITH FACTORY CONTROL DIVISION, BY REGION AND NUMBER OF EMPLOYEES BY THE END OF 1974

No. of Employees	Greater Bangkok	Central Plain	North	Northeast	South	Whole Kingdom
Less than 10	6,809	2,813	720	723	739	11,804
10 - 49	2,813	1,449	447	556	382	5,647
50 - 99	259	284	75	64	42	724
100 - 199	113	144	15	25	19	316
200 and over	48	88	12	6	14	168
Total	10,042	4,778	1,269	1,374	1,196	18,659

Source: Factory Control Division, Ministry of Industry.

of the total. In fact, if non-registered firms were also included, the percentage of firms with less than 10 employees could be much higher than this. The number of firms with 10-49 and 50-199 workers by industrial group by the end of 1975, which adjusted from the data obtained from the National Statistical Office and used as the sampling frame in the survey is shown in Table 2[9/]

Table 3 shows the distribution of firms by industrial activity and size of the firm based on the survey returns. It is seen that small-scale firms appear in every industrial group. The industrial group that has a higher proportion of medium-scale firms (employing 50-199 workers) can be found only in tobacco and chemical products. As we further disaggregate the industrial activities, we found that large-, medium-and small-scale firms in many cases produce different types of product. The majority of smaller firms produce basic consumption goods to satisfy the demand of low-income people, and simple machine tools and equipment, spare parts which can be classified
while larger firms are more heavily oriented toward the production of consumer goods which serve the need of medium-and high-income people, and other intermediate and capital goods.

The value of production (in 1975) from 1,049 surveyed firms totalled 8, 641.2 million baht (U.S.$432.1 million). Nearly half of that amount comes from the large firms with 200 employees or over, which comprise only 4 percent of the total number of responding firms. There is much difference in average production value among firms of different

TABLE 2: NUMBER OF FIRMS BY INDUSTRY FOR THE WHOLE KINGDOM BY THE END OF 1975

Industry	No. of Employee		Whole Kingdom
	10-49	50-99	
Food	571	106	677
Beverage	73	33	106
Tobacco	84	124	208
Textiles	417	121	538
Wearing apparel	189	16	205
Leather products	43	4	47
Footwear	36	-	36
Wood products	127	33	160
Furniture	107	9	116
Paper products	72	16	88
Industrial chemicals	204	39	243
Other chemical products	140	46	186
Rubber products	65	29	94
Plastic products	144	19	163
Pottery	98	21	119
Glass products	110	35	145
Non-metallic mineral products	52	-	52
Iron and steel products	242	42	284
Non-ferrous metal	94	26	120
Fabricated metal products	126	-	126
Machinery	261	60	321
Electrical appliance	281	46	327
Transport equipment	113	44	157
Scientific equipment	126	43	169
Miscellaneous	26	-	26
	148	30	178
Total	3,949	942	4,891

Source: National Statistical Office.

TABLE 3: DISTRIBUTION OF FIRMS BY INDUSTRY AND EMPLOYMENT SIZE

Industry	No. of Employees					
	Less than 10	10-49	50-99	100 to 199	200 and over	Total
Food	29	92	17	7	5	150
Beverage	1	8	5	3	2	19
Tobacco	-	11	11	3	5	30
Textiles	5	76	22	6	7	116
Wearing apparel	9	15	5	1	2	32
Leather products	5	8	2	-	-	15
Footwear	4	6	-	-	-	10
Wood products	9	12	-	2	2	25
Furniture	4	19	5	3	1	32
Paper products	4	10	2	2	-	18
Industrial chemicals	2	19	3	-	2	26
Other chemical products	6	8	13	10	-	37
Rubber products	3	24	9	7	6	49
Plastic products	7	19	5	2	1	34
Pottery	4	26	9	3	1	43
Glass products	1	4	5	2	-	12
Non-metallic mineral products	12	58	6	5	-	81
Iron and steel products	10	25	1	-	-	36
Non-ferrous metal	8	14	1	-	1	24
Fabricated metal products	12	51	10	7	2	82
Machinery	13	42	1	2	-	58
Electrical appliance	5	19	2	3	2	31
Transport equipment	8	30	3	2	2	45
Scientific equipment	-	2	1	-	-	3
Miscellaneous	13	27	-	-	1	41
Total	174	625	138	70	42	1,049

employment sizes. The average production of the small firms with less than 10 workers is 500,000 baht (U.S. $25,000) while in the case of large enterprises which employ 200 workers or more the average production per firm amounts to almost 100 million baht (U.S. $ 5 million). The production ratio among different employment-size groups also varies widely. For example, although the number of firms in textile industry in the sample are concentrated in the small and medium scale categories, over 80 percent of the production value in this industrial group is generated by 7 largest-sized firms with 200 or more workers. The higher production value in small- and medium-scale firms appear in footwear, wearing apparel, and iron and steel products.

The industrial activities have been grouped into consumer, intermediate, and capital goods.[10/] Table 4 summarizes the proportion in each size category. We see that the proportion of consumer goods decreases and that of intermediate good increases with the size of the firms, except for large firms with 200 workers or more which have a higher proportion of consumer good production, which is largely accounted for by the firms producing food products, tobacco and textiles in this size category. As for capital goods, it appears that small-scale firms have a higher production ratio than medium - and large-scale firms. This may be the result of putting iron and steel and other metal foundries and other firms that repair or produce metal tools and utensils which are mostly small in size under the capital good category.

Another indicator for relative importance of industries is value-added. The value-added has been computed by deducting the costs

TABLE 4: VALUE OF PRODUCTION CLASSIFIED BY CONSUMER, INTERMEDIATE AND CAPITAL GOOD INDUSTRIES AND BY EMPLOYMENT SIZE

Number of Employees	Consumer goods (B' 000)	%	Intermediate goods (B' 000)	%	Capital goods (B' 000)	%	Total (B' 000)	
10 or less	72,084	71.0	16,509	16.3	12,865	12.7	101,458	1(
10 - 49	821,035	56.9	307,433	21.3	314,752	21.8	1,443,220	1(
50 - 99	687,239	46.7	626,397	42.5	159,071	10.8	1,472,707	1(
100 - 199	576,953	39.1	692,191	47.0	205,230	13.9	1,474,374	1(
200 and over	2,883,958	69.5	1,041,264	25.1	224,187	5.4	4,149,409	1(
Total	5,041,269	58.3	2,683,794	31.1	916,105	10.6	8,641,168	1(

of material inputs (including raw materials and other intermediate goods, fuel and utility costs, depreciation and other capital allowances, and other material supplies) from the value of production. The data for the production and value-added by size of the firm are shown in Table 5 and 6.

III. Employment Effects

The volume of employment by industry based on data returns from 1,049 firms show that 52, 309 workers are hired, with food and textile firms having the highest volume of employment. Tobacco, metal products, and rubber products industries are also with a high volume of employment (see Table 7).

The number of employment in each industry is obviously influenced by the number of firms included in each industry. It also influenced by the size of the firms in each industry. If we consider the volume of employment by size of the firm, Table 8 shows that 42 firms in the largest size group account for more than one-third of the total employment.

In assessing the employment-generating capacity of an industry, however, we should consider that at a given level of investment, how much employment is generated. If we see only the absolute figures, an industry with a high volume of investment and with more large-sized firms will obviously have a high employment figures than other industries. Normally, an industry's capacity to create job opportunities for a given

TABLE 5: PRODUCTION BY INDUSTRY AND EMPLOYMENT SIZE

Industry	No. of firms	Production (B' 000)	%	Valued added (B' 000)	%
Food	150	1,638,005	19.0	171,145	6.1
Beverage	19	252,667	2.9	105,478	3.7
Tobacco	30	297,915	3.5	79,335	2.8
Textiles	116	2,188,593	25.3	941,381	33.3
Wearing apparel	32	150,886	1.8	18,267	0.7
Leather products	15	56,117	0.7	9,644	0.3
Footwear	10	11,746	0.1	8,036	0.3
Wood products	25	66,389	0.8	32,576	1.1
Furniture	32	175,040	2.0	67,704	2.4
Paper products	18	120,954	1.4	33,695	.2
Industrial chemicals	26	383,576	4.4	165,735	.9
Other chemical products	37	651,419	7.5	369,185	13.1
Rubber products	49	1,186,872	13.7	115,574	4.1
Plastic products	34	125,029	1.5	65,748	2.3
Pottery	43	44,394	1.5	26,459	0.9
Glass products	12	52,250	0.6	12,656	0.4
Non-metallic mineral products	81	166,217	1.9	57,863	2.0
Iron and steel products	36	39,311	0.5	4,378	0.2
Non-ferrous metal	24	64,996	0.8	54,043	1.9
Fabricated metal products	82	380,217	4.4	189,879	6.7
Machinery	58	115,552	1.3	23,174	0.8
Electrical appliance	31	101,916	1.2	41,731	1.5
Transport equipment	45	297,510	3.4	200,258	7.1
Scientific equipment	3	18,519	0.2	12,779	0.5
Miscellaneous	41	55,078	0.6	20,140	0.7
Total	1,049	8,641,168	100.0	2,826,873	100.0

TABLE 6: PRODUCTION AND VALUE ADDED BY EMPLOYMENT SIZE OF THE FIRM

No. of employees	No. of firms	Production (B' 000)	Production %	Value added (B' 000)	Value added %
10 or less	174	101,458	1.2	26,674	0.9
10 - 49	625	1,443,220	16.7	409,819	14.5
50 - 99	138	1,472,707	17.0	437,915	15.5
100 - 199	70	1,474,374	17.1	484,997	17.2
200 or over	42	4,149,409	48.0	1,467,468	51.9
Total	1,049	8,641,168	100.0	2,826,873	100.0

TABLE 7: NUMBER OF EMPLOYEES BY INDUSTRY

Industry	No. of firms	No. of workers	%	Average workers/firm
Food	150	6,380	12.2	42.5
Beverage	19	1,532	2.9	80.6
Tobacco	30	5,265	10.0	175.5
Textiles	116	8,274	15.8	70.9
Wearing apparel	32	1,297	2.5	40.5
Leather products	15	316	0.6	21.0
Footwear	10	169	0.3	16.9
Wood products	25	2,078	4.0	83.1
Furniture	32	1,513	2.9	47.2
Paper products	18	692	1.3	38.4
Industrial chemicals	26	1,587	3.0	61.0
Other chemical products	37	2,586	4.9	69.8
Rubber products	49	3,773	7.2	77.0
Plastic products	34	1,212	2.3	35.6
Pottery	43	1,878	3.6	43.6
Glass products	12	750	1.4	62.5
Non-metallic mineral products	81	2,399	4.6	30.7
Iron and steel products	36	676	1.3	18.7
Non-ferrous metal	24	619	1.2	25.7
Fabricated metal products	82	3,841	7.3	47.4
Machinery	58	1,175	2.3	20.2
Electrical appliance	31	1,463	2.8	47.1
Transport equipment	45	1,911	3.7	44.4
Scientific equipment	3	83	0.2	27.6
Miscellaneous	41	840	1.6	20.4
Total	1,049	52,309	100.0	49.9

TABLE 8: NO. OF WORKERS BY SIZE OF EMPLOYMENT

Size of Factory	No. of Factories	No. of Workers	%	Average Worker/factor
Less than 10 workers	174	1,187	2.2	6.8
10 - 49	625	14,060	26.9	22.5
50 - 99	138	9,393	18.0	68.1
100 - 199	70	9,344	17.9	133.5
200 workers of over	42	18,325	35.0	436.3
Total	1,049	52,309	100.0	49.8

level of investment may be gauged on the basis of capital-labor ratio. It is generally beleived that the capital-labor ($\frac{K}{L}$) ratio in a small industry is lower than that of a larger one. A lower $\frac{K}{L}$ ratio, however, usually means a lower output-worker ($\frac{O}{L}$) ratio. This is due to the fact that part of the products of a larger industry with higher volume of investment have been attributable to the use of more capital inputs.

The fixed assets - labor ratio is computed to assess the capital intensity of the firms and is presented in Table 9 (by industrial group) and Table 10 (by employment size of the firm)[11/] In Table 9, industrial chemicals, textiles, glass products food and non-metallic mineral products, machinery and scientific equipment appear to have quite high $\frac{K}{L}$ ratio, while wood products and tobacco-curing firms have very low $\frac{K}{L}$ ratio. Those traditional industries such as garment, footware, furniture and pottery are also having relatively low $\frac{K}{L}$ ratio. It is observable that food products and textiles which are normally regarded as labor-intensive industries appear to have quite high $\frac{K}{L}$ ratio in our sample, while iron and steel products and non-ferrous metal which should have a high $\frac{K}{L}$ ratio turn out to be the contrary. These paradoxical results may be partly explained by the fact that some large firms included in the food and textiles industries are having a very high fixed asset value, while the firms in iron and steel products and non-ferrous metal under survey are mostly small workshops with low fixed assets value. As is evident from Table 10, the $\frac{K}{L}$ ratio tend to rise with the size of the firms, and the $\frac{K}{L}$ ratio of the largest size group is much higher than that of any size.

TABLE 9: FIXED ASSETS TO LABOR RATIO BY INDUSTRY

Industry	Fixed Assets/Worker (B 000)
Food	112.6
Beverage	81.0
Tobacco	29.4
Textiles	296.1
Wearing apparel	50.1
Leather products	98.5
Footwear	45.2
Wood products	21.6
Furniture	50.6
Paper products	86.8
Industrial chemicals	400.5
Other chemical products	82.3
Rubber products	50.7
Plastic products	85.2
Pottery	34.6
Glass products	127.7
Non-metallic mineral products	110.9
Iron and steel products	42.1
Non-ferrous metal	51.9
Fabricated metal products	88.8
Machinery	114.7
Electrical appliance	61.5
Transport equipment	63.7
Scientific equipment	105.1
Miscellaneous	48.6
Total	112.5

TABLE 10: FIXED ASSETS TO LABOR RATIO BY SIZE OF EMPLOYMENT

Number of Employment	Fixed Assets/worker (B' 000)
Less than 10	85.6
10 - 49	67.7
50 - 99	77.6
100 - 199	87.6
200 and over	216.1
Total	122.7

The high $\frac{K}{L}$ ratio of large scale industry may be due to several factors. Larger firms are in a comparatively advantageous position in acquiring credits for the provision of fixed capital.[12/] The promotional privileges which some of the large firms enjoy enable them to import machinery and equipment with import duties and business taxes exemption may have also contributed to the excessive use of capital. The adoption of foreign technology may compel the firms to use modern machinery and equipment, which also contributed to the high $\frac{K}{L}$ ratio.[13/] On the contrary, small-scale firms have many reasons to use relatively labor-intensive techniques of production. These include the limitation on using large machines in small-scale production, the relatively poor ability to acquire funds necessary for the purchase of modern machine and equipment and for its operation, the use of rudimentary techniques which rely mainly on simple, relatively inexpensive tools, the fact that it can offer wages which are lower than the larger firms,[14/] and the ability to supervise its worker closely because of the small number involved.

If figures of average fixed assets per worker are indicative of the amount of investment required for a given amount of employment the data in Table 10 would imply that for the absorption of 1,000 workers, 67.7 million baht of additional investment will be needed for a small industry employing 10-49 workers. But 77.6 million baht and 87.6 million baht for a medium size industry employing 50-99 workers and 100-199 workers respectively. But for a large size industry employing 200 workers or over, an increase in fixed assets of 216.1 million baht will be needed.

The ability of an industry to create employment at a given level of investment depends on many factors. A high K/L ratio in certain enterprises is necessitated by the nature of production and existing techniques available. But in other enterprises there may be some flexibility in chooseing the factor mix between capital and labor. In most enterprises where capital and labor can more or less be substitutable, the K/L ratio will be determined by the elasticity of substitution. Business firm would like to keep unit cost low. Consequently, the decision to keep K/L ratio at a desirable level will be significantly influenced by the relative price of capital and labor, except in case where a fixed capital - labor ratio is necessitated by the available production techniques. Development economists often assert that the desire to modernize industry in many LDCs, together with the social pressure to set minimum wages higher than the market clearing wage rate, will create price distortions in the factor market and lead to inefficient utilization of resources. As a result, the industrial development in these countries will not be as effective as it should be in solving the problem of unemployment. However, with disadvantages in acquiring credits together with the unsophisticated production techniques and possibility to pay lower wages than those paid by large establishments, small industrial enterprises might have to purchase capital equipment at a higher cost and hire workers at a lower wage rate.[15/] And if in addition, the scope of substituting labor for capital in the case of small establishments is wider than the larger firms, the price factor will force the small firms to have a lower K/L ratio, which is more

suitable to the domestic factor availabity conditions. As a result, the small-scale enterprises will have a higher capacity to generate employment at a given level of fixed capital as compared to the larger units.

How about the relatively low productivity of small-scale firms? If by using relatively labor intensive production techniques, small-scale industry turn out to be relatively inefficient than the larger firms, the desire to create employment opportunity by promotion of labor-intensive production may actually retard the growth of the economy. That is, the desire to create more employment at the present time may eventually lead to less employment in the future because of the lower growth rates. We will return to this controversy later after presenting some results on the structure of employment and wages in firms of different scales in the next section.

IV. Structure of Employment and Wages

The survey returns from 1,037 firms provide data on sex composition of workers. Of a total employees of 48,536 employed in these firms, 18,539 or 38.2 percent are women. Table 11 shows the number of employees by sex composition by industrial group. Female workers appear in all industries and are dominant in textiles, wearing apparrels, pottery, and chemical products.[16/] The lowest proportion of female workers appears in iron and steel products industry, with only 4.4 percent of female workers employed.

TABLE 11: MALE & FEMALE WORKERS BY INDUSTRY

Industry	No. of firms	Male workers	Female workers	Total	% of female workers on total workers
Food	150	4,081	2,517	6,958	38.2
Beverage	19	929	573	1,502	38.2
Tobacco	30	2,622	2,310	4,932	46.8
Textiles	112	3,337	4,525	7,862	57.6
Wearing apparel	30	531	745	1,276	58.4
Leather products	15	218	82	300	27.4
Footwear	10	111	33	144	22.9
Wood products	24	942	177	1,119	15.8
Furniture	32	1,028	345	1,373	25.1
Paper products	18	295	178	473	37.6
Industrial chemicals	24	1,223	305	1,528	20.0
Other chemical products	36	1,056	1,387	2,443	56.8
Rubber products	49	2,130	1,059	3,189	33.2
Plastic products	34	691	448	1,139	39.3
Pottery	43	919	1,014	1,933	52.5
Glass products	12	490	224	714	31.4
Non-metallic mineral products	81	1,492	658	2,150	30.6
Iron and steel products	36	613	28	641	4.4
Non-ferrous metal	24	430	154	584	26.4
Fabricated metal products	81	3,045	678	3,723	18.2
Machinery	58	955	238	1,193	20.0
Electrical appliance	31	852	448	1,300	34.5
Transport equipment	45	1,326	242	1,568	15.4
Scientific equipment	3	108	25	133	18.8
Miscellaneous	40	590	146	736	19.8
All industries	1,037	29,997	18,539	48,536	38.2

In Table 12 we see that the number of female workers rises with the size of the firm, except in the case of large firms with 200 workers and over, which have a lower proprotion of female workers compared to medium - scale firms. This is due to the fact that large firms in some industrial groups such as wood products, furnitures, metal products and transport equipment hire mostly male workers. Large firms which employ a high proportion of female workers are found in textiles, wearing apparels, and plastic products.

Most of the female workers are employed to do low-skilled jobs and receive lower wages than their male counterparts on the average. It is observable from Table 13 that the proportion of female workers decreases when the scale of wages increases. This is because the female workers are mostly general factory workers, and very few of them are in the positions of sales or managerial personnel, technicians, or other types of skilled workers.

In the survey, workers are classified into 5 categories: 1) family workers (paid or unpaid) 2) managerial personnel 3) sales personnel 4) technicians, engineers, and other types of skilled workers, 5) others. Scale of wages for each type of labor vary in each industry and with different sizes of the firm. Among 52,309 workers who are employed by 1,049 firms, 8,305 or 15.4 percent of them may be classified as skilled workers (managerial and sales personnel, technicians, engineers and other skilled workers). Table 14 shows the proportion of each type of workers by industrial group. The extreme right column of the Table

TABLE 12: NUMBER OF MALE & FEMALE WORKERS BY SIZE OF EMPLOYMENT

Size of Employment	No. of factories	Male workers	Female workers	Total	% of female workers on total workers
Less than 10 workers	168	899	299	1,198	25.0
10 - 49	621	9,174	4,078	13,252	30.8
50 - 99	137	5,120	3,857	8,977	43.0
100 - 199	79	4,621	3,925	8,546	45.9
200 workers and over	41	10,183	6,380	16,563	38.2
All sizes	1,037	29,997	18,539	48,536	38.2

TABLE 13: PROPORTION OF FEMALE WORKERS BY SCALE OF WAGE AND BY SIZE OF EMPLOYMENT

Size of employment	Wage Scale						
	Under 400 B	401-600	601-800	801-1,000	1,001-2,000	2,001-5,000	Over 5,000
Less than 10	46.9	25.6	25.5	24.0	15.8	12.5	-
10 - 49	52.1	47.2	36.2	21.3	12.1	8.8	-
50 - 99	48.4	55.0	55.6	36.7	26.1	16.0	23.1
100 - 199	77.5	69.4	49.4	64.9	21.4	14.4	25.9
200 workers & over	63.6	46.1	39.2	64.3	29.7	12.8	8.2
All sizes	52.8	49.9	43.3	44.3	23.7	12.8	13.4

TABLE 14: PROPORTION OF EMPLOYEES BY INDUSTRIES

Industry	Types of Workers						
	Family members	Managerial personnel	Sales personnel	Technical personnel	General wage workers	Others	Skilled workers*
Food	3.7	4.3	2.0	5.6	70.1	14.3	11.9
Beverage	1.7	7.3	2.4	2.9	60.1	15.6	22.6
Tobacco	0.3	3.8	0.1	1.8	85.2	8.8	5.7
Textiles	2.9	2.9	1.1	5.1	86.6	1.4	9.1
Wearing apparel	3.7	6.6	3.4	23.1	61.6	1.6	33.1
Leather products	4.1	4.1	4.1	12.3	65.5	9.9	20.5
Footwear	16.0	2.4	2.4	7.1	71.5	0.6	11.9
Wood products	1.5	3.7	1.0	8.3	85.4	0.1	13.0
Furniture	4.9	3.8	3.5	14.1	67.4	6.3	21.4
Paper products	6.7	5.2	1.7	17.5	68.5	0.4	24.4
Industrial chemicals	3.0	1.6	1.6	17.6	50.9	25.3	20.8
Other chemical products	2.0	7.0	7.2	6.5	67.4	9.9	20.7
Rubber products	3.1	4.0	2.0	4.1	85.4	1.4	10.1
Plastic products	7.4	3.2	1.2	8.7	76.2	3.3	13.1
Pottery	3.7	1.9	2.0	10.2	80.8	1.4	14.1
Glass products	4.5	3.2	1.7	11.1	73.4	6.1	16.0
Non-metallic mineral products	4.2	4.0	2.9	6.5	80.1	2.3	13.4
Iron and steel products	7.5	5.0	0.7	20.3	65.6	0.9	26.0
Non-ferrous metal	8.2	1.3	0.8	54.0	34.1	1.6	56.1
Fabricated metal products	5.6	3.3	3.3	8.1	68.3	11.4	14.7
Machinery	14.3	6.3	2.5	21.4	51.8	3.7	30.2
Electrical appliance	2.7	3.8	3.3	9.2	78.0	3.0	16.3
Transport equipment	3.0	2.0	0.9	20.0	73.7	0.4	22.9
Scientific equipment	1.2	13.3	2.4	7.2	66.3	9.6	22.9
Miscellaneous	7.1	3.7	1.4	42.5	45.3	-	47.6
All codes	3.7	3.9	2.3	9.2	74.5	6.4	15.4

* Managerial personnel, sales personnel and technical personnel.

shows the proportion of skilled labor to total workers in each industrial group. Caution should be made, however, on the interpretation of these data. The classification of type of workers in the survey is primarily done by the interviewee who, in most cases, are manager or owner of the firm. The meaning of technicians, or skilled workers, or even managerial or sales personnel may be different from one enterprise to another. The technicians or skilled workers in one industry may signify relatively high level of expertise, while in some others only general factory workers which have some additional training may be considered as an skilled workers. This will become more obvious when we compare the wage differentials among firms in different industries and different size classes.

Table 15 shows the proportion of workers of various types by employment scale. It is seen that the proportion of family workers declines and that of general unskilled workers increase with the size of the firms. Another observation is that the proportion of skilled to total workers for small firms is higher than that of a medium and large establishment, and the largest size group has the lowest proportion of skilled workers. This may be due to the fact that the number of workers employed by a small firm is small and a number of skilled workers are needed for the production regardless of the size of the firm. Since the total number of workers hired in the small firms is not large, even if there are only a few skilled worker's, the proportion could be higher than that in large firms where there are large number of workers, mostly unskilled ones. Also, it has been mentioned earlier that skilled labor may have different connotation from one firm to another. For a small

TABLE 15: PROPORTION OF VARIOUS TYPES OF EMPLOYEES BY SIZE OF EMPLOYMENT

Size of employment	Types of Employees						
	Family members	Managerial personnel	Sales personnel	Technical personnel	General wage laborers	Others	Skille labore
Less than 10 workers	14.7	2.4	1.9	16.6	61.9	2.5	20.9
10 - 49	7.3	3.3	2.5	13.3	71.3	2.3	19.1
50 - 99	3.0	6.4	3.4	6.9	74.7	5.6	16.7
100 - 199	1.6	4.7	2.9	9.3	75.3	6.2	16.9
200 and over	0.6	2.8	1.3	6.7	77.3	11.3	10.8
All sizes	3.6	3.9	2.3	9.2	74.6	6.4	15.4

* Managerial , sales and technical personnel.

firm, a skill worker may not necessarily be a worker who is highly educated or trained. In many cases the "skilled worker" in small firms are found to be promoted from general workers as they have aquired more skills and experiences with the passage of time. Division of labor in small firms are generally not as clearcut as that in larger-scale firms. The case of owners assuming the role of manager, salesman and technician all at one time are not uncommon. Owing to the limitation in the scope of division of labor, and the proprietors or their relatives have a chance to supervise the operation of the firm closely, a small factory then becomes a good training arena for entreprenuers. At any rate, having to assume many duties concurrently will not afford an opportunity for that person to acquire specific expertise and these small firms will not benefit from the division of labor as in the case of larger firms.

In the survey, wages and other compensations of employees have been recorded by dividing into wages, bonuses and other welfare payments (including payments in kind). Moreover, income of workers has also been recorded by type of worker.[17/]

Table 16 shows monthly compensation in different industrial groups. Bonus, premiums and compensatory welfare paid in kinds augment workers' real income to a considerable extent i.e., 4.7 percent of the average workers' income are in bonuses and 11.1 percent in compensation paid in kind .

It is seen from Table 16 that compensation received among various types of workers differ from one industry to another. Wage

TABLE 16: AVERAGE MONTHLY COMPENSATION RECEIVED PER WORKER BY TYPES OF COMPENSATION AND BY INDUSTRY

Industry	Type of Compensation			
	Wages	Bonuses	Fringe benefits	Total
Food	1,006.7	30.8	177.5	1,215.0
Beverage	1,012.5	62.5	83.3	1,158.3
Tobacco	919.2	55.8	32.5	1,007.5
Textiles	1,204.2	113.3	198.3	1,515.8
Wearing apparel	872.5	58.3	233.3	1,164.1
Leather products	841.7	54.2	90.0	985.9
Footwear	736.7	75.0	235.8	1,047.5
Wood products	731.7	4.2	60.0	795.9
Furniture	1,090.0	40.8	94.2	1,225.0
Paper products	1,033.3	44.2	110.8	1,188.3
Industrial chemicals	1,511.7	26.7	225.0	1,763.4
Other chemical products	1,219.2	101.7	222.5	1,543.4
Rubber products	810.8	40.8	84.2	935.8
Plastic products	977.5	21.7	240.0	1,239.2
Pottery	852.5	18.3	66.7	937.5
Glass products	808.3	26.7	118.3	953.3
Non-metallic mineral products	954.2	50.8	103.3	1,108.3
Iron and steel products	858.3	92.5	181.7	1,132.5
Non-ferrous metal	974.2	59.2	224.2	1,257.6
Fabricated metal products	905.8	46.7	75.8	1,028.3
Machinery	1,247.5	64.2	137.5	1,449.2
Electrical appliance	1,220.0	105.8	129.2	1,455.0
Transport equipment	1,285.8	28.3	136.7	1,450.8
Scientific equipment	1,489.2	60.8	20.0	1,570.0
Miscellaneous	871.7	10.8	180.0	1,062.5
All industries	1,025.8	56.7	135.8	1,218.3

differentiation may be caused by several factors, which include unequal hours of work, the different proportion of skilled to unskilled workers, the skill differential as well as the proportion of male to female workers in each industry. Bonuses and premiums are primarily determined by profits of the firm. The number of regular employees is also another factor that determines the size of bonuses and premiums. In general, managerial and sales personnel and skilled worker will get more bonuses and premiums than general factor workers.

Small firms normally pay less bonuses and lower wages than larger ones, but their fringe benefits given to workers are better. Table 17 shows that the workers' compensation tend to increase with the size of the firms, but the compensation differentials are rather small.

The fact that the skills and trainings of workers classified in the same category may be widely different in different industries is refected in the differentials in monthly compensation of the workers in the same job category, but in different industrial group. As is seen in table 18 compensation received by managerial personnel in transport equipment industry is ten times higher than their counterparts in footwear manufacturing, and workers of scientific instrument manufacturing receive compensation three times higher than their counterparts in wood products industry.[18/]

The monthly compensation received by skilled workers in large firms is much higher than that received by their counterparts in small firms, while there is only slight differences among income earned by

TABLE 17: AVERAGE MONTHLY COMPENSATION RECEIVED PER WORKER BY TYPES OF COMPENSATION AND BY SIZE OF EMPLOYMENT

Size of employment	Type of Compensation			
	Wages	Bonuses	Fringe Benefits	Total
Less than 10 workers	835.0	28.3	210.8	1,074.1
10 - 49	848.3	46.7	164.2	1,059.2
50 - 99	1,034.2	72.5	168.3	1,275.0
100 - 199	1,123.3	68.3	117.5	1,309.1
200 and over	1,126.7	51.7	103.3	1,281.7
All sizes	1,025.8	56.7	135.8	1,218.3

TABLE 18: AVERAGE MONTHLY COMPENSATION PER WORKER BY TYPES OF WORKER AND BY INDUSTRY

Industry	Type of Workers			
	Managerial	Sales	Technical	General
Food	3,493.3	1,961.7	2,175.0	1,100.8
Beverage	2,880.0	1,699.2	1,694.2	911.7
Tobacco	3,770.5	805.8	1,365.0	912.5
Textiles	4,860.8	2,701.7	2,416.7	1,344.2
Wearing apparel	2,312.5	2,208.3	1,137.5	1,061.7
Leather products	1,448.3	2,269.2	1,478.3	895.0
Footwear	1,041.7	1,291.7	3,270.8	1,059.2
Wood products	5,176.7	2,783.3	2,083.3	480.0
Furniture	4,385.8	2,870.8	1,489.2	954.2
Paper products	4,108.3	1,812.5	1,122.5	1,079.2
Industrial chemicals	7,436.7	1,673.3	1,085.0	1,156.7
Other chemical products	4,601.7	2,967.5	2,924.2	1,197.2
Rubber products	3,482.5	2,926.7	2,685.0	680.8
Plastic products	3,677.5	2,970.0	1,871.7	1,175.0
Pottery	1,700.0	1,450.0	1,535.0	840.0
Glass products	1,367.5	1,788.3	2,011.7	790.0
Non-metallic mineral products	2,103.3	1,107.5	2,620.0	899.2
Iron and steel products	2,676.7	1,300.0	1,625.0	987.5
Non-ferrous metal	1,437.5	3,166.7	1,470.0	1,182.5
Fabricated metal products	3,064.2	1,571.7	1,911.7	775.0
Machinery	3,389.2	3,744.2	1,908.3	1,299.2
Electrical appliance	6,780.0	3,530.8	2,370.8	963.3
Transport equipment	10,540.2	6,083.3	1,902.5	1,043.3
Scientific equipment	3,242.5	1,250.0	1,291.7	1,520.8
Miscellaneous	1,900.8	1,610.8	1,357.5	864.2
All industries	3,851.7	2,305.8	1,952.5	1,003.3

unskilled factory workers in different sizes of firms. This may mean that skilled labor in large firms have much more training and expertise than those in small firms, while the difference in equality among production line workers in firms of different sizes is not large.

V. Employment and Output Objectives

The desirability to promote industrial enterprises with a low K/L ratio is based on the assumption that there would be no conflict between output and employment objectives. However, some economists would argue that the use of labor intensive techniques may lead to a slower growth of output as compared to the capital intensive ones. If the intensive use of capital leads to higher efficiency of production and enable the enterprenurs to reap a higher rate of return, which in turn lead to higher rate of investment, the choice of capital-intensive industries may eventually lead to a higher rate of growth of output and employment in the long run.[19/] Even though capital inputs are relatively scarce and have to be imported, which means the use of foreign exchange, which is a even scarcer resource for the LDCs, the adoption of capital intensive techniques is still worthwhile if it can lead to a higher rate of growth in the long run. Thus one of the arguments against the promotion of labor intensive industries is that labor intensive production may lead to a lower growth rate than the average capital-intensive industries. If we assume that capital is the only scarce factor of production, however, in order to maximize output the scarce capital resources should be utilized efficiently. The output capital ratio is thus an

indicator of the efficiency of production, and the adoption of labor-intensive techniques may be considered as undesirable for output growth if the output-capital ratio of the relatively labor-intensive industries is low.

In assessing the average (partial) labor and capital productivity, the output-labor and output-capital ratio are calculated. Since it is not possible to use the machinery usage per man hour, we use simply the output per worker (O/L) and value added per worker (V/L) for average partial labor productivity, and output-fixed assets (O/K) and value added fixed assets (V/K) ratio for partial capital productivity.

The O/L and V/L ratio by industry is shown in Table 19. It is seen that the O/L and V/L ratio vary widely by industry. The ranking of industry in terms of O/L as compared to V/L ratio has not much different, as should be. There are, however, some industries such as food, wearing appeals and rubber products with quite different rankings of the two ratios, this is mainly due to the low value-added to output ratio in these industries (see Table 5).

One of the important explanations for higher O/L or V/L ratio for an industry compared to another is the different level of fixed capital used, i.e., part of the higher output generated in the industries with a high O/L and V/L ratio is attributable to the higher level of capital inputs. As a matter of fact, the V/L ratio has been used to represent capital intensity in some studies for the lacking of capita data.[20] The argument for using the value-added per worker as a proxy

TABLE 19: PRODUCTION AND VALUE ADDED PER WORKER BY INDUSTRY

Industry	Production/worker		Value-added/worker	
	(฿ 000)	Rank	(฿ 000)	Rank
Food	256.7	3	26.8	16
Beverage	164.9	9	68.9	7
Tobacco	56.6	23	15.1	22
Textiles	264.5	2	113.8	3
Wearing apparel	116.3	11	14.1	24
Leather products	177.6	7	30.5	14
Footwear	64.5	19	47.6	11
Wood products	31.9	24	15.7	21
Furniture	115.7	12	44.8	12
Paper products	174.8	8	48.7	10
Industrial chemicals	241.7	5	104.4	5
Other chemical products	251.9	4	142.8	2
Rubber products	314.6	1	30.6	13
Plastic products	103.2	14	54.3	8
Pottery	23.6	25	14.1	23
Glass products	69.7	17	16.9	20
Non-metallic mineral products	69.3	20	24.1	17
Iron and steel products	58.2	22	6.5	25
Non-ferrous metal	105.0	13	87.3	6
Fabricated metal products	99.0	15	49.4	9
Machinery	98.4	16	19.7	19
Electrical appliance	69.7	18	28.5	15
Transport equipment	155.7	10	104.8	4
Scientific equipment	223.1	6	153.9	1
Miscellaneous	65.6	21	24.0	18
Total	165.2	-	54.0	-

for K/L ratio are that those industries with a higher V/L ratio is partly due to the high ratio of capital used per worker and possibly due to a higher proportion of skilled workers. And for skilled workers, the "human capital" embodied is higher than that for unskilled workers. Thus an industry with a high V/L ratio can be said to be the composite result of both human and physical capital.

The order to see the relationship between capital intensity, the use of skilled labor, and average labor productivity, the rank correlation of O/L, V/L and K/L ratios, and average wage of employees for different industries is computed. The proportion of skilled labor in each industry could be directly computed by the employment data. However, as we found that the meaning of "skilled workers" varies much among firms of different sizes and different industries, it is decided that average wage level be used instead as the criteria to gauge the workers' level of skill in different industries. This is based on the assumption that a worker with higher education or training should get higher wages and other compensations than a worker with a low level of training. Average wage per worker may also reflect difference in hours of work among various industries due to the fact that the figure on average wage is calculated by the wage bill and other compensations to employees for the whole year and dividing that sum by the total number of workers.

The rank correlation coefficient of the four variable is as follows:

	O/L	V/L	K/L	W/L
O/L	1	.6700	.5815	.4892
V/L	.6700	1	.4615	.6462
K/L	.5815	.4615	.1	.4792
W/L	.4892	.6462	4792	1

O/L is output/worker;

V/L is value added/worker;

K/L is fixed asset value/worker; and

W/L is wage/worker in a month.

The correlation for each pair of variables is significant at .01 level of confidence. The results indicate that those industries with high O/L and V/L ratios on the average pay higher wages and also have a higher K/L ratio. The positive relationship between fixed asset value and wage per capita implies that an industries with a high K/L ratio have to hire workers with higher skills who command higher wages.

Table 20 shows that the O/L and V/L ratios tend to increase with the size of the firm. We could thus say that the average labor productivity in large firms in generally higher than that in small firms. However, the O/L ratio may not be a good indecator for efficiency of production. As pointed out before, if in Thailand capital is a relatively scarce factor, while labor is relatively abundant, the efficiency of production may be better assessed by the productivity of capital inputs. If the output objective is more important than the employment objective,

TABLE 20: **PRODUCTION AND VALUE ADDED/WORKER BY NUMBER OF EMPLOYMENT**

Number of Employees	Production/worker		Value-added/worker	
	(B' 000)	Rank	(B' 000)	Rank
Less than 10	85.5	5	22.5	5
10 - 49	101.9	4	29.2	4
50 - 99	157.9	2	46.6	3
100 - 199	157.8	3	51.9	2
200 and over	226.4	1	80.1	1
Total	165.2	-	54.0	-

the labor intensive industries are desirable only if these industries could utilize the scarce capital input efficiently.

The O/K and V/K ratios by industry are shown in Table 21. Again these ratios vary widely among industries but the ranks of O/K and V/K ratios in each individual industry are not much different. We compute the rank correlation between O/K, V/K and K/L. It appears that the correlation coefficient of O/K, V/K and K/L are negative, which indecates that the relationship between capital intensity as is indicated by the K/L ratio and the average (partial) capital productivity as indicated by the O/K and V/K ratios, is heading in the opposite direction; or in other words, industrial groups that are capital intensive have a tendency to have low average capital productivity. (the rank correlation coefficient between O/K and K/L is significant at .01 level, and the coefficient between V/K and K/L is significant at .05 level).

Rank correlation coefficient O/K, V/K, K/L

	O/K	V/K	K/L
O/K	1	.6108	-.5231
V/K	.6108	1	-.3577
K/L	-.5231	-.3577	1

Table 22 show O/K and V/K ratios by employment size. It can be observed that the medium scale firms (employment size 50-99) have the highest O/K and V/K ratios. From Table 10 we see that firms of this

TABLE 21: PRODUCTION AND VALUE ADDED TO FIXED ASSETS VALUE RATIO BY INDUSTRY

Industry	Production to fixed assets		Value-added to fixed assets	
	Ratio	Rank	Ratio	Rank
Food	2.20	9	0.23	22
Beverage	2.19	10	0.91	8
Tobacco	2.41	7	0.64	12
Textiles	0.91	20	0.39	17
Wearing apparel	2.60	5	0.32	18
Leather products	1.83	14	0.31	19
Footwear	1.63	15	1.12	6
Wood products	3.25	2	1.59	4
Furniture	2.37	8	0.92	7
Paper products	2.01	10	0.56	15
Industrial chemicals	0.60	25	0.26	20
Other chemical products	3.06	3	1.74	2
Rubber products	6.26	1	0.61	14
Plastic products	1.43	18	0.75	10
Pottery	0.72	22	0.43	16
Glass products	0.70	23	0.17	23
Non-metallic mineral products	0.69	24	0.24	21
Iron and steel products	1.47	17	0.26	25
Non-ferrous metal	3.00	4	2.49	1
Fabricated metal products	1.31	19	0.66	11
Machinery	0.86	21	0.17	24
Electrical appliance	1.52	16	0.62	13
Transport equipment	2.55	6	1.72	3
Scientific equipment	2.12	12	1.46	5
Miscellaneous	2.13	11	0.78	9
Total	1.48	-	0.48	-

TABLE 22: PRODUCTION AND VALUE ADDED TO FIXED ASSET VALUE RATIO BY NUMBER OF EMPLOYEES

Number of Employees	Production to fixed assets		Value added to fixed assets	
	Ratio	Rank	Ratio	Rank
Less than 10	1.07	5	0.28	5
10 - 49	1.61	3	0.46	3
50 - 99	2.24	1	0.66	1
100 - 199	1.85	2	0.61	2
200 and over	1.22	4	0.43	4
Total	1.48	-	0.48	-

employment size has lower capital intensity (K/L) than those firms with larger employment size. We may thus say that the intensive use of capital input leads to a higher average labor productivity, but when we consider the average capital productivity, we found that capital inputs are not more productively used in capital-intensive firms.

From the empirical results obtained, we could say that although the frequent claim that capital intensive techniques of production are more likely to be associated with technological progress cannot be rejected, we found that there is no apparent conflict between employment and output objectives in SMI sector in Thailand.

The higher average capital productivity of the medium scale firms may lead one to think that firms of this size in general are suitable to the market environments of the country, while firms of larger size may have too high a level of investment to be operated efficiently. However, as different industries have different optimal scales of production, further detailed studies on specific industries should be done before any conclusion can be made.

VI. Profitability, Growth, and Others

The fact that small-scale firms are relatively more labor intensive can also be seen from the cost structure of the firm. Table 23 shows the expenditure items including profits[21/] of the surveyed firms. The percentage share of each expenditure item vary among different sizes of the firms. Of our interest here is the profit share rises while the

Table 23: EXPENDITURES AND PROFIT BY SIZE OF EMPLOYMENT

Expenses	Size of Employment											
	Less than 10		10-49		50-99		100-199		200 & over		Total	
	(₱)	(%)	(₱)	(%)	(₱)	(%)	(₱)	(%)	(₱)	(%)	(₱)	(%)
Raw materials	61,348	60.5	863,838	60.3	863,025	58.2	823,927	55.9	2,161,248	52.1	4,773,386	55.3
Salaries, wages	15,298	15.0	178,741	12.5	143,736	9.7	144,898	9.8	289,762	7.0	772,435	9.0
Depreciation & capital expenditures	8,046	7.9	63,830	4.5	85,787	5.8	72,032	4.9	194,324	4.7	424,019	4.9
Utilities	1,869	1.8	34,355	2.4	10,714	0.7	18,327	1.3	40,443	1.0	105,728	1.2
Rent	982	1.0	5,602	0.4	2,280	0.1	3,239	0.2	7,880	0.2	19,983	0.2
Fuel	1,989	1.9	23,034	1.6	17,090	1.1	23,377	1.6	29,518	0.7	95,008	1.1
Advertising	279	0.3	2,197	0.1	3,810	0.3	5,310	0.4	5,797	0.1	17,393	0.2
Taxes	1,904	1.9	26,502	1.8	16,080	1.1	37,174	2.5	128,459	3.1	210,119	2.4
Interest	6,249	6.2	34,224	2.4	21,628	1.5	25,064	1.7	104,644	2.5	191,809	2.2
Patent fees	78	0.1	6,249	0.4	824	0.2	1,899	0.1	7,069	0.2	16,119	0.2
Other expenses	1,532	1.5	38,344	2.7	68,156	4.6	51,714	3.5	256,408	6.2	416,154	4.8
Profit	1,884	1.9	156,304	10.9	249,557	16.8	267,413	18.1	923,857	22.2	1,599,015	18.5
Total	101,458	100.0	1,433,220	100.0	1,482,707	100.0	1,474,374	100.0	4,149,409	100.0	8,641,168	100.0

percentage share on wages declines as the size of firms get larger. The profit share on total production increase at a rather high rate from small to medium and large scale firms, while the trend of wage expenditures is heading in the opposite direction. It is also observed that average profit share on total production of the firms in the smallest size category (with less than 10 workers) is unbelievably low. This could be due to the over-estimation of certain expenditure items. It is also possible that the revenues of these small enterprise are low and the entrepreneurs have spent a portion of their revenues in their family during the year and treat this as expenditure and not as profits of the enterprises.

We should not conclude from the higher average profit share in production value of larger enterprises that they are relatively more efficient than the smaller enterprises. There are many reasons for the higher profit-production ratio. One of these in that relatively more capital inputs are used in the production of the larger enterprises. Also, as already mentioned, a higher proportion of larger enterprises are enjoying promotional previledges from the government. The reduction or exemption on import duties and business taxes on machineries and/or other materials could add much to profitability of the promoted firms. Moreover, since the production values are calculated in market prices, the higher profits of larger enterprises may also reflect the monopolistic power of the larger firms in the product market.

The average profits to fixed assets ratio for firms of different sizes is calculated as the following:

Employment Size	Profits/Fixed assets (percent)
Less than 10	1.99
10 - 49	17.59
50 - 99	37.68
100 - 199	33.50
200 and over	27.21

If we disregard the distortion in factor and product markets due to protection and promotional previleges, and if profit figures could be indicative of relative efficiency, or of growth potential of the industry, it seems from the profit rates that medium-scale firms are in general better off than firms of other sizes, and firms of smallest size (with less than 10 employees) come last in the competition.

As mentioned before, one of the argument that industries with higher capital intensity may be desirable for growth is that capital intensive industries generate higher profits than the labor - intensive industries. The calculation of rank correlation between profit rate and K/L ratio in different industries, however, show very weak relationship, with a coefficient of 0.0315. We thus cannot say that highly capital intensive industries are more profitable than others.

In the survey, we try to assess the potential for growth of firms with different sizes by asking the production figures for the past five years before 1975, but the respondents were few. Based on the returns from 521 enterprises which did supply the figures for 1973-1975,

the results are as the following:

Employment size	No. of Firms	Growth of Production
Less than 10	89	-19.7
10 - 49	306	60.0
50 - 99	70	19.0
100 - 199	37	68.6
200 and over	19	27.1

The negative growth rate of firms of smallest size seems to concur with the low profitability of firms in this size group, but the growth for firms employing 50-99 persons is surprisingly lower than small-scale and larger sized firms. These figures, while not much reliable, tend to support the contention that many small-scale firms (those with 10-49 employees) expand in the last three year before the survey.[22] The small-scale firms with high growth rates are found in wood products, chemical products, plastic products, metal and non-metallic products industries.

Although the evidence presented thus far tends to suggest that small-scale establishments (with 10-49 workers) are on the average not less efficient than the large-sized firms, we did find many operational problems of small-scale firms in the survey. To be sure, firms of different sizes have different problems and large enterprises are by no means free from trouble . Among the major operational problems

that are more frequently found in small-scale firms are variable quality and shortage of raw materials (mostly found in agro-based industries), shortage of funds, shortage of labor during the rice growing season, and high labor turnover. We will not go intc details in each of these items here, but we would like to make an observation that the constraints for further growth of many SMI firms are found to be lack of financial funds and lack of management ability of enterpreneurs to deal with the problems which may associate with the expansion of the firm. SMI firms in Thailand are mostly self-financed and depend much on unorganized sources of funds in both the initial and operating stages of production. They have relatively poor ability to borrow from commercial banks for lack of complete accounting system and/or lack of collaterals, and often have to acquire necessary funds from unorganized market with much higher interest rates. The SMI firms also have relatively poor ability in recruiting able managerial personnel as compared to the larger firms. Thus the survivalof the firm in most cases depend on the individual ability of the proprietor.

Operations of SMI are in many ways affected by Government policies. Promotional measures - such as tax incentives and other promotional previleges benefit large-scale enterprises more than small ones. SMI enterprises covered in the survey have expressed their need for Government assistance in providing sources of funds, marketing, and technical services. Although the government has not laid down any clear-cut policies or set out a strategy for the development of small

industries until the Fourth Economic and Social Development Plan period (1971-1981), it has for some time shown its intention to promote growth in this manufacturing sector by establishing agencies directly responsible for this sector. Among the governmental agencies which deal mainly with the SMI enterprises are the Small Industrial Finance Office (SIFO) and the Industrial Survice Institute (ISI). SIFO provides loans to SMI firms with low interest rate and ISI provides several kinds of assistance, particularly technical consultation to industries. But the scope of operation of both SIFO and ISI has been very limited due to budget constraints and other problems. We could say that the potential importance of SIFO and ISI has so far been relatively neglected by the government and the government's promotional services in the field of financial, technical and managerial assistance have been limited to a very narrow scale. In the survey, it is found that a considerable number of SMI enterprenuers would like to receive government assistance, but are not aware of the existence of the above - mentioned government agencies or do not know the procedures for requesting assistance. The government's role on SMI thus seems to be that of regulation and supervision rather than promotion and development. Starting from the Fourth Economic and Social Development Plan period, the government seems to more attention to the SMI development. The reorganization of SIFO to expand its present scope of services has been mentioned explicitly in the Plan. Whether the increasing government attention to SMI will really help the development in this industrial sector remains to be seen.

VII. Conclusion

Small and medium scale firms have certain characteristics that are different from large-sized ones. One of the most obvious distinctive characteristics is that small-scale firms are more labor and less capital intensive than larger sized firms. Since capital is considered to be a scarce input and labor is relatively abundant in a developing economy like Thailand, the development of small and medium-scale industry may be more desirable in creating industrial employment. There have been some assertions on the low efficiency of small-scale firms. Based on the empirical data obtained in a survey of small - and medium-scale enterprises in Thailand in 1975, we found that there has been no apparent conflict between the output and employment objectives in the development of small and medium-scale industry in Thailand. Smaller firms have lower average labor productivity, but the average capital productivity as indicated by the output-capital ratio of small and medium scale firms, except for the very small sized firms with less than 10 workers, is actually higher than that of the larger firms. We therefore have no reason to believe that small-and medium-scale enterprises are relatively inefficient as compared to larger firms. The fact that many small firms survive along with the larger firms despite many disadvantages may itself be a strong evidence for its relative efficiency. As a matter of fact, small and medium-scale firms possess certain characteristics which may be helpful for long-run industrial development of the country. One of these is the provision of training

opportunity for industrial enterpreneurs and the development of indigenous instead of imported technology, which may be more suitable for the local factor market conditions.

In stating the benefits of development of small and medium scale industry, we should however always bear in mind that small, medium and large-scale industries are part of the nation's industrial system, and each has its place in industrial development. Some industries may be suitable for small-scale production while others will be more efficient for large-scale operation. It is because of the relative neglect, intentionally or unintentionally, of the Thai government in promoting the small - and medium-scale manufacturing as compared to the large one that we feel that the importance of small-and medium-scale industry need to be emphasized. It should be warned also that excessive protection of industries regardless small or big ones, is undesirable. It is true that smaller firms are on the average more labor intensive and hence more desirable for employment purpose than the larger ones, but surely not all the small firms are labor intensive. The relative low capital intensity of smaller firms is partly due to the fact that larger firms are more heavily subsidized by the government policy in their purchase of capital inputs. The correct policy prescription in this particular issue is then the correction of distortions in the factor market through the revision of various incnetive schemes rather than giving subsidy to small enterprises.

The NIDA-Thammasat study on small - and medium scale study on which this report is based is originally design to survey and collect

some basic data on small- and medium-industries in Thailand which previously were totally lacking. Since it is just a preliminary study, it is not possible to explore any aspect of industrialization in depth. In interpreting the data presented, one should always bear in mind that they are based on a survey of a sample of small - and medium - scale firm for only one year. Needless to say, many important questions concerning small - and medium-scale industries in Thailand remain unanswered, and many of these questions need to be studied with more comprehensive time series data instead of the cross-sectional data as those used in the report.

There are many important areas of small - and medium-scale industries that need to be further explored. One of them is the study of linkages between large and small industries. In developed countries, small industries play a key role in support of large industries in the sense that they are manufacturers of parts and other materials for larger enterprises. This kind of division of specialization could substantially improve the overall efficiency of the manufacturing sector. The study of linkage effects also enable us to assess the importance and the impact that investment in one industry has upon the expansion of other industries. The study of linkages between modern small - and medium-scale industries and traditional cottage industries could also provide much information for industrial development planning. A detailed study on characteristics of firms of different sizes in certain industries should also be carried out. Different industries have different

characteristics and require different sizes to operate efficiently. The identification of types of activity as well as the conditions that small - scale firms could sucessfully compete with larger - sized firms will also be useful for the formulation of industrial development policy.

Footnotes

1/ The manufacturing enterprises which are required to registered with the Factory Control Division, Ministry of Industry are those with 7 or more workers, or those use machinery of 2 hourse power or over.

2/ The policy of promoting Small-scale industries has currently been included in the Fourth National Economic and Social Development Plan (1977-1981). It is stated that "The government will encourage the development of Small-scale industries which are important for generating employment. This will be done through the provision of credits, risk guarantees, the provision of investment opportunity, technical services and marketing service". Government of Thailand, The Fourth National Economic and Social Development Plan (1977-1981), p. 194.

3/ The report was written (in Thai) by Saeng Sanguanruang, Somsak Tambunlertchai, and Nit Summapun in July 1977. The study was financed by the Industrial Corporational of Thailand (IFCT), The Institute of Development Administration (NIDA), and Thammasat University.

4/ Selection of industries and regions for the survey is based on the relative importance of industries in terms of number of manufacturing firms in each province. Rice-milling, printing, and saw-milling, printing, and ice-making firms were excluded from the study for the season that firms in these industries comprised nearly half of the total number of manufacturing firms in the country, and a separate study should be made.

5/ Family workers, paid or unpaid, are also included.

6/ This was mainly due to the wrong employment figures given in our sampling frame.

7/ In investigating the questionnaire returns, the survey team believe that the large sized firms covered in the sample are quite a good representation of large manufacturing firms in the country. But for those firms with less than 10 employees, whether or not representative for the smallest size enterprises is open to doubt.

8/ Since there has been no major study on SMI in Thailand before and after this one, and the official statistics are scanty, the data presented in this report are primarily from the survey.

9/ The industrial classification was done according to the Thai Standard Industrial Classification (TSIC) at 3 degit level. The TSIC is similar to TSIC with the inclusion of some indigeneous products. One of the major reasons for choosing the NSO data as sampling frame was that the SMI firms have already been classified by TSIC industrial group.

10/ We have classified food, beverage, tobacco, textiles, wearing apparel, footware, furniture, plastic products, pottery, electrical appliances and other miscellaneous manufacturing as consumer goods; leather products, paper products, chemical products, rubber products, glass products, and other non-metallic mineral products as intermediate goods; iron and steel products, non-ferrous metal, fabricated metal products, machinery, transport equipment, and scientific equipment as capital goods. Since each industrial group contains many different activities, the line drawn for consumer, intermediate, and capital goods is unavoidably rough and arbitrary. Our reason for classifying plastic products, electrical appliances and miscellaneous industries as consumer goods is due to the fact that the Products manufactured by firms in these industrial groups are mostly household consumer goods.

11/ The fixed-assets value includes land, building, machinery and equipment, vehicles and other fixed assets. The evaluation of fixed capital was originally intended to estimate by replacement cost. In the actual survey, accounting value of fixed assets was used instead. In many cases, particularly for small-scale firms, due to the lack of accounting records, the value of fixed assets was estimated by the entrepreneurs interviewed.

12/ The survey results show that small industries tend to pay higher interest rates than larger firms since they have to rely on sources of funds through unorganized markets which charge high interest rates.

13/ About 12 percent of the sample enterprises previously or currently enjoy promotional privileges. They are mostly large and medium-scale firms. A number of these firms are with foreign investment.

14/, 15/ The wage structure of firms with different sizes will be discussed in the next section. The wages paid tend to increase with the size of the firms. But when other types of income are added, the wage differentials among firms of different sizes are not so great.

16/ Comprised of firms producing points, pharmaceuticals perfumery, cosmetics, and other consumer chemical products.

17/ During the course of the survey, it was found that a number of firms paid their workers on an hourly rate or peice - rate basis. For comparison purposes, the daily rate or peice-rate wages have been transformed into monthly wages. Payments in kind include free meals and lodgings, medical services and others. In some cases interviewees were unable to estimate the exact cost of payments in kind which the firms provide for their workers, these are estimated by using the average figures from those firms which did supply the data in money terms.

18/ The wage figures for general workers in wood products industry, however, are unbelievably low.

19/ The classic reference for this argument is W. Galenson and H. Leibenstein, "Investment Criteria, Productivity, and Economic Development", Quarterly Journal of Economics, Vol. 69 (August 1955). For discussions of conflicts between output and employment, see F. Stewart and P. Streeten, "Conflict Between Output and Employment Objectives in Developing Countries", Oxford Economic Papers, Vol. 23 (July 1971)

20/ See, for example, Hal B. Lary, Imports of Manufacturing from Less Developed Countries, National Bureau of Economic Research, New York, 1968.

21/ The profit figures are estimated by deducting all expenditure items from the value of production.

22/ It should be noted that 1973 and 1974 are years with rising prices. In 1974 and 1975, there was a general recession in the Thai economy and the growth of industrial output in that two years was very low. The high figures on growth of the responding firms could be due to the fact that those firms with low or negative growth rate in the survey mostly did not supply the production records in previous years.

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