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URBAN FOOD SUPPLY AND DISTRIBUTION: SUPPLY LINKAGES OF BANGKOK --ETC(U)
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URBAN FOOD SUPPLY AND DISTRIBUTION: SUPPLY LINKAGES OF BANGKOK AND THONBURI FRESH-FOOD MARKETS

Margaret E. Crawford

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Department of Geography
University of Michigan

Research Project Nonr 1224 (56)
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PREFACE

This report is one of a series of publications concerned with development topics in Southeast Asia. The research detailed in this report represents a portion of a larger study sponsored by the Applied Scientific Research Corporation of Thailand which dealt with an analysis of transportation systems in Thailand. This study, designated as Research Project 30, was the joint undertaking of the University of Michigan and the Applied Scientific Research Corporation of Thailand and was funded by the University from a research contract with the Geography Branch of the Office of Naval Research (Research Project Nonr 1224 (56) N.R. No. 388080). Research and analysis was conducted by both Corporation and University personnel under the direction of Professor L. A. Peter Gosling, Department of Geography, University of Michigan. Coordination of the project publications and editorial assistance were provided by Catherine J. Baker. Inquiries regarding the publication series should be directed to the Department of Geography, University of Michigan, Ann Arbor, Michigan, U.S.A. The conclusions, opinions and recommendations of the various authors in these reports do not necessarily reflect the views of any of the sponsoring organizations.

This report, Urban Food Supply and Distribution: Supply Linkages of Bangkok and Thonburi Fresh-Food Markets, was originally part of a Ph.D. dissertation in Geography submitted by Margaret E. Crawford. Invaluable assistance was provided for this study by personnel of the

Applied Scientific Research Corporation of Thailand. In particular, economists Mit Pramuanvorachat and Nipon Panomkarn made vital and important contributions in both the fieldwork and in the analysis of the complex patterns of rural-urban commodity linkages. This report also reflects the assistance of the many merchants, truckers, boatmen and others who, in spite of inconvenience, were willing to provide information about their work.

Bangkok and Thonburi, the primate city par excellence and the dominating center of urbanization in Thailand, have experienced a very recent and rapid growth in population. With almost three million persons, or close to 10 percent of the country's population, they form a major center of demand and are the focus of nationwide transportation and marketing systems.

This report is concerned with one facet of urban demand, the basic need for food. It attempts to understand the organization and functioning of the urban food supply system and deals primarily with the supply linkages between the markets and the urban market foci and between the foci and provincial sources of supply. The study is based mainly on interview data gathered in and around marketplaces, wholesaling centers and areas where trucks and boats congregate. It details the focussed spatial patterns of urban supply links and specifies the primary and secondary foci for the different commodities. The dispersion of widespread sources defining food supply areas is established, and an examination is made of the transportation systems used to move goods into the cities and of the informational and organizational contacts by which producers and consumers are linked.

Dr. Crawford's study identifies points of congestion in the supply system where pressures from consumers and suppliers overlap. Striking changes in transportation have not only enlarged provincial supply areas but have also intensified the strain on terminals suited to earlier transport technologies. Where these are located in markets, congestion may become extreme. The organization of marketing has not shown changes as notable as those in supply areas or in movement of foods but should be understood in assessing the current system. All of these deserve careful consideration in any planning of future urban development.

L. A. Peter Gosling
Project Director

TABLE OF CONTENTS

	Page
PREFACE	ii
LIST OF TABLES	vii
LIST OF ILLUSTRATIONS	vii
LIST OF MAPS	viii
LIST OF APPENDICES	ix
INTRODUCTION	1

Chapter

I. THE SUPPLYING OF BANGKOK AND THONBURI FRESH FOOD MARKETS: THE URBAN NETWORK 4

- Internal and External Linkages
- Vegetable Supply Linkages
- Fruit Supply Linkages
- Fish Supply Linkages
- Pork Supply Linkages
- Beef Supply Linkages
- Poultry Supply Linkages
- Supply Linkages for Groceries
- Primary and Secondary Sources of Commodity Supply to Bangkok and Thonburi Markets: A Summary

II. URBAN RURAL LINKAGES IN THE SUPPLYING OF BANGKOK AND THONBURI MARKETS: VEGETABLES AND FRUIT 39

- Vegetable Sources and Seasonality
- Fruit Sources and Seasonality
- Transportation and Organizational Linkages
  - Transportation
  - Organization
  - Summary

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Chapter Page

III. URBAN RURAL SUPPLY LINKAGES AND URBAN DISTRIBUTION OF FISH AND POULTRY PRODUCTS AND SELECTED GROCERIES IN BANGKOK AND THONBURI 72

Supplying Fish to the Urban Population
Supplying Poultry to the Urban Population
Supplying Fresh Eggs to the Urban Population
Supplying Salt to the Urban Population
Rice and Sugar Supply to Urban Consumers

IV. SUMMARY AND CONCLUSIONS 102

APPENDICES 114

SELECTED BIBLIOGRAPHY 172

LIST OF TABLES

Table		Page
1.	External Supply Linkages for One Hundred Fifty-five Active Fresh-food Markets	10
2.	Bangkok and Thonburi Market Supply Links by Commodity .	11
3.	Percentages of Quantity of Selected Fruits and Vegetables Moving to Bangkok and Thonburi by Road, by Zone of Origin, 1967	61
4.	Transportation of Fish to Bangkok Fish Markets, 1960-1969	76

LIST OF ILLUSTRATIONS

Figure		Page
1.	Fruit and Vegetables Supply Linkages to Bangkok and Thonburi Consumers	67
2.	Poultry Supply Linkages to Bangkok and Thonburi Consumers	86
3.	Salt Supply Linkages to Bangkok and Thonburi Consumers .	94
4.	Rice and Sugar Urban Supply Linkages to Bangkok and Thonburi Consumers	101

LIST OF MAPS

Map		Page
1.	Bangkok and Thonburi Markets Location Index	5
2.	Bangkok and Thonburi Active Food Selling Markets: Extra-Urban Commodity Supply B.E. 2513 (1970)	9
3.	Bangkok and Thonburi Markets: Vegetable Supply B.E. 2513 (1970)	13
4.	Bangkok and Thonburi Markets: Fruit Supply B.E. 2513 (1970)	17
5.	Bangkok and Thonburi Markets: Fish Supply B.e. 2513 (1970)	20
6.	Bangkok and Thonburi Markets: Pork Supply B.E. 2513 (1970)	24
7.	Bangkok and Thonburi Markets: Beef Supply B.E. 2513 (1970)	27
8.	Bangkok and Thonburi Markets: Poultry Supply B.E. 2513 (1970)	31
9.	Bangkok and Thonburi Markets: Grocery Supply B.E. 2513 (1970)	34
10.	Bangkok and Thonburi Market Supply: Primary and Secondary Sources B.E. 2513 (1970)	36
11.	Provincial Vegetable Sources for Bangkok and Thonburi Markets	45
12.	Provincial Fruit Sources for Bangkok and Thonburi Markets	49
13.	Travel Times from Selected Fruit and Vegetables Sources to Bangkok and Thonburi Markets	56
14.	Provincial Poultry Supply Sources for Bangkok and Thonburi Markets	83
15.	Provincial Sources of Fresh Eggs for Bangkok and Thonburi Wholesalers	90

LIST OF APPENDICES

Appendix		Page
1.	Alphabetical List of Bangkok and Thonburi Markets with Index Locations to Accompany Map 1	115
2.	Bangkok and Thonburi Markets: Interview Data Summary .	119
3.	Market Seller Interview Format	137
4.	Carrier Interview Format	138
5.	Frequency of Citing Extra Urban Fresh Food Sources by Commodity	139
6.	Interview Identified Source Locations for Vegetables in Bangkok and Thonburi Markets	141
7.	Interview Identified Source Locations for Fruits in Bangkok and Thonburi Markets	148
8.	Summary of Provincial Sources of Commodities for Bangkok and Thonburi Markets	153
9.	Selected Travel Times for Fruit and Vegetables Arriving at Bangkok and Thonburi Markets	159
10.	Transport Changes: The Damnoen Saduak Example	162
11.	Lamyai Supply to Bangkok and Thonburi Markets	166
12.	Fish Marketing Linkages	169
13.	Live Poultry Sources Outside Bangkok and Thonburi Selected from Interviews	170

INTRODUCTION

This report is the second of a pair dealing with different facets of fresh food supply and distribution in the cities of Bangkok and Thonburi. The first report[1] identified the locations of close to two hundred fresh-food markets or talat which play a crucial role in the provisioning of the urban population of almost three million persons. The markets' sizes, their occupancy by sellers, the commodities they trade, their daily business periods and their function as retail or wholesale markets were all described in some detail. From this it was possible to derive a tentative summary of the utilization or activity of markets and to discuss the process of market adjustment to an expanding urban area and rapidly increasing population.

In the discussion of urban and market changes, potential points of congestion in the market system were recognized, and the importance of smoothly functioning supply linkages connecting individual markets and the market system as a whole to both producers and consumers was stressed. This theme provides the focus for this second study, the organization and functioning of the supply system.

---

[1] Margaret E. Crawford, Urban Food Supply and Distribution: Characteristics and Utilization of Fresh Food Markets in Bangkok and Thonburi, Technical Report No. 5, Department of Geography, University of Michigan, Research Project Nonr 1224 (56), N.R. No. 388080, 1974.

As was the case in establishing the characteristics of markets, information about the supply linkages is not readily available and therefore must be sought from the many individuals involved in them. The study is then exploratory in seeking to establish both patterns of urban circulation, and those which highlight the interdependence of city and countryside as supply linkages were followed from talat out to provincial sources. Data obtained through interviews with sellers in markets was supplemented by work with wholesalers located outside the markets for the commodities where it was evident that they play a major role in food distribution. In addition, truck and boat operators and other transport agents were important sources of information.

The report deals first with the urban segment of the linkages between the many sellers of food in markets and their immediate suppliers in order to specify the locations of any urban foci as well as the connecting linkages. Preliminary work suggested that the market system in the cities is a rather open one and not peculiarly urban. Because the focussing of supply patterns was found to differ distinctively from one food group to another, the discussion which follows is organized by commodity rather than by market or market type.

Succeeding chapters of the study push the exploration of the food supply system out beyond the urban network to consider rural to urban food movements. Emphasis is placed on three broad topics in dealing with this larger context of the urban food supply system: establishing the location pattern of provincial sources; a description of the transport linkages involved in moving food into the cities; and a variety of informational and organizational contacts through which producers,

intermediaries and consumers are connected. These topics are investigated for a selection of the commodity groups offered for sale in the markets in order to illustrate commodity differences and the variation in the importance of talat as focal points in the articulation of the food supply system.

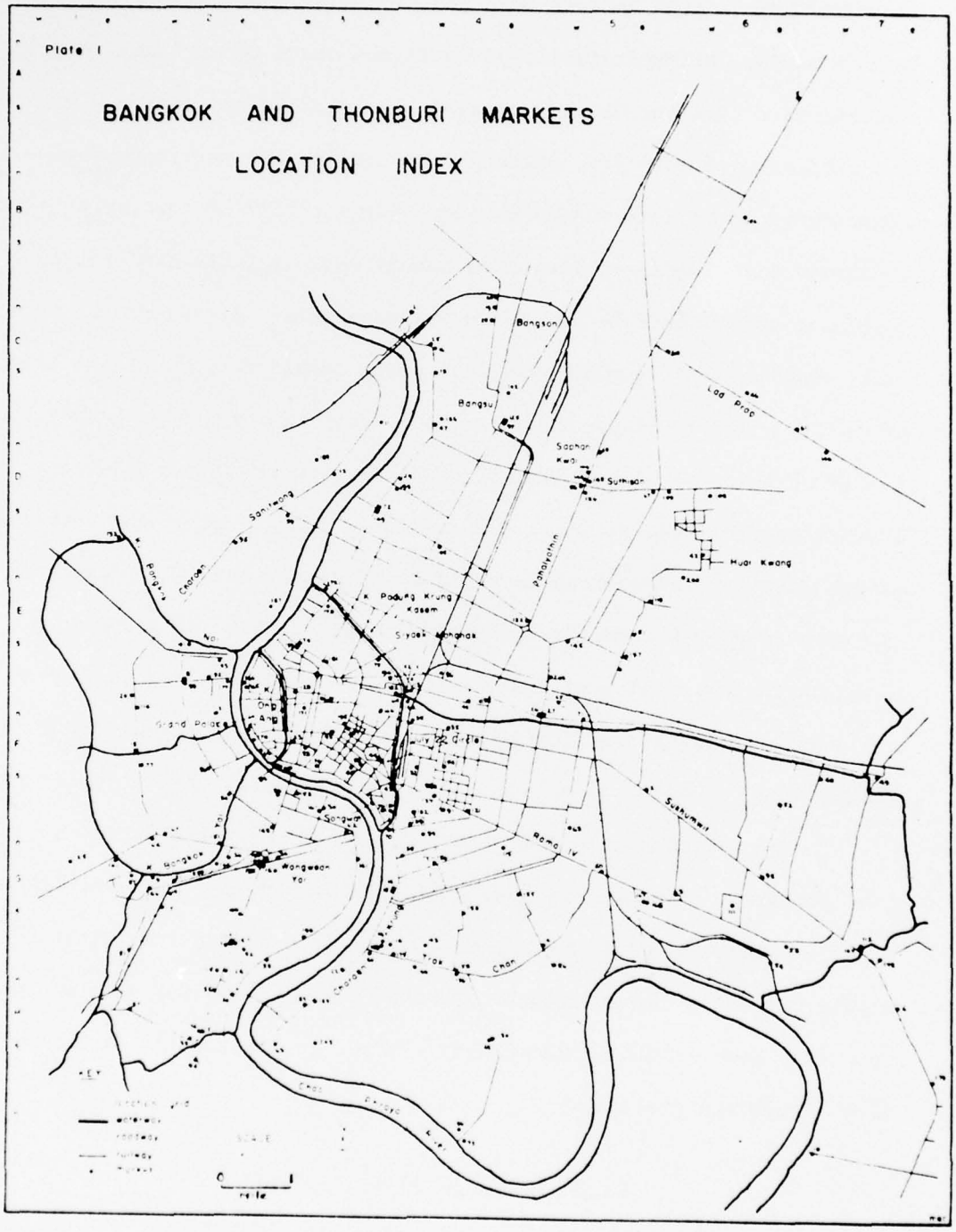
The talat and other city foci which mediate provincial and urban movements are pressure points in the larger system and must be able not only to distribute ever larger supplies of food within the cities but also to absorb increasing quantities reaching them by changing means of transport from expanding production areas. They are strongly affected by a multitude of individual decisions taken throughout the marketing networks and must be responsive to change. The concluding section of the report presents a summary of the substantive findings of the study and takes up the theme of change in the urban fresh food supply system.

CHAPTER I

THE SUPPLYING OF BANGKOK AND THONBURI FRESH FOOD MARKETS: THE URBAN NETWORK

Fresh food markets in Bangkok and Thonburi (see Map 1) focus the movement of food supplies from producers scattered throughout Thailand as they enter the cities and are distributed among the urban population. From the markets most of the perishables consumed are fanned out by a multitude of small transactions between sellers renting market stalls and household buyers from throughout the metropolitan area. The fresh food markets thus represent the most constricted and spatially focussed channeling of supplies in the whole pattern linking producer to consumer. Changes or difficulties in the organization or functioning of the supply system operating through fresh food markets vitally affect the entire urban population.

In this chapter, the urban supply networks are investigated in their market to market commodity movements and in their direct linkages between markets and sources outside the cities. In order to describe and examine these linkages, sellers of each of the food categories present in each of the markets were interviewed. They were asked where they bought their supplies, what the occupation of the supplier was, if the good were delivered or had to be fetched, what means of transport was used and its cost, the frequency of buying and usual quantity


Plate 1
BANGKOK AND THONBURI MARKETS
LOCATION INDEX
Bangsue
Bangsu
Sapan Kwai
Sutthisan
Lad Prao
Huai Khwang
Sanjaeng
Pongphetchanin
Grand Palace
Sukhumvit
Wongwian Yai
Chan
Charoen Krung
Klong Toei
Klong Toei
SCALE

Map 1

bought. Many of the sellers were also asked if they thought that others in the market followed similar patterns and where other likely supply sources were. It was usually possible to complete an interview except for estimates of quantity, although, of course, the willingness of respondents to be interviewed varied. The activity of the market at the interview time was an important factor as well as individual personality. Questions which could be linked to tax assessments or government regulations such as those governing slaughtering tended to generate reticence or 'safe' answers. A decision was made early in the study to vary the number of informants in a market according to what seemed necessary to acquire complete and reliable information. Since some of the commodity groups were not represented at the time of the interview, information for each commodity comes from different total numbers of markets as noted in the discussion of each commodity. As always in this kind of exploration, the information gathered in conversation beyond the interview proved tremendously valuable in establishing a context for judgment.

The patterns of supply linkages within the urban area and beyond the cities are presented as they emerged from mapping the interview data. After a preliminary and general discussion of external and internal supply patterns, the individual patterns are examined for each of the commodity groups handled in markets: pork, poultry, beef, fish, vegetables, fruit and groceries.

Internal and External Linkages

Preliminary analysis of interview data identifying the locations of sources from which sellers trading from paeng in the markets draw

their supplies made it clear that the supply system generally is a rather open one. There are many links from urban markets directly to sources outside the cities as well as the expected filtering of supplies from major urban contact points through which provincial supplies enter the city and move into the urban market network. Thus, both internal and external linkages are important.

First, it is necessary to define the terms internal and external supply linkages as they are used in this study. Internal supply is taken to mean the buying of the commodity anywhere within Bangkok and Thonburi, in effect within the two municipalities and their continuously built-up extensions and in turn, selling that commodity at the market where the interview was taken. The connecting of the two places is termed a linkage. Internal supply sources are in food markets or in businesses operating from other urban locations. External supply linkages are taken to mean the market stall operator's purchase of the commodity outside the two cities but within Thailand. In the interview data, locations were specified as precisely as possible. Internal and external supply linkages are investigated here to assess the degree to which food markets in Bangkok and Thonburi are mutally interdependent components of the food supply system.

Of the 171 markets at which food sellers were interviewed, only thirty-two or 18 percent had no external supply linkage, but drew solely on markets or other urban sources. This diffuse supply pattern is somewhat unexpected considering the clustering of retail and wholesale market functions to which the supply system is closely related.[2] Thus

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[2]Only 14 percent of the markets are categorized as wholesale,

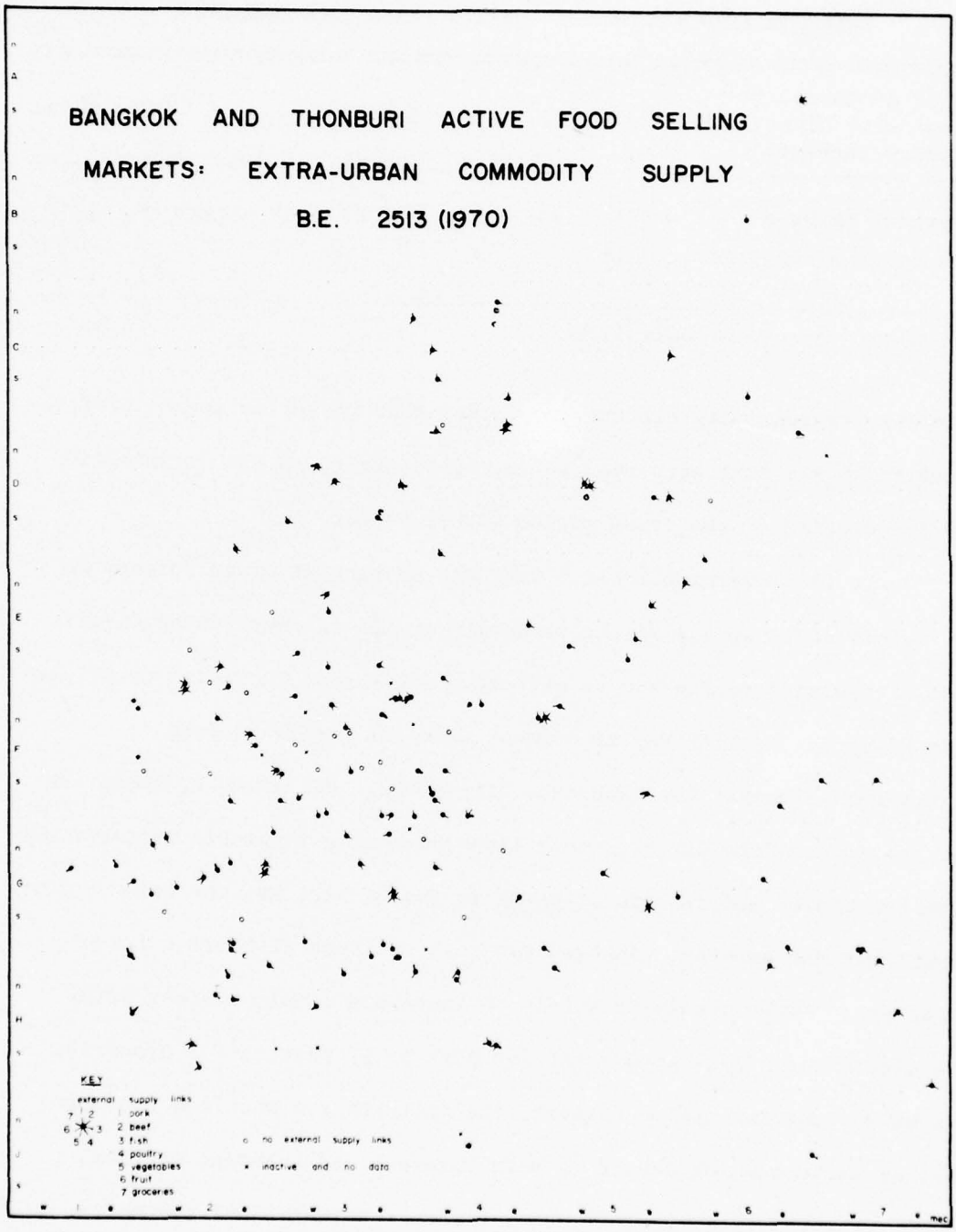
retail markets do not necessarily draw through wholesale market centers setting up an hierarchical supply system, but rather many of them develop direct links to extra-urban supplies from producers as well as from wholesalers. These patterns are much less surprising if no impermeable boundary to a distinctively urban food marketing system is assumed. It must also be kept in mind that an external contact for any one commodity excludes a market from the wholly internally supplied category. As Map 2 shows, markets without any external or extra-urban direct supply linkages appear to be centered in the older parts of Bangkok and Thonburi. All are retail markets but vary in other characteristics to include morning only, morning and afternoon, and all day markets. They range in size from fewer than 25 sellers to 150 and in estimates of activity from inactive, through moderately active to very busy centers of trading.[3]

More detailed examination of the external linkages of food markets showed that the generalizations made above do in fact conceal considerable variation. Table 1 shows the number of markets which have external linkages for varying numbers of one to all seven commodity groups. The commodities are not specified, but simply show the number of commodity groups drawn directly from a non-urban source. As might be expected, few markets are even close to being totally independent of urban source locations, but many do draw one to three commodities from outside the cities. This raises the possibility that it may be

---

with 10 percent as wholesale and retail and 77 percent as retail only. Ibid., p. 43.

[3] Ibid., pp. 48-53, pp. 75-87.


BANGKOK AND THONBURI ACTIVE FOOD SELLING
MARKETS: EXTRA-URBAN COMMODITY SUPPLY
B.E. 2513 (1970)
KEY
external supply links
1 pork
2 beef
3 fish
4 poultry
5 vegetables
6 fruit
7 groceries
o no external supply links
x inactive and no data
mec

Map 2

TABLE 1

EXTERNAL SUPPLY LINKAGES FOR 171 FRESH FOOD MARKETS

Number of Commodity Groups with Direct External Linkages	0	1	2	3	4	5	6	7	Total
Number of Markets	32	59	45	21	9	4	1	0	171
Percentage of Markets	19	35	26	12	5	2	1	0	100

Source: Interview data 1970.

commodity to commodity differences rather than market to market differences which are most pertinent to an understanding of the organization and functioning of the urban market supply system.

It is clear from Table 2 that any assumption of uniformity in the supply links of all of the commodity groups is unwarranted. Variation in source location and in differing degrees of focussing or dispersion of operating linkages is evident when the interview data is rearranged by market for each commodity group. For example, there are few instances where direct supply links between a vegetable producer outside the cities and sellers at paeng in the markets are the sole supply links, but the external linkages for pork or fresh fish are extremely important. Markets relying solely on immediate supply sources within the cities range from 46 percent for pork to 92 percent for groceries and 86 percent for beef. However, the patterns are modified considerably by markets which depend on both internal and external sources.

The remainder of this chapter sets out individual commodity analyses in order to indicate the clearly differing urban supply foci for each commodity, the channeling of linkages within the two cities and

TABLE 2

BANGKOK AND THONBURI MARKET SUPPLY LINKS BY COMMODITY

	Pork				Beef				Fresh Water Fish				Sea Fish			
	I	I&E	E	Total	I	I&E	E	Total	I	I&E	E	Total	I	I&E	E	Total
No. Markets	67	31	55	153	98	7	9	114	51	13	25	89	67	22	35	124
Percent Markets Each Linkage	44	20	36	100	86	6	8	100	57	15	28	100	54	18	28	100

	Poultry				Vegetables				Fruit				Groceries			
	I	I&E	E	Total	I	I&E	E	Total	I	I&E	E	Total	I	I&E	E	Total
No. Markets	36	9	7	52	131	32	5	168	102	27	11	140	66	4	2	72
Percent Markets Each Linkage	69	17	14	100	78	19	3	100	73	19	8	100	92	5	3	100

Source: Interview data, 1970.

Note: I = supplied from within the urban area
E = supplied from outside the urban area
I&E = supplied both from internal and external linkages

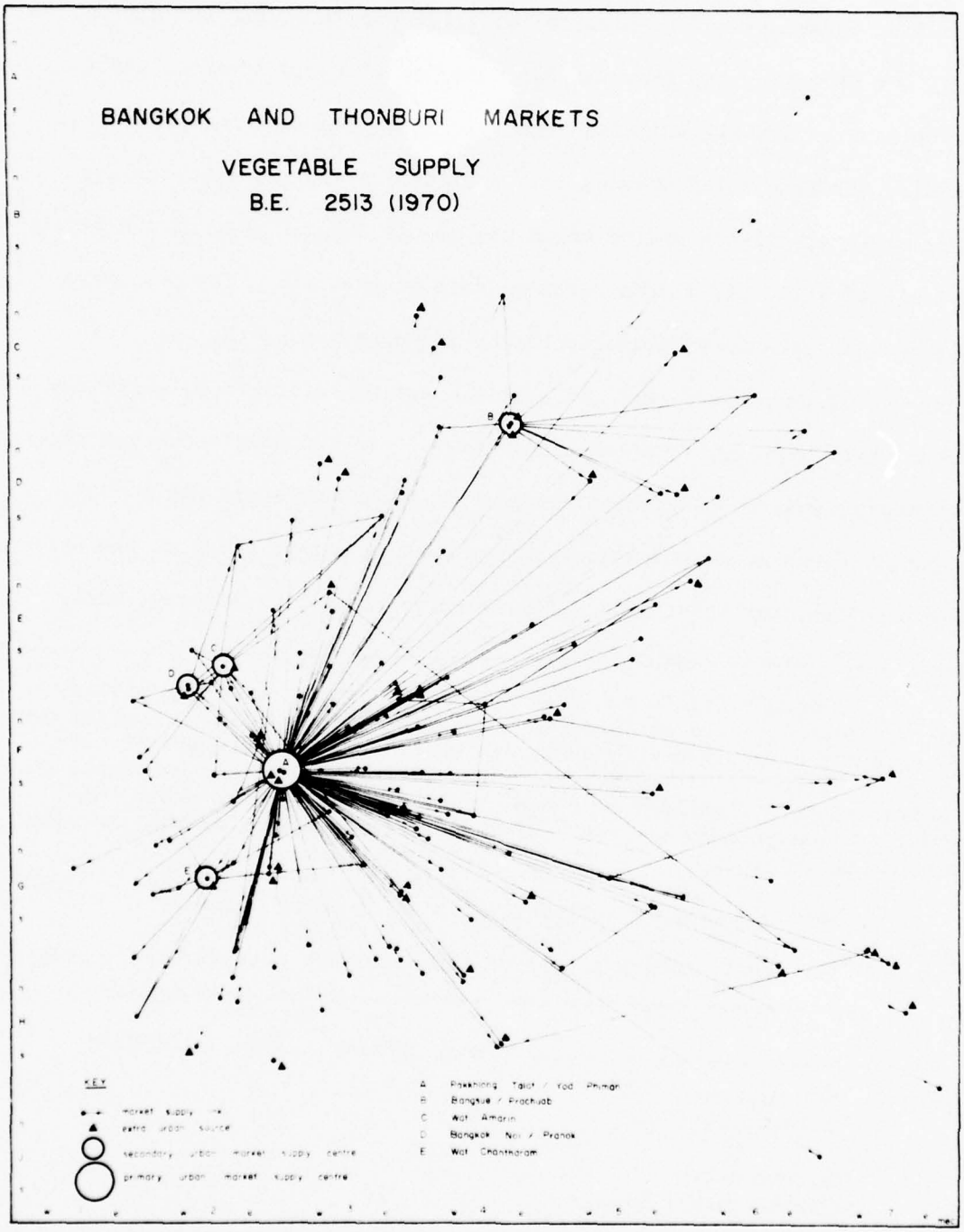
the permeability of the channels to contacts which link producing areas directly to market outlets.

Vegetable Supply Linkages

The abstracted pattern of the market supply linkages for vegetables is shown on Map 3. Market locations are indicated by dots and the linkage by a straight line connecting the market to its immediate fresh vegetable source locations. The lines are arrowed from the sources to indicate direction of movement. A line represents inter-urban connections, and a triangular symbol beside a market indicates that it draws vegetables directly from outside Bangkok and Thonburi. At this point in the discussion no emphasis is placed on whether this extra-urban link is simply to adjacent gardens or whether it represents the terminus of interprovincial movement. This theme is pursued in the following chapter.

From the map, it can be seen that the markets with extra-urban contacts are mostly located on the outskirts of the two cities, or if central, are also major foci of inter-urban movement. Few markets depend solely on direct contact with producers for their vegetable supply. Furthermore, most draw at least partially on the wholesaling function of one of only a few centers.

The line pattern indicates the prime importance in vegetable supply to both Bangkok and Thonburi of the Pakkhlong Talat/Yod Phiman complex on the Chao Phraya river bank in central Bangkok. Its reach encircles the entire metropolitan area, and its merchants deal in the whole range of the impressive multiplicity of vegetables which are drawn, in turn, by land and water from throughout almost the entire country.


BANGKOK AND THONBURI MARKETS
VEGETABLE SUPPLY
B.E. 2513 (1970)
KEY
market supply link
extra urban source
secondary urban market supply centre
primary urban market supply centre
A Pakkhlong Talat / Yod Phimar
B Bangkwe / Prachuab
C Wat Amarin
D Bangkok Noi / Pranok
E Wat Chantharam

Map 3

Besides this one major center of outstanding importance, there are four secondary source markets for talat supply within the cities.[4] Only one of these, the Prachuab/Bangsu complex[5] is in Bangkok, and it draws some of its own supplies from Pakkhlong Talat/Yod Phiman as well as directly from rural sources. It provides subsidiary supplies for nine markets, all but one of which are on the Bangkok side of the river, and all of which are in the northern part of the city. Its secondary position to Pakkhlong Talat/Yod Phiman is suggested by the fact that only two of the nine markets it supplies depend on it alone, while the other seven buy also from Pakkhlong Talat.[6] In Thonburi there are three secondary centers for vegetable supply to urban markets: Wat Amarin, commonly known as Sala Nam Ron, a busy morning market close to the railway terminus; Wat Chantharam, locally referred to as Wat Klang, where

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[4]Throughout this and the following sections the terms primary and secondary sources are used in a relative sense. Primary sources are centers which supply many markets and which draw on producers or merchants outside the cities for their goods. Secondary sources supply a smaller number of markets with goods, and they themselves depend on supplies from primary sources and other urban locations as well as from outside the cities.

[5]Bangsu market is officially listed as Sapsin Bangsu.

[6]The supplementary nature of the secondary centers may be seen:

	Bangsu	Wat Amarin	Bangkok Noi	Wat Klang
No. Markets Sole Supply	2	1	--	1
No. Markets Supplementary Supply	7	10	5	6

supplies shipped in on Khlong Bangkok Yai are often unloaded; and the less important Bangkok Noi market. Each of these, like Prachaub/Bangsu, draws from Pakkhlong Talat/Yod Phiman as well as directly from producers. Wat Amarin supplies eleven markets in Thonburi, ten of which also draw on Pakkhlong Talat. Wat Chantharam supplies seven markets located in central and south Thonburi, six of which also draw from Pakkhlong Talat. Bangkok Noi is a secondary source for five others.

There is relatively little overlap in the areas which draw on the secondary centers, except around Bangkok Noi and Wat Amarin. They are located quite close to one another, but differ in that Wat Amarin is a busy morning only market in which the most developed wholesale sector is the fruit and vegetable trade. Bangkok Noi and Pranok across the road have a wider selection of commodities available all day and are particularly attractive to buyers on a multi-purpose trip.

The focus on seller supply rather than on consumer supply brings out a relatively simple pattern of inter-urban supply links for vegetables. The importance of breaking down the analysis to separate the individual commodity groups becomes increasingly apparent as their distinctive patterns emerge in the following sections. Consideration of these patterns yields insights important in decision making which deals with urban congestion.

Fruit Supply Linkages

Fresh fruit is available year round in Bangkok and Thonburi markets, with fruits such as bananas, oranges and coconuts plentiful all year and others like durian, mango or rambutan available for short

seasons only.[7] It is often the shapes, colors and aromas of the fruits in season which give the changing impressions of a market. The interview data for sources of fruits is rather less complete than that for vegetables as fruits are often sold outside the market proper by hawkers or regular traders who sell for shorter periods than the paeng renters. However, sufficient cross-questioning was done to ensure that all major urban sources of talat fruit supply were identified.

The abstracted map of fruit supply (Map 4) should be read in the same way as Map 3. While fewer markets draw fruits directly from extra-urban sources, those which do are mainly located on the periphery. A reading of the line pattern identifies two major primary sources for fresh fruits, Pakkhlong Talat/Yod Phiman and the area commonly known as Si Yaek Mahanak. The latter includes five markets and a boat covered stretch of Khlong Padung Krung Kasem, and like Pakkhlong Talat/Yod Phiman, it draws its supplies by both land and water from a large area. Three of the five markets have a major wholesale component, as do the open yard outside Wang Mahanak and the khlong. It is noteworthy that unlike the boat traffic which can unload on the banks of the Chao Phraya, only small craft can navigate the khlong to Mahanak; many of these are used to bring fruit from transshipment points which are located on the outskirts of the city, such as from Bangkhae. The larger barges in the khlong at Si Yaek Mahanak, most of which are permanently moored there for use as storage, are generally supplied by truck.[8]

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[7] For a discussion of fruit seasonality, see Chapter II.

[8] There are plans to clear this stretch of the khlong of permanently moored boats. There is also active construction in the Si Yaek Mahanak area effecting the markets' layout.

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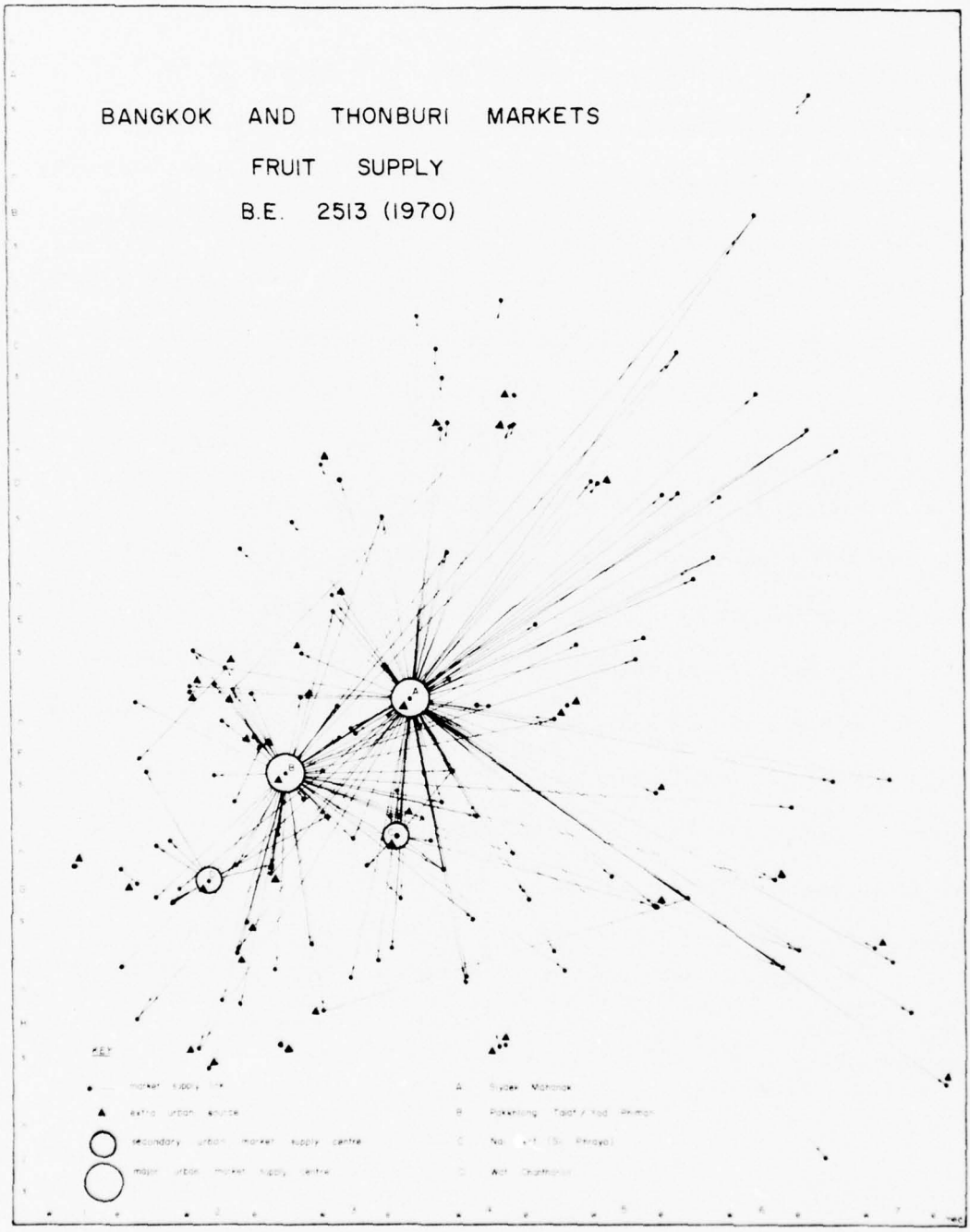
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[7] For a discussion of fruit seasonality, see Chapter II.

[8] There are plans to clear this stretch of the khlong of permanently moored boats. There is also active construction in the Si Yaek Mahanak area effecting the markets' layout.

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Map 4

The Si Yaek Mahanak markets specialize in fruit although some dealers also stock dry vegetables like onions, garlic and other commodities in the grocery category. This primary focus serves not only the urban area, throughout which it is recognized as the fruit market, but also satisfies considerable provincial demand as well. In the Pakkhlong Talat/Yod Phiman complex, the Yod Phiman section specializes more in fruits than in vegetables. The trading from the surrounding shophouses is an inseparable part of the activity of this center. Both of these primary sources are drawn on by many markets throughout the two cities.

Besides the two primary centers, there are also two secondary centers in the cities, Nai Lert[9] in Bangkok and Wat Chantharam[10] in Thonburi. Wat Chantharam is the more important of the two serving ten markets in central and south Thonburi and providing the sole source of fruit supply for five of these. As is the case with Yod Phiman, this role of fruit supplier for many sellers is not readily discernible from discussions of the talat itself, since much of the trading takes place in temporary shelters in the Wat courtyard rather than at the paeng of the market buildings proper.

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[9] There is a great deal of confusion in the common reference to this market. Si Phraya market is actually a very small market on Si Phraya Road with temporary wooden paeng. It has been partly cleared to make room for a road. The market known to people from most of the city as the fruit market, Si Phraya, is actually Nai Lert or Bai Yok market further west.

[10]

Secondary Fruit Sources	Si Phraya	Wat Klang
No. Markets Sole Supplier	3	5
No. Markets Supplementary Supplier	4	5

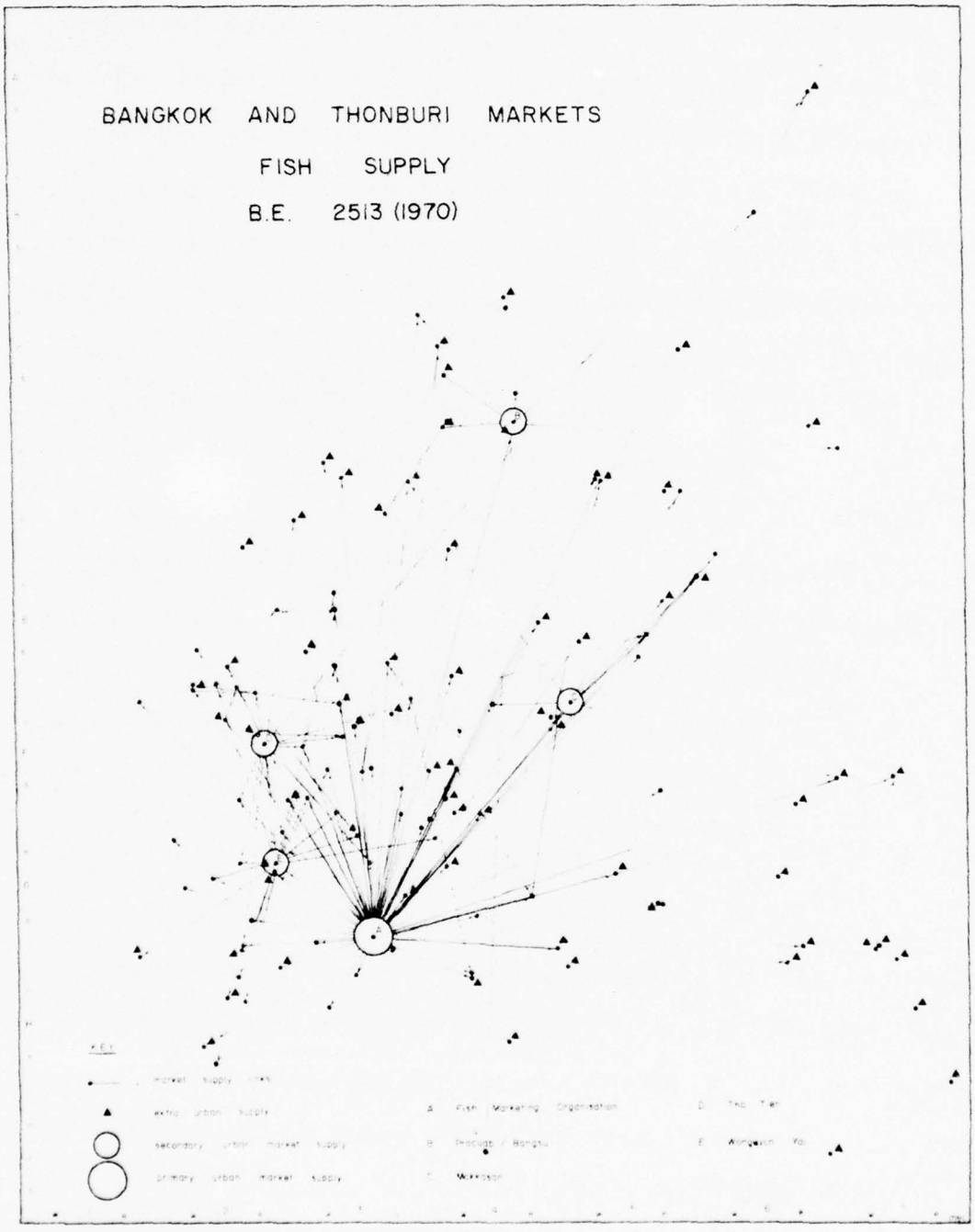
The secondary center at Talat Nai Lert, or Si Phraya as it is more commonly called, specializes in fruit only and is also unusual in having upstairs living-quarters which can be rented by sellers. It too draws supplies in by Khlong Padung Krung Kasem as well as by road and like the primary foci, supplies itinerant and small boat peddlers who criss-cross the urban area as well as paeng holders in markets. Si Phraya serves seven south Bangkok markets and is sole supplier for three of them.

One large general market complex which wholesales several commodities including fruit, Thewarat, has not been mapped as a secondary fruit source. The number of markets it was noted as supplying may be an underestimate due to the difficulty in distinguishing talat trading from that in surrounding warehouses, shophouses and alleys and in boats tied up on the khlong which borders one side of the market building. In addition, the nearby coconut storage where the khlong enters the Chao Phraya river adds to the area's drawing power as a fruit source.

Fish Supply Linkages

The pattern of supply linkages between urban market sellers of fresh fish and their immediate sources is quite different from that of either vegetables or fruit. Map 5 shows an overwhelming concentration on one primary source which in this case is not a talat but the auction place of the Fish Marketing Organization. Commonly known as Saphan Pla, it is located on the Chao Phraya river off the frequently congested, to the point of standstill, Charoen Krung Road in south Bangkok. From the Fish Marketing Organization fish are moved to markets all over the two

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Map 5

cities. However, this general pattern for fish as a whole obscures differences between marine and fresh water fish. In talat marine fish and fresh water fish are often separated, with sellers usually handling only one type. Marine fish, usually dead, are sold from heaps of different kinds, either on ice or without it, while fresh water fish are usually kept live in basins until sold, and then are killed and often sliced on the spot for the buyer. An attempt is made in Appendix 2 to reflect the different supply sources for marine and for fresh water fish, while the map shows all fresh fish as one category. The Fish Marketing Organization handles much more marine than fresh water fish and is the source of marine fish for a majority of the markets. For some, it is the source for both marine and fresh water fish, but very few markets purchase only fresh water fish at the Fish Marketing Organization. Fresh water fish sources, in general, are more dispersed than for marine fish which are so strongly channeled through the F.M.O. and a small number of extra-urban sources. These differences are explored further in a later chapter.

As is the case for other commodities, secondary centers are also locally important.[11] Only one of these, Wongwean Yai, is in Thonburi; this center includes not only both the north and south parts of the

[11] Secondary fish sources.

	Source			
	Wongwean Yai	Makkasan	Prachuab/ Bangsu	Tha Tien
No. Markets Sole Supplier	5	--	4	--
No. Markets Supplementary Supply	9	9	3	11

market but also Tang Ah market across the street, the footpath hawker trading area and the railways terminus. Wongwean Yai serves fourteen markets in south Thonburi, nine of which also draw on other sources of urban supply.

On the Bangkok side of the river, there are three secondary sources of fish supply to markets; Bangsu serves seven markets in the north, four of them exclusively, and Makkasan, which is similar to Wongwean Yai in that it encompasses the market and the railway station area, serves nine markets directly. While six of these receive marine fresh fish from other sources, Makkasan is the sole supplier of fresh water fish for all nine. The third secondary source in Bangkok is Tha Tien which is more often associated with the wholesaling of dried foods, grains, eggs and groceries than with fish. However, it serves as a supplementary fish source for eleven markets. Some of the markets are unusually far away, but a likely explanation of this pattern is that buyers use Tha Tien for multi-purpose shopping trips.

The pattern of fish supply to urban markets differs from those of fruit and vegetables in that many more markets have direct contact with extra-urban sources. Several of these markets are quite independent of any contact with other markets in either city or with the prime supply source in the Fish Marketing Organization. However, the actual number of different locations represented by these numerous citations of extra-urban contacts, especially for marine fish, is much less than that for fruit or vegetables. If F.M.O. facilities in other places as well as in Bangkok are included, the channeling through this organization is even more marked since 69 percent of the extra-urban marine fish sources

cited are in Samut Prakan and another 31 percent in Samut Sakhon. As the summary sheets in Appendix 2 indicate, extra-urban sources of fresh water fish include a larger number of scattered locations as might be expected.

Pork Supply Linkages

Pork and beef are extremely important components of Bangkok and Thonburi people's diet and represent a large part of family food spending.[12] Pork is bought in markets both fresh and already cooked, but fresh meat makes up by far the larger part of pork trading, and it is that aspect which is explored here.

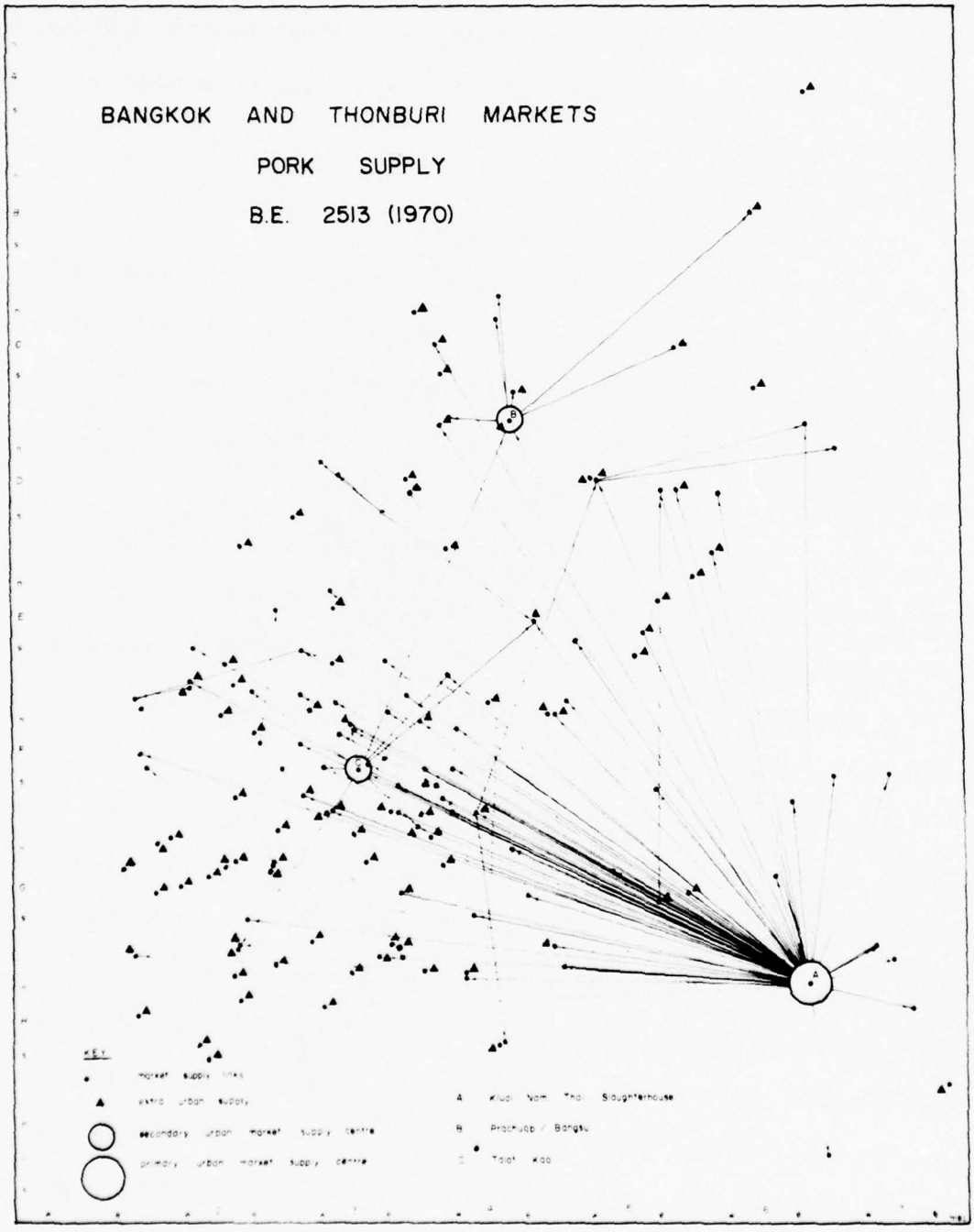
Map 6 again shows a strikingly focused pattern of the linkages by which the everyday pork sellers in the fresh food markets in the two cities are supplied. The prime focus is the municipality run slaughterhouse at Kluai Nam Thai which serves the majority of the Thonburi markets as well as almost all the Bangkok talat.

There are fewer secondary centers than there were for vegetables or fish. One of the reasons for this is the changing legal restrictions on slaughtering and efforts to channel the trade through the slaughterhouse. Regulations have differed from time to time, but firmly established and powerful marketing patterns do not disappear simply with the promulgation of a regulation. Informants in the markets almost always gave the "best" answer to the question as to where they bought the meat they were selling, the municipal slaughterhouse. Even with this known

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[12] The National Statistical Office's 1964 household expenditure survey gives meat expenditure at 14 percent.

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Map 6

bias, the supremacy of the municipal slaughterhouse as the primary source in the urban area is not seriously questioned here.

A minor secondary urban center[13] for pork supplies to paeng operators exists in the Bangsu/Prachuab complex and also around Talat Kao. The former supplies seven markets in northwest Bangkok and is the sole supplier of four of them. The latter serves eight markets, seven of which also draw on Kluai Nam Thai slaughterhouse. These secondary centers are commonly the termini for multi-purpose trips and are quite different in nature from specialized major sources such as the Fish Marketing Organization or the Kluai Nam Thai abbatoir.

Sellers in the vast majority of the markets said that they also drew supplies from outside the cities; the most frequently cited sources were Bangkhe, changwat Nonthaburi and Nakhon Pathom. As the triangular symbols on the map indicate, in some markets the sellers claimed to depend solely on extra-urban sources. While no claims are made for completeness of information or for the veracity of the answers given by respondents, it is quite clear that large quantities of the pork consumed by the metropolitan population come from a variety of sources which the users hesitated to locate, at least until the definition and enforcement of regulations becomes clearer. It was interesting that this was the only commodity for which the uncertainties of legality made interviewing somewhat difficult.

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[13] Secondary pork centers.

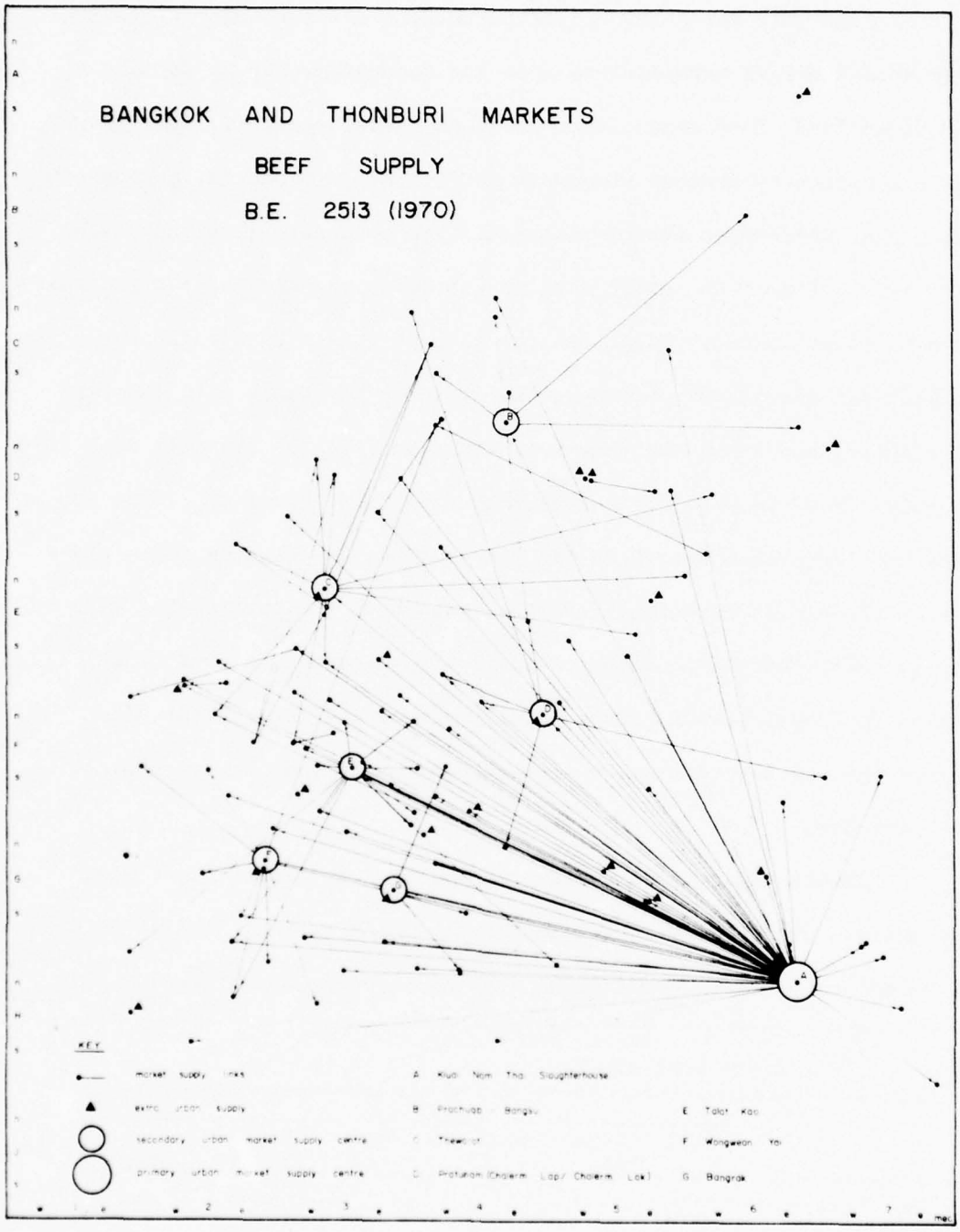
	Source	
	Prachuab/Bangsu	Talat Kao
No. Markets Sole Supply	4	1
No. Markets Supplementary	3	7

Pork supply linkages differ from those of the other commodities described above in the organization of transportation to paeng sellers. While fruit, vegetable, and most fish sellers go themselves to their source place and hire public transport to move the goods back to the market, pork is generally delivered to the seller at the paeng by an agent who considers transportation cost as part of the buying price and often would not quote commodity costs and transport costs separately. This, of course, also meant that it was common to claim that pork was ordered from agents who came to solicit business and that the locations of the agents' businesses were unknown. Differing opinions were expressed about the degree of control over quality, or the lack of it, which this type of supply operation allowed; however, relatively few sellers said that they preferred to go themselves to the slaughterhouse to select their own qualities. For most, the convenience of regular delivery by a supplier who was often well known was sufficient. Paeng renting traders who only handle small quantities usually use secondary sources, although merchants selling less than one carcass a day were rare.

Beef Supply Linakges

The beef supply pattern which emerges from the interview data (see Map 7) is similar in some respects to that of pork. The primary urban source is also the municipal slaughterhouse at Kluai Nam Thai, but its reach into Thonburi is less extensive, with fewer than a third of Thonburi markets receiving beef from there.

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Map 7

The pattern of secondary urban sources is also more clearly defined than that for pork.[14] Furthermore, these secondary centers are used by sellers in more markets than are secondary centers for any of the other fresh food commodity groups, as Table 2 showed. Only one of the six secondary sources of supply is located in Thonburi at Wongwean Yai market which also caters to specialized consumers like the Moslem community. Six of the eight markets depending on Wongwean Yai generally have no other source. Talat Kao Yawarat, serving eleven markets, is the largest secondary source in Bangkok. Its reach extends into Thonburi overlapping the supply pattern from Wongwean Yai, and its pull is sufficiently strong to bypass other secondary centers. In fact, Talat Kao is something of a misnomer since the most active beef selling takes place not in the market building itself but rather in the surrounding alleys. During interviews many sellers said it was an especially convenient source for small traders since purchases could be made by the kilo rather than by the carcass, which is the measure used in large scale beef trading.

Thewarat market in northern Bangkok is the second most used secondary source, with several merchants in the market building as well as in adjacent shophouses trading unusually large quantities for this

[14] Secondary beef sources.

	Source					
	Talat Kao	Thewe-rat	Wongwean Yai	Pratu-nam	Prachuab/ Bangsu	Bangrak
No. Markets Sole Supply	6	1	6	4	4	4
No. Markets Supplementary Supply	5	6	2	3	1	--

situation. Pratunam, as the markets including Chalerm Lap and Chalerm Lok are called, is a secondary center serving east-central Bangkok. Three of seven markets for which this is a source also call on other places. Bangsu/Prachuab in the north serves five markets, four of which do not rely on other sources. Bangrak is the sole source for four markets in south Bangkok.[15]

The transportation of beef between markets varies from the pattern of pork movement. Beef is delivered to most of the market sellers using Kluai Nam Thai as a source by agents working out of the slaughterhouse. However, the users of secondary sources generally provide their own transportation, most commonly samlor or hired minibus.

There is an obvious contrast between pork and beef in the much smaller dependence of beef market-sellers on sources outside the two cities. The triangular symbol which represents a non-urban source is recorded for few markets.

Poultry Supply Linkages

In tracing the supply linkages built up by the paeng renters in the daily markets for the different commodity groups, a pattern of one or two primary sources with two to six secondary sources has emerged. For poultry, which here means almost entirely chicken and duck, although a small quantity of geese is consumed, a much simpler pattern of three primary but no distinguishable secondary sources emerges.

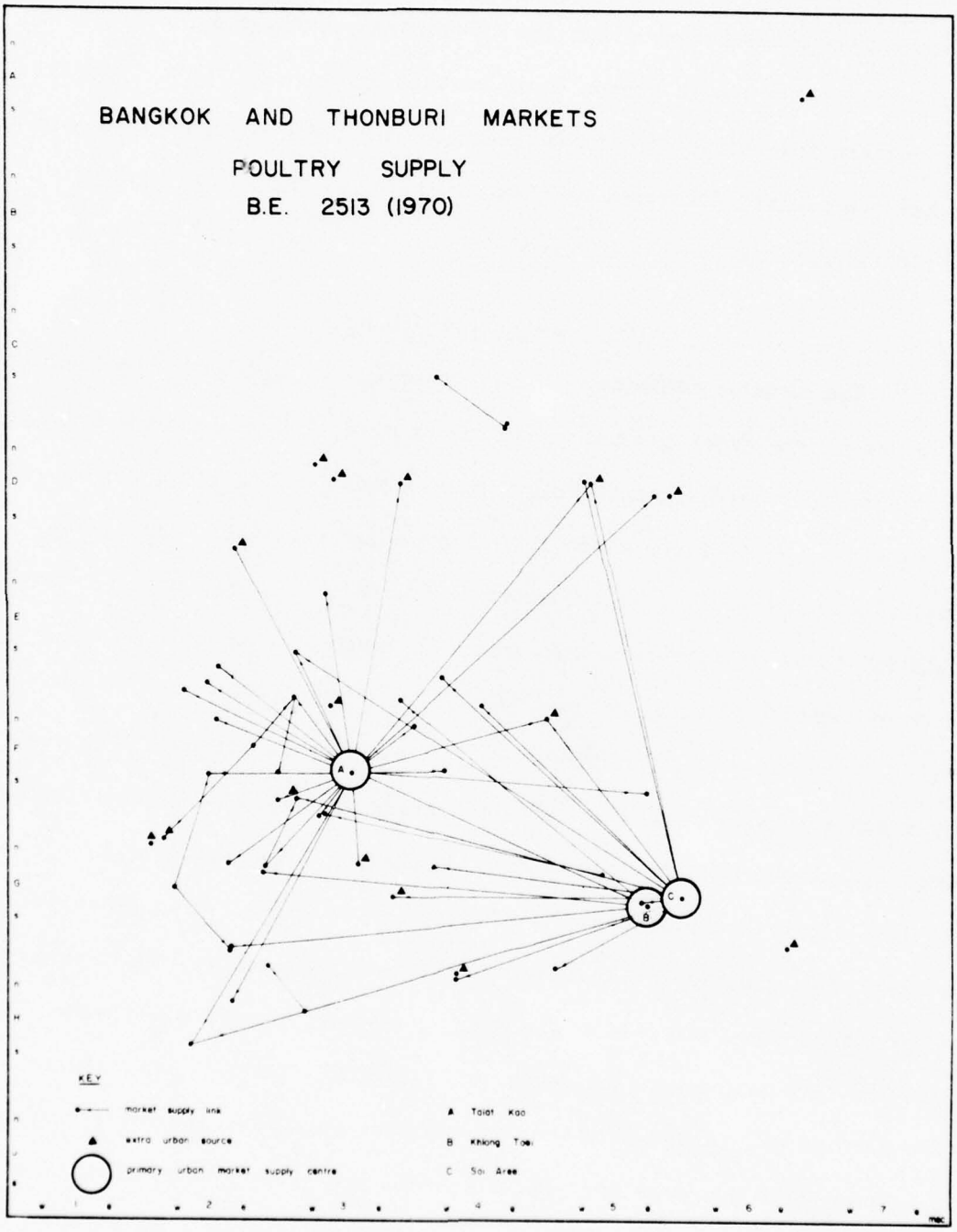
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[15] No attempt was made in this study to estimate how much water buffalo meat is consumed. It was often commented upon as being tougher than beef and was sometimes recognizable to this interviewer, but the distinction did not appear to be important for this study.

The interview coverage of poultry sellers was not as wide as that for fruit, vegetables or pork, but it quickly became clear that the supply linkages were distinctive. The organizational aspects are dealt with in some detail in the next chapter. It suffices here to note that many markets do not have anyone selling dressed poultry for long periods during the time they are operating, that the sellers rarely have more than fifty carcasses in view and that usually those were bought alive at one of the primary sources and were taken to the seller's home, killed and dressed before being taken to market for sale. Thus, unlike any of the other commodity groups, poultry had a hidden stop and change of state between market and source. The locations of these interruptions are often as widespread as the homes of the sellers and are unnecessary to detail for the present discussion.

The poultry supply linkages, shown on Map 8, are distinctive in another respect in that two of the primary source locations are not in fresh food markets. The primary urban sources for the markets of both Bangkok and Thonburi are in Soi Aree and Khlong Toei in southern Bangkok. It is here that merchants have recently grouped together in temporary and permanent structures and through which the vast majority of the chickens and ducks enter the urban marketing system, regardless of whether directly from the producer or from the duck fattening places found around the cities.

The primary location for poultry supply noted in the Talat Kao area refers to a small group of merchants who occupy an entire alley. Formerly, many more merchants had clustered here. Sellers in several of the markets which use this source also draw on others.


BANGKOK AND THONBURI MARKETS
POULTRY SUPPLY
B.E. 2513 (1970)
A
B
C
KEY
market supply link
extra urban source
primary urban market supply centre
A Talat Kao
B Khlong Toei
C Soi Aree
1
2
3
4
5
6
7
mile

Map 8

Source locations outside the two cities were given by informants in markets scattered throughout the two cities, although again extra-urban sources were more common among markets on the periphery. Few of the sellers interviewed in the markets had their own means of transport or had the poultry delivered to them but depended instead on hired public transport to move their goods.

Supply Linkages for Groceries

The seventh commodity group, groceries, is much less homogeneous than any of the other groups, including as it does a whole range of goods from rice, salt and sugar to dried onions, chillies, pickles, spices and fresh eggs. Most of the goods in the group are not fresh, and therefore receive less detailed treatment in this study. However, in a later chapter, brief comments are made about the individual supply organization of several of these commodities.

For the most part, groceries are not supplied through a primary or secondary talat source; rather, the goods are traded directly through wholesalers who usually operate from shophouses found all over the cities. From the interview information, it was evident that groceries were also distinctive in that daily buying is not required as in other commodity groups, and stocks are kept up instead by periodic buying. Many sellers said that they dealt entirely with agents or wholesalers who came to the paeng and who delivered what was ordered. For those who purchase their own supplies at the source, the primary centers are the Talat Kao area, Songwat, the Pakkhlong Talat/Yod Phiman area and around

Tha Tien (see Map 9).[16] In all of these, trading is not restricted to the market itself but is even more active in shophouses in surrounding lanes. This is especially the case in Talat Kao and Pakkhlong Talat/ Yod Phiman, and in Songwat which has no talat focus.

Interviewing suggested only two secondary centers where sellers go to buy groceries (mostly dried vegetables), one in Bangkok and one in Thonburi. The Si Yaek Mahanak source claimed by informants usually meant Padung Krung Kasem market and the adjoining Saha Wattana market, and to a lesser extent, Mahanak market itself. A total of eleven markets is served by this source, five in a supplementary role. The Thonburi secondary center at Wat Chantharam refers both to the active trading in the Wat courtyards and in the market buildings. Wat Chantharam serves eleven markets and is sole supplier of five of them.[17]

Very few sellers anywhere in the two cities said that they had direct supply linkages with producers at other sources outside the cities, with the noted exception of merchants in the primary sources just mentioned. It should be emphasized that a large proportion of the groceries trade is conducted by wholesalers in the two cities using salesmen and delivery services; the map, however, represents those

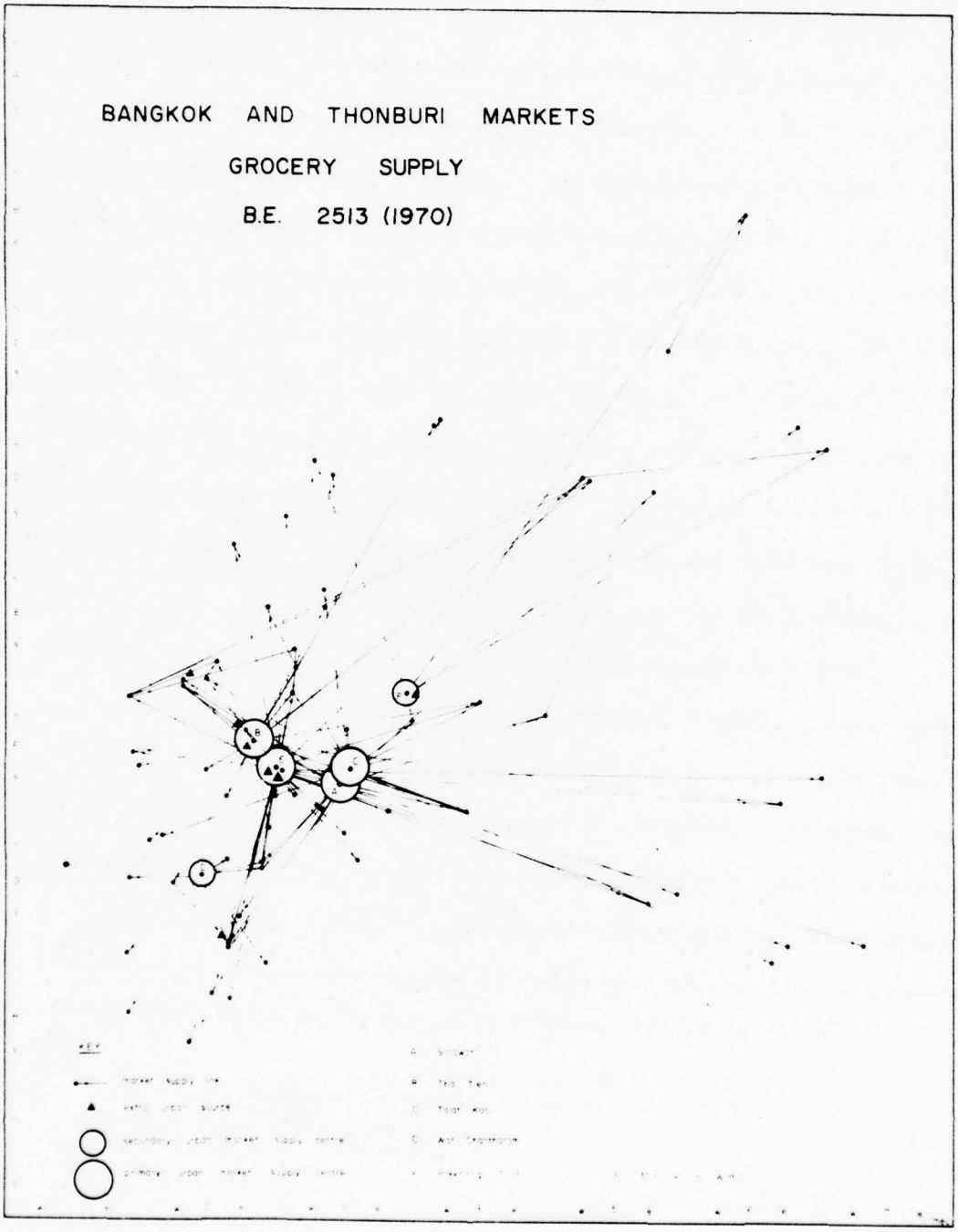
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[16] Comments in this section refer mainly to dried commodities.

[17] Secondary dried grocery centers.

	Source	
	Wat Chantharam	Siyaek Mahanak
No Markets Sole Supply	5	6
No Markets Supplementary Supply	6	5

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Map 9

sellers who generally go themselves to choose their goods and who hire transportation to move them.

Primary and Secondary Sources of Commodity Supply to Bangkok and Thonburi Markets: A Summary

Map 10 summarizes the primary and secondary centers of supply for goods sold in the fresh food markets throughout Bangkok and Thonburi as they emerged from the interview data gathered from sellers in the markets. Eight source locations are noted as primary foci of market supply. Only one of these, Pakkhlong Talat/Yod Phiman, is a primary source for three of the commodity groups: vegetables, fruit, and groceries. Two are primary sources for two commodities: Kluai Nam Thai municipal slaughterhouse for pork and beef and Talat Kao for groceries and poultry. Each of the other six locations is a primary center for only one commodity.

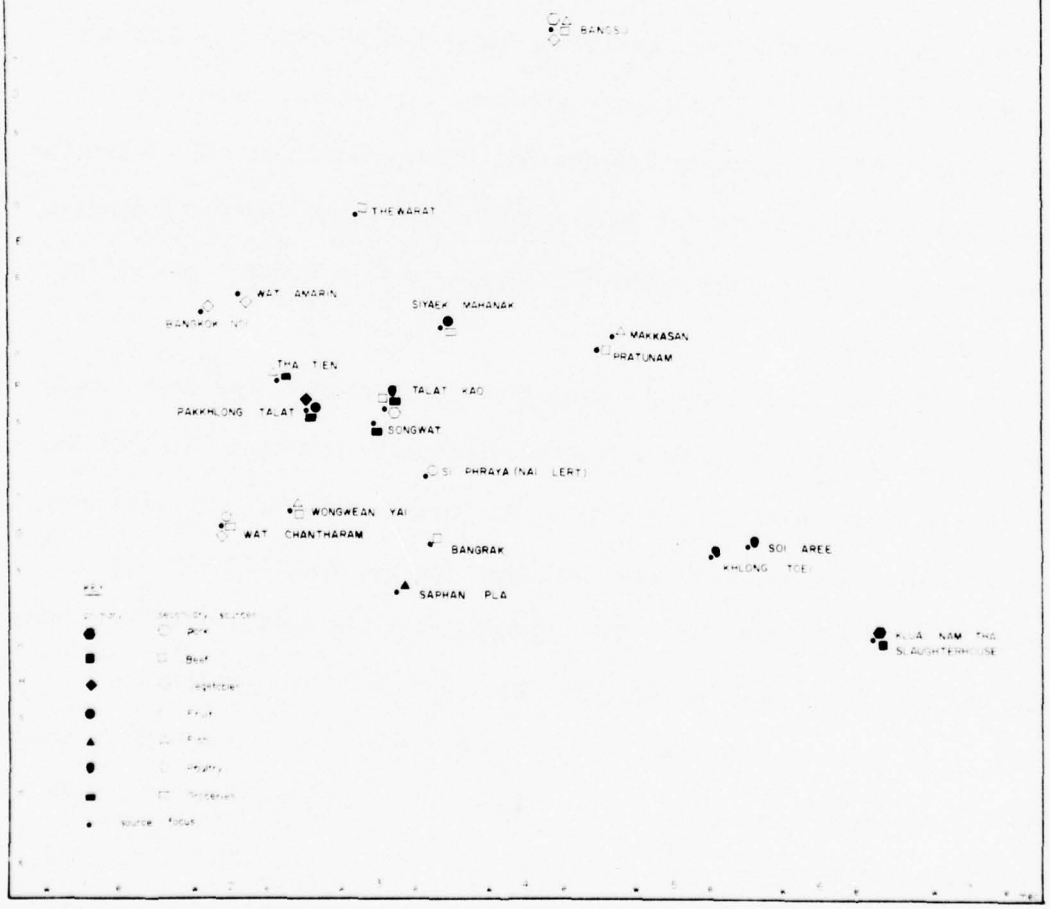
Thirteen locations are secondary urban sources for food supply to sellers in markets. Six are single commodity sources: Bangkok Noi, Si Yaek Mahanak, Makkasan, Pratunam, Si Phraya, Bangrak, Thewarat and Wat Amarin. Two locations are the focus for two commodity groups: Talat Kao and Wongwean Yai. Three commodities are centered at Wat Chantharam, and Bangsu is a secondary center for four food groups.

It should be emphasized that five out of the eight primary source locations are not in talat. Two of them, Kluai Nam Thai and the Fish Marketing Organization, reflect direct official policy decisions, and three, Songwat, the Talat Kao area and Soi Aree, reflect the operation over time of many individual decisions. The latter also reflects the

BANGKOK AND THONBURI MARKET SUPPLY

PRIMARY AND SECONDARY SOURCES

B.E. 2513 (1970)



Map 10

force of changing times, for although the Soi Aree site may not have been officially selected, its necessity arose mainly from pressures triggering a move from the previously occupied locatirn.

In contrast, all of the secondary source locations are in talat. These talat are not uniform in their internal characteristics and vary from large to small and from general to specialized. It should be noted, however, that although the talat as defined by the market building proper vary considerably, the differences are smoothed somewhat when the trading that occurs in adjacent lanes, khlongs and shophouses is also considered. As mentioned previously, the supply to other markets operating from these centers is not entirely restricted to the buildings.

The maps and footnote tables indicate the focusing of the supply between food sellers in markets and their immediate sources into relatively few locations. They also suggest that the channeling to these foci is more or less marked depending on the commodity group in question. For example, most beef and groceries follow the pattern very closely, but for pork or fish direct contacts outside the urban area are very much more important.

The commodity maps themselves simply show the presence in a market of immediate linkages to places outside the cities and the openness of the urban system to such contacts but do not specify these locations. These are listed in Appendix 5, along with the number of times a place was claimed as a source by respondents in talat in order to give a general idea of their importance. As might be expected, the linkages between sellers in most of the markets and their out of town sources are to places which are not far from Bangkok or Thonburi. The more

widespread and long distance contacts are mainly restricted to merchants in primary centers. This is especially so for commodities whose primary centers are in talat. Also, as might be expected, the locational concentration of out of town sources is much greater for a commodity such as sea fish, which is drawn from two sources, than it is for fruit or vegetables, which have a very widespread distribution of production.

In the following chapters the analysis of market supply will focus on the linking of countryside and city as the different commodities move to satisfy the appetites of the urban population. Thus, the food supply system may be seen throughout the areal extent of its operation.

CHAPTER II

URBAN RURAL LINKAGES IN THE SUPPLYING OF BANGKOK AND THONBURI MARKETS: VEGETABLES AND FRUITS

In the preceding chapter, the immediate sources of the commodities sold in Bangkok and Thonburi fresh food markets were examined. Supply linkages were traced from food sellers at paeng in markets to wholesalers in other city markets, to scattered non-market urban locations and to sources outside the cities. Thus, in the wider urban food supply system, market sellers' contacts with the general buying public are diffused widely, and, more importantly here, these sellers themselves draw together areas of production which are widely dispersed throughout the country. In the urban segment of the linkages through which city food sellers draw commodities, there are marked variations from commodity to commodity in the tightness of the channeling of supplies. Focal points in the urban area were identified in the previous chapter. These are important to recognize since they are points of pressure in the system and must be able to absorb sufficient food from production areas and distribute it into the urban system as the cities grow.

The emphasis of this chapter is on pushing the exploration of the city food supply system out beyond its urban segment to examine the wider context. Information about three aspects of the rural to urban

supply are sought. These are an indication of the dispersion of the provincial sources on which the two cities draw, some understanding of the actual movement of goods into the cities and a suggestion of the variety of informational and organizational contacts by which producers and consumers are linked. All three are deliberately couched in tentative terms, since definitive work on any one of them should be a separate study. For these aspects of the study, detailed interviews of food wholesalers and operators of trucks and boats to the cities were conducted. Descriptions from these sources present a deliberately skewed Bangkok eye view of their agricultural production. The value of such a perspective is two-fold. It can provide valuable insights both into the essential relationships which tie together country producers and city consumers and into the role of the fresh food markets through which food is supplied to the urban population.

Although the most convenient arrangement of the data is by commodity, it was not feasible to give equal weight to each commodity group; therefore, only selected commodities are explored and compared. In this chapter, two commodities whose urban-rural linkages are very largely channeled through talat are discussed, vegetables and fruits. In the following chapter, fish and poultry are chosen as representative of commodity groups which have highly concentrated city-based urban-rural connections but primary foci not located in talat. As mentioned earlier, the supply channels through which the various commodities falling into the grocery category move to households vary considerably. These patterns proved to be fugitive in the analysis of market based interviews, since the rural-urban linkages for many of their components are not made

in talat but rather are channeled through agents who deliver goods from many different locations. However, the availability of commodities such as fresh eggs, salt, rice and sugar is sufficiently important to warrant a brief discussion of these goods, and this commodity group is explored in the latter part of the third chapter.

The interviewing on which these chapters are based was carried on throughout 1970. Coverage of each commodity varied and is noted as each of the foods is discussed. The interviews in all cases included questions about the source of the commodity, its seasonality, the source person, transportation details and information linkages, and other linkages, such as supplies and credit which bind merchants to producers and consumers.

Vegetable sellers comprise about 40 percent of the close to 14,000 sellers recorded in seller counts made in licensed markets in Bangkok and Thonburi at the end of 1969. Vegetables, while not the most expensive part of a Thai person's diet, are probably eaten daily by almost everyone, and although fresh vegetables may be purchased from storefront sellers or from hawkers, there is little doubt that talat play the major role in supplying households. From the analysis presented in the previous chapter, it is also clear that it is talat like Pakkhlong Talat and Yod Phiman which are the foci for both the receipt of vegetables from the provinces and the supply to urban markets on which households draw. The supply contacts made directly to sources outside the cities by market-sellers are supplemental to, or supplemented by, drawing on these major centers.

Fruit selling occupies a much smaller proportion of market sellers, about 13 percent. For the reasons explained in the previous chapter, this is probably an underestimate of the actual trading in talat complexes. Although fruit is perhaps felt to be less essential in the daily diet of most people, it is, nonetheless, widely eaten fresh, in various prepared desserts and in snacks. Furthermore, the consciousness of seasonality of some fruits, like durian or mangos, is strong enough to be a referrant for other diverse happenings. Like vegetables, urban-rural contacts in the supply of fruit are focused most strongly in talat with dominant centers at the Pakkhlong Talat/Yod Phiman and Si Yaek Mahanak complexes and secondary centers at Thewarat, Wat Chantharam and in Si Phraya. The latter is somewhat unusual in that many of its sellers are also producers. Very few direct supply contacts are made by paeng sellers in other markets to fruit sources outside the cities and those, too, are only supplemental in nature.

Since the supply of some fruits and vegetables is more seasonal than others, year round supply may be provided by a progression of commodity source areas from one part of the country to another. Repeated visits were made to the focus points of fruit and vegetable trading, especially to Pakkhlong Talat/Yod Phiman and Si Yaek Mahanak to seek information relevant to the questions of this chapter.[18]

One difficulty in dealing with fruits and vegetables as categories is the remarkable variety obtainable. A list may run to well

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[18]The information in this chapter is drawn from interviews at 75 vegetable and 88 fruit businesses and from interviews with 30 vegetable and 50 fruit carriers. The completeness and emphases of the conversations varied slightly, although an attempt to cover the same topics was made.

over a hundred items, and it is not uncommon for a vegetable seller doing moderate business in even the smaller markets to offer twenty-five or thirty different kinds of vegetables for sale. Although the aim of the interviews reported here was to try to cover the major business of the focus markets throughout the year rather than make an exhaustive study of the variety of kinds of fruits and vegetables, details are given for the origins of fity-two different vegetables and thirty-three fruits; included are most of the fruit and vegetables which come into the cities in large quantities, those which are drawn from more distant sources and require more formalized trading, and other fresh produce such as tree leaves or flowers of other plants which are harvested but not necessarily cultivated and are offered for sale only sporadically and in small quantities.

The arrangement of this discussion of fruits and vegetables is first a description of the source locations and seasonality of both separately and then a discussion of transportation and organizational linkages dealing with the two together.

Vegetable Sources and Seasonality

Information gathered during interviews about provincial sources of vegetables consumed in Bangkok and Thonburi is presented in some detail in the appendices.[19] This information has also been mapped (see

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[19] A list was made of the major kinds of vegetables which reach the cities and for each, the provincial sources mentioned by informants. This data was then rearranged by source location along with the number of different kinds of vegetables which originate in each source (see Appendix 6). It should be pointed out that because of differences in the degree of accuracy with which informants could pin-point the source locations of the commodities in which they dealt, supply sources listed

Map 11) to give a visual impression of the general patterns and extent of supply sources upon which Bangkok and Thonburi depend for their food needs. Major origins are linked to the cities by straight lines. Changwat sources which are in fact summaries of local collecting patterns are suggested by dotted lines centered around the provincial sources. The concentration of sources around Bangkok and Thonburi can be shown at this scale only generally.[20]

It is evident from both Appendix 6 and Map 11 that the urban demand for vegetables is indeed a far reaching one. While concentrated in the Chao Phraya and other adjacent lowlands where a great variety of different kinds of vegetables are drawn from Ratburi, Thonburi, Nakhon Pathom and Pathumthani, it nonetheless extends all the way north to Chiangmai and into the northeast to the Lomsak area; however, very little is recorded as moving out of the eastern provinces except for Si Saket. The isthmus, which is a widely known fruit source, also supplies vegetables from as far south as Prachuab.[21]

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in the appendices are not necessarily mutually exlusive. Informants could much more easily identify villages and even landmarks as sources in provinces near Bangkok-Thonburi while sources in more distant provinces were often identified only by changwat. Appendix 8 is a summary by changwat of the source locations as they were identified by informants of all the commodity groups which are covered in this study.

[20]Because buying contacts between urban markets other than primary foci and producers or wholesalers outside the cities are generally made in nearby areas, the changwat of Thonburi and Pranakhon show a heavy concentration of extra-urban sources (see shaded area on Map 11). Most of these are gardens only a short distance or travel time from the cities, and it is not uncommon to see deliveries of single bunches of vegetables being made to stall holders in markets.

[21]Suwanpinit Kanitta, "Vegetable Trade at Central Market in Bangkok 1967-68" (B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, 1967; in Thai) points out the central source area, but gives no idea of the less concentrated extensions.

Map 11 PROVINCIAL VEGETABLE SOURCES FOR BANGKOK AND THONBURI MARKETS



Not all the source areas identified are equally involved in vegetable production, however. Some, like Bang Chang and Damnoen Saduak, are devoted largely to year round vegetable and fruit growing. Much of Thonburi provides a continuous supply of leafy green vegetables, as well as fruits, for the cities. Yet, in other places, vegetables are grown only in the brief interludes between the area's major crops. For example, the landscape undergoes considerable transformation between rice crops around Angthong which becomes a major, though temporary, source of cucumbers, egg plants and string beans. In addition, localized and seasonal production may be sold in the cities for only very brief periods. For example, for about two or three weeks in July, part of one side of Khlong Padung Krung Kasem at Si Yaek Mahanak is completely filled with miniature sweetcorn from Amphur Saphaya south of Chainat. In this instance, women carry the corn from the fields in baskets to particular stretches of roadside where it is picked up by trucks and carried to the cities once a sufficient number of the smaller quantities have been accumulated to make the trip worthwhile. Much of the corn is moved by truck owners who speculate on the venture and sell from the truck itself in Bangkok. There are many such sideline and localized activities contributing to the support of the cities, and it is possible to include only a fragment here.

There is less seasonal variation in vegetable availability in the markets than there is for fruit, and most of the leafy green vegetables are sold year round. But even all the year round varieties have their peaks and shortages. To list but a few examples, the quantity and quality of peas is lower during the hot season; cucumbers and cabbages

peak in the cooler period from November until February, spring onions peak in June and July and egg plants peak in the wetter months of September, October and November. Variation in temperature and water availability can be very important in influencing the type of crop grown and its seasonality. Wholesalers claimed that seasonality was greatly reduced where irrigation is available, and Pak Chong was cited as one area where new farming techniques make possible the growing of Chinese peapods, carrots and fruits of good quality. In the Bang Chang area, tomatoes are interplanted among orange trees which are not yet bearing. Increase in demand for food has also encouraged the spread of production of food crops beyond specialized areas; for instance, onions and garlic which in the past were products especially of changwats Chiangmai and Lampang are now grown throughout the Damnoen Saduak area.

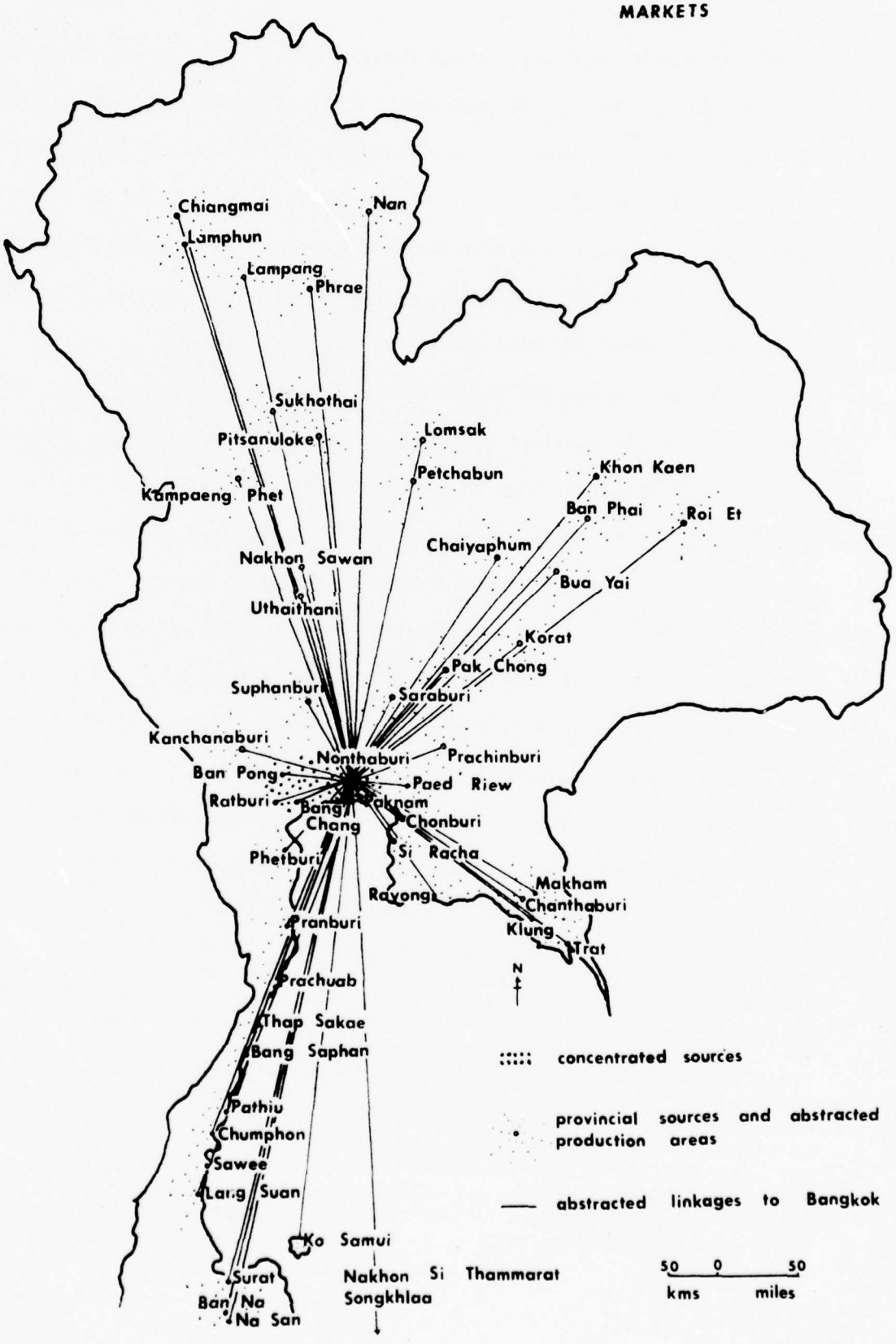
An example of successive source areas contributing to a year round supply is the production of yam bean, which peaks from the Chinese New Year until May and is in short supply during August and September. It is planted in the Bang Chang region at low water, starts arriving in markets in January and peters out in July. Chonburi and Pathumthani become the main sources from May until July and Ratburi and Phetburi are the major suppliers from July until February. In another example, the major pumpkin producing area from October through January is Bang Chang; in March and April, it is Bangbuathong; from April until June, Uthaithani; and from June until August, Sukhothai. Bamboo shoot, which is available for about half the year, arrives from Chanthaburi in March and April and from Phanat Nikkom in May and June.

Of course, products are not only seasonal in many cases, but the extent of the whole pattern of agricultural land use for city bound food crops has a certain fluidity as new production areas are opened up or are linked to the urban markets through wider availability of improved transportation facilities. Examples include the relatively recently started cabbage growing in the Lomsak area for Bangkok and Thonburi markets and the experimental lettuce growing of the Thai/Israeli Cha-Am project in Ratburi. Conversely, vegetable producing areas may switch to other crops if they appear to be more lucrative. For example, the Takri area has changed from yam bean to maize growing, and around Thapsakae coconuts have replaced yam beans.

Fruit Sources and Seasonality

The locations of fruit sources upon which Bangkok and Thonburi draw are even more widespread than are the vegetable sources described above. The different kinds of fruits and their sources as identified by informants are listed in Appendix 7 along with a list of sources and the number of different kinds of fruit which are produced there. Map 12 summarizes these sources in the same manner as vegetable sources were in the preceding section. When Maps 11 and 12 are compared, it can be seen that the number of fruit sources in the southern provinces is noticeably larger and links extend all the way to Songkhlaa and Nakhon Si Thammaret, although Surathani, Chumphon and Prachuab Khirikkhan contribute more variety. Other areas not part of the vegetable supply network which do provide fruit for the urban population are the northeastern changwat of Nakhon Ratchasima, Khonkaen and Roi Et and the northern changwat of Nan

Map 12 PROVINCIAL FRUIT SOURCES FOR BANGKOK AND THONBURI MARKETS



and Phrae. The former group supplies several different types of fruit while the latter supply only oranges. Fruit links are also more extensive than vegetable links in the southeastern provinces of Chanthaburi and Rayong. On the other hand, the rice growing central plains provinces which were such important vegetable sources are relatively unimportant for fruits, where growing perennial tree crops is not the most economically attractive land use.

Gardens in Thonburi, Nonthaburi, and around Phrapadaeng in Samut Prakan provide the greatest recorded variety of fruits for the urban markets, with the Bang Chang area in Ratburi, and nearby Sam Pran in Nakhon Pathom, Lang Suan in Chumphon, Kanchanaburi and Surathani all sending at least five different kinds. Although a total of 103 places were mentioned by informants as the source of fruits for Bangkok and Thonburi, many of them send only one or two kinds to city markets (see Appendix 7). Since many fruits are available for only a few months of the year, it should be remembered in reading the map of fruit sources that it shows the maximum extent of the supply area derived from the interviews and represents a composite which covers an annual cycle.[22]

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[22]There are several relevant brief B.Sc. thesis studies done in Thai by students in the Faculties of Agriculture and Economics and Business Administration, Kasetsart University in Bangkok. They deal with aspects of fruit supply to the cities, covering a period from 1959 to 1967. Particularly useful is Niratpatanasi Phansak's, "A Survey of the Fruit Trade in Bangkok, B.E. 2509," which deals with nine important fruits, detailing sources, marketing and transportation, and estimates of monthly quantities arriving at Pakkhlong Talat in 1966. Differences in sources in the present study are noted only for oranges, which were not shown as coming from the southeast or southwest in 1966.

Mahanak market was the subject of a study by Prachongphim Pradith, "Market Situation of Agricultural Products at Mahanak Market, 1959," which summarizes trading in four fruits. Phanusathien Nongluk,

In most descriptions of seasonality and crop calendars,[23] an attempt is made to classify crop planting or harvesting periods by month and by changwat. The data presented here, although somewhat fragmentary, intends to show not which changwat grow certain crops but rather when different fruits actually appeared in Bangkok and Thonburi markets. This is a useful distinction since much fruit grown in the provinces is absorbed locally, by other provincial markets or exported rather than being consumed by Bangkok and Thonburi markets. As was the case for vegetables, only major types of fruit are considered.

A large group of fruit, including bananas, oranges, lemons, watermelon, guava, papaya, pineapple, grapes, pomelo, jackfruit, coconuts and sugar cane, is available in the markets all the year round. Even for these fruits, however, there is often considerable variation in the quantity of the supply from month to month, and they may move from the commonplace to luxury quite quickly. For example, bananas peak in April, but are in shorter supply during the cool season. Oranges on the contrary, are most plentiful in the cool season and in September, and fewest from May to July; orange gardens may have two or three harvests

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in "Production and Distribution of Oranges of Chun Khomwong Co. Ltd., 1964," details the operations of one Petahabun based comapny which has an agent in Mahanak market. Watanakul Prasarn, in "Production and Situation of Coconuts, 1964," gives a useful description of the marketing of coconuts in 1964.

The descriptions in all of these studies were largely borne out out in this study, reflecting the fact that changes in perennial tree crop growing are apparently occurring less rapidly than those in vegetable growing.

[23] For example, the Agricultural Economics Division of the Ministry of Agriculture and the United States Operations Mission have described seasonality for selected crops.

in one year, as is common in Thonburi. Lemons are in short supply in March and April and peak from June to November. The length of this peak is explained by changes in the source during the season; lemons arrive from Phetburi in the early months and from Kanchanaburi in the later months. Guava peaks in July, papaya in April and May, pineapple from May until July, grapes in September and pomelo in December and January (especially around the Chinese New Year). During the rainy season, jackfruit is most plentiful and the availability of sugar cane reaches a low. Much larger quantities of sugar cane arrive in the hot season when demand for drinks is greater. Watermelon, a relative newcomer to Thailand, used to be a seasonal fruit but is now in the markets throughout the year, although they are considerably more abundant in November.

Thus, the quantities of the year-round fruits do change. Of course, some of the peaks are visible only in the specialized centers of the trade like Wang Mahanak, where the arrival of as many as fifty ten-wheel trucks of pineapple a day brings an unmistakable sweetness to the whole market for a short period. Considerable quantities of fruit arriving at Wang Mahanak have destinations other than the urban fresh food markets, for marketing networks still channel a great deal of inter-provincial, as well as export, trade through the capital.

But most striking is the visual transformation markets all over the cities undergo with the arrival and disappearance of seasonal fruits. Mangos begin to arrive in March and are joined in April by mangostein and lychee. By May they are gone, but durian with its own distinctive aroma has taken their place. Durian is available from April until July, and the connoisseur can distinguish among those from Nonthaburi,

Chanthaburi or Lang Suan not only by their prices, which may vary from 10 to 20 ฿ to over 100 ฿ for one fruit, but also by their own particular flavors. By May, custard apple, langsat and rambutan are arriving in the markets. Langsat, with the shortest season of the three, disappears in August when lamyai are beginning to make an appearance. Custard apples last until September, lamyai until October and rambutan until November. As with lemons, the source of this fruit changes, arriving from Chanthaburi from May to August and from the southern provinces of Chumphon and Surathani from August until November.

Transportation and Organizational Linkages

Transportation

The transport networks through which a variety of carriers move the several commodities from producer to consumer are vital in maintaining the cities' fresh food supply. Changes in transportation continue to have major influence on food production for talat in Bangkok and Thonburi and are also generating congestion in the urban nodes through which increasingly large quantities of goods are passing. In order to comment on the adjustment of the system's urban foci it is necessary to look more closely at the means by which fruit and vegetables reach the cities.

Interviewing in and around markets such as Pakkhlong Talat/Yod Phiman and Si Yaek Mahanak gave a strong sense of movement and bustle with the daily commonplace of continual arrivals from the provinces of both large and small trucks and boats. Railroad shipment, which soon came to be associated with certain containers from particular provinces,

plays a less important role in moving food to the cities than either trucking or boat shipment. It became increasingly obvious in the course of data collection that road transport is playing an ever increasing part in moving produce to talat, and it is emphasized in much of the following discussion. For each mode of transport, road, water and rail, the themes of travel time, timing, and informational and organizational linkages through which they function are explored.[24]

The convergence of Thailand's extending road system on the capital makes movement to it from provincial centers relatively easy, although cross-country movement may be tortuous. Fresh food sources are rarely over 800 kilometers from Bangkok, and the majority are within a 150 kilometer range; this holds especially for vegetables. But in dealing with perishable commodities, travel time is a much more crucial measure of distance than miles or kilometers. Data gathered from truckers and boatmen around the central markets suggests that, with the exception of the extreme north or south, no part of the country presently being drawn upon for fresh fruits and vegetables is more than a day's journey from Bangkok-Thonburi by road. Thus, it is not surprising that any spatial sorting of kinds of vegetables produced for the cities' markets according to linear distance from them is becoming increasing blurred. Ohions and garlic are sent from Bang Chang and Ratburi as well as from

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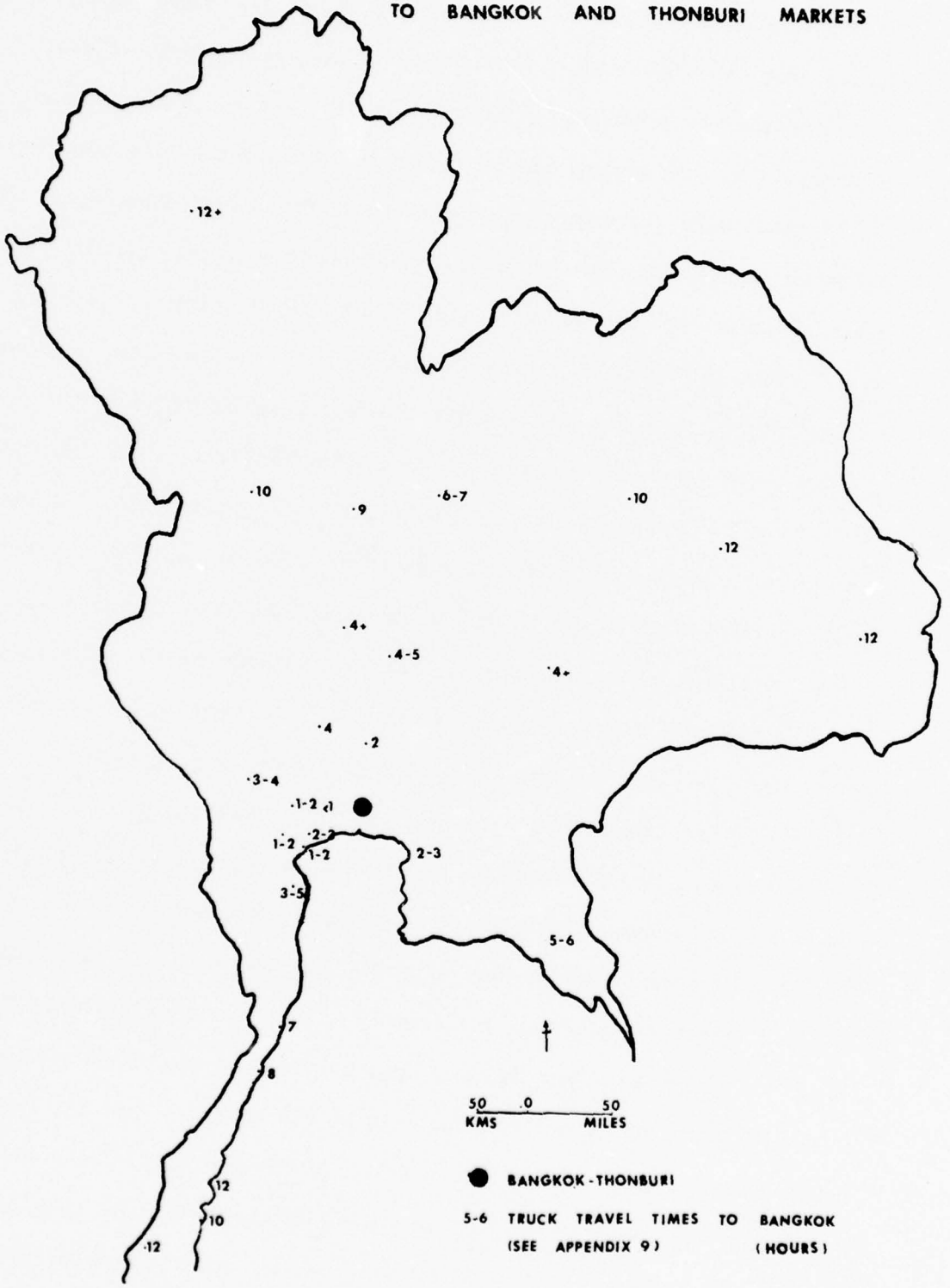
[24]There are available general sources for background information on transportation in e.g., Transportation Consulting Inc., A Comprehensive Evaluation of Thailand's Transportation System Requirements (Washington, 1959), or W. Smith, Thailand Transportation Coordination Study (Bangkok, 1970), and fragmentary information in provincial marketing studies. See also, P. J. Rimmer, Transport in Thailand: The Railway Decision (Canberra, Australian National University, 1972).

Chiangmai and Lampung, and Chiangmai now provides fresh green peas and cabbage for the urban market in addition to its earlier specialties.

Estimates given of travel times varied, and these are summarized in Appendix 9. Variations may depend on the size of the load, whether or not there were stops *en route* and whether driving was done during the day or at night. In the camaraderie among truck drivers, there is sometimes reference to the complimentary, if unofficial, title of 'devil's foot.' This title refers to the ability to drive the two lane highways, day and night, at high speed and with minimal rest and reflects the premium put upon speed of transfer. Although for many vegetables up to a day's travel time does not change their quality significantly, keeping time is more limited for soft leafy green vegetables, and they are still grown in the provinces closest to Bangkok and Thonburi. The most concentrated vegetable producing area is from half an hour to one and a half or two hours away from the urban markets. With a travel time by road of more than three or four hours, the sources become more localized, for with the longer time required for a round trip, fewer trips can be made.

Travel time information was computed through spot checks only, and no attempt was made at complete coverage. Nonetheless, a graphic display of what information was gathered (Map 13) is useful in visualizing an important aspect of the feeding of the city populations. It should be remembered that this map does not include the often considerable time required to assemble the load at the source. This may involve transferring produce from different means of transport, for local delivery to pick-up points may depend on boats, small vehicles or pedestrian traffic. By the same token, the source location would undoubtedly be

Map 13 TRAVEL TIMES FROM SELECTED FRUIT AND VEGETABLE SOURCES TO BANGKOK AND THONBURI MARKETS



pushed out with further precision by merchants in the provincial centers. It must also be remembered that the information mapped is but the extrapolation of a pattern composed over a limited period and cannot show the dynamic aspects of the location of crop production areas which result from changes in agricultural practices, in transportation technology and availability and in how people in production areas see their needs as well as in the demands of Bangkok and Thonburi populations.

In planning for delivery of produce to the cities, suppliers must not only take into account actual travel time but also the desired time of arrival. The operating hours of fresh food markets range from only a few hours in the morning or afternoon to all day. In examining the activity of markets,[25] it was discovered that those markets which supply other markets and produce sellers in general were usually busiest in the very early morning, before and around dawn, while the peak selling period in the more strictly retail markets was later in the day. Thus, the time at which the provincial merchant or producer arranges to have commodities delivered becomes very important. As well as wishing to participate in the height of the market's activity, suppliers have an additional incentive to arrive before dawn; the municipalities have imposed a rush hour ban on heavy trucks within the cities, and arrival during these times often means time wasted in queueing on the outskirts. The cities hope to make these regulations more stringent by banning

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[25] For a more detailed discussion of market selling times, see Margaret E. Crawford, Urban Food Supply and Distribution: Characteristics and Utilization of Fresh Food Markets in Bangkok and Thonburi, Technical Report No 5, Department of Geography, University of Michigan, Research Project Nonr (1226 (56), N.R. No. 388080, 1974.

heavy trucking in the cities either completely or at least during the day. This raises interesting questions about the possibility of radical change occurring in the location of those primary urban supply points identified in the previous chapter. Such a ban could also lead instead to an increase in the number of smaller vehicles, a response which would avoid bans on large trucks without decreasing present levels of urban congestion.

Several carriers interviewed reported that it required a day in the upcountry location to assemble their loads. They then travelled in the evening or at night and arrived in the cities from 1:00 a.m. onwards. This is especially true of shippers who are sufficiently far from the cities to require two or more days for a round trip. Arrivals from the nearby gardens, often using small capacity vehicles, take place almost anytime during the day, although they too may be concentrated in the urban markets' peak selling period.[26]

Trucking fruit and vegetables to Bangkok and Thonburi may be either a part-time or full-time business and involves a great variety of operating and load-finding arrangements. For example, for seasonal fruits like rambutan, many small truck owners speculate on the chance of finding a load in producing areas and on being able to sell it in Bangkok, either directly from the truck or to traders at paeng or wholesalers. Once the season for that fruit is over, the truck may no longer be involved in food movements to the cities. Such highly competitive

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[26]Afternoon proved to be the most unsuitable time to interview in the primary centers like Wang Mahanak, since few people were left in the market and most of those were sleeping. Early morning was also difficult since informants often felt too busy to talk.

small scale trading can develop rapidly as it has from Chanthaburi and Prachaub in the last few years. In contrast, large trucks on the same route generally rely on an agent to find them a load. In one instance, close to thirty independently owned trucks carrying bananas from Prachuab were reported to have a regular arrangement with one of the several merchants there. This merchant set the pick-up schedule and exacted fines from those truckers who did not keep to it. Brokerage companies operate in many other places like Khonkaen and charge a commission for finding loads for the privately owned trucks which are associated with them.

Not all trucks involved in the supply of Bangkok-Thonburi markets are privately owned. Particularly the large trucks which are on the run to Bangkok year round carrying different products (not always fruit or vegetables) may be hired from transportation companies or may be owner operated in association with such a company. Truckers in the latter situation often complained of long waits in rotation for loads and company charges without being protected against losses or accidents. For some owner operators, a one-way journey with a load was preferable to joining a company and being guaranteed a load on the return trip as well.

Neither full nor part-time transporters are responsible for all of the city-ward movements. Provincial fruit and vegetable merchants and city wholesalers may also have trucks which they send to the producers who are supplying the fruits and vegetables in which they are dealing. Sometimes the Bangkok merchant or his agent goes along to do the buying but more commonly, the truck is simply sent to collect the produce, especially if the contract is a regular one. In still other

cases, the Bangkok buyer may go to the source and hire a truck locally if he actually buys a load.

Large numbers of trucks converge daily on the two cities, an unknown proportion of them with loads destined for fresh food markets and urban consumption. Respondent's estimates of the number arriving regularly to Pakkhlong Talat from different places included fifty to sixty trucks from Nakhon Pathom, seven or eight from Roi Et, over twenty from Chonburi, twelve or more from Damnoen Saduak, twenty from Ranong and ten or more from Kampaeng Phet. There are, in addition, much larger numbers arriving with seasonal produce. The highway surveys carried out by the Ministry of Communications indicate substantial amounts of fruits and vegetables heading towards Bangkok through the three check points at Hinkong, Bang Pakong and Samyek Krachet. However, it is impossible from these counts alone to separate the proportion of produce arriving in these trucks which was destined for the urban markets from that which was destined for provincial supply or export.

An extract of the commodities of interest to this study was drawn from the 1967 highway survey data and is given in Table 3, which shows the percentages representing the quantities given as originating in the different zones of grouped changwat. Whether or not the quantities are precisely accurate and regardless of the exact proportions ending their journey in Bangkok markets, data in the table parallels earlier comments made on sources and road transportation. Of special interest are the large proportions of fruits coming from the south and the large proportions of vegetables from the Chao Phraya valley and particularly

TABLE 3

PERCENTAGES[a] OF QUANTITY OF SELECTED FRUITS AND VEGETABLES MOVING TO BANGKOK AND THONBURI BY ROAD, BY ZONE OF ORIGIN,[b] 1967

Commodity	Zone of Origin							
	2	3	4	5	6	7	8	9
Beans	12	30	32	12	<1	7	4	3
Dried onion and garlic	85	<1	2	4	--	4	3	2
Sweet potato	--	5	--	35	--	21	4	35
Bamboo shoot	--	8	5	6	--	20	58	3
Fresh vegetables	<1	3	1	2	<1	4	73	17
Bananas	--	<1	--	<1	--	<1	5	94
Watermelon	--	1	--	6	7	82	3	1
Sugar cane	--	3	3	--	--	--	91	3
Coconut	--	--	2	--	--	53	45	--
Pineapple	--	--	<1	--	--	1	1	98
Lemon	--	--	--	--	<1	4	4	92
Fresh fruits	1	12	1	3	3	62	3	15

Source: Computed from data from Highway Survey 1967, Ministry of Communications.

[a]Percentages rounded.

[b]Zone 2--Chiangmai, Chiangrai, Lamphun, Lampang, MaeHon Song.
Zone 3--Nan, Phrae, Uttaradit, Sukhothai, Pitsanuloke, Tak, Petchabun, Pichit.
Zone 4--Kampaeng Phet, Nakhon Sawan, Uthaithani, Chainat.
Zone 5--Nakhon Ratchasima, Chaiyaphum, Khonkaen, Udornthani, Nong Khai, Loei.
Zone 6--Sakhon Nakhon, Nakhon Panom, Kalasin, Mahasarakham, Roi Et, Ubon, Si Saket, Surin, Buriram.
Zone 7--Chachoengsao, Chonburi, Rayong, Chanthaburi, Trat.
Zone 8--Suphanburi, Kanchanaburi, Nakhon Pathom, Pathumthani, Nonthaburi, Samut Prakan, Samut Songkhram, Ratburi.
Zone 9--Petchaburi, Prachuab Khirikkhan, Chumphon.

from around the cities. However, it should be borne in mind that road transport is only one of the three carriers of foods to Bangkok and Thonburi.

Waterway transport is still an extremely important channel locally for the movement of many commodities; the major Chao Phraya river system and an interweaving set of canals in its central and lower valley make linkages to the cities from almost all directions possible. But for the transport of fruit and vegetables to the markets of Bangkok and Thonburi, the waterways face serious competition from road transportation. Fruits and vegetables are carried in vessels of many sizes, from longtails[27] carrying 2,000 kilograms of oranges from Bang Mot and motor boats bringing either passengers or 3,000 kilograms or so of leafy Chinese cabbage from Khlong Khut in Thonburi, to barges arriving from Sena in Ayutthaya with a mixed cargo including different fruits or from Damnoen Saduak with ten to fifteen tons of fruit or vegetables. However, as Appendix 9 shows, the contrast in travel time between boat and truck from the same source in most marked. The longtails, which might be as fast, have insufficient capacity to compete successfully and thus are used more often where there is no alternative to water transport rather than in direct competition with trucks. Time consuming obstacles, such as locks or the necessity of transshipment are important considerations. For example, on the route between Damnoen Saduak and Bangkok via the Phasi Charoen Canal, three locks must be passed, and as mentioned

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[27]The term longtail accurately suggests the long shafted propellor which gives the boat its maneuverability in shallow water. These long, narrow, shallow draught boats provide rapid transport for people and goods throughout Thailand.

earlier, larger barges can not pass through Khlong Padung Krung Kasem to Si Yaek Mahanak, one of the major market areas in Bangkok. Many informants among retail market sellers as well as among wholesalers mentioned Bangkhae as an important transshipment point for goods coming from the west. Their comments were borne out by several visits where large barges were observed transferring their loads to smaller boats or to trucks rather than continuing into the cities.

Changes from water to road transport are not uncommon. For example, informants trucking chili peppers, cucumbers, egg plants and string beans from Angthong to Pakkhlong Talat said they had switched only three or four years ago and also stated that while some vegetables still go by boat, the quantities are smaller. Rather than collect fragmentary information for the whole country, these types of changes were looked at more closely in one production area, Damnoen Saduak, which is important for both fruit and vegetables and in which both road and water transport play an active role in the movement of produce to Bangkok and Thonburi markets.

The Damnoen Saduak-Bang Chang area in Ratburi province had been identified by informants in city markets as the source for three kinds of fruit and seventeen kinds of vegetables, with different crops being harvested and sent to the cities throughout the year. Much of the area can be reached only by boat, although two trucking companies have begun operating from Damnoen Saduak. In the course of visits to the area, trucking companies, barge companies, towboat operators and fruit and vegetable traders were interviewed; all stated that significant changes

had occurred not only in transport but also in crop production in the last five or six years. (See Appendix 10 for more detailed discussion.) From the information gathered, it appears that while water transportation is still more important in moving fresh produce from the Damnoen Saduak-Bang Chang area, trucking is certainly competitive, especially in those fruit and vegetable growing area which are accessible by roads. It is obviously difficult in a country with as much internal diversity as Thailand to make sound generalizations about the relative importance of the different means of transport. But it is in the area of concentrated production for urban fresh food markets that growers will increasingly have a choice of mover, and it is suggested that the example of Damnoen Saduak aptly portends the future.

Unlike inland water transport, coastal shipping moves little produce to the fresh food markets of Bangkok and Thonburi except for coconuts. The coconuts found in storage at Tha Tien or Thewet arrive through the Gulf of Thailand from Ko Samui and the southern provinces.[28]

To complete the trio, railways are the least important movers of fresh produce to Bangkok and Thonburi and are not dealt with in detail here. Briefly, the major lines to Chiangmai in the north, Nongkhai in the northeast, Ubon in the east, Aranyaprathet in the southeast and the line which follows the isthmus south to Malaysia all focus on the capital. These are major movers of many goods, but fruits and vegetables

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[28]Formerly coconut wholesalers were located at Mahanak. Now only smaller quantities are sold there by agents of companies which truck the coconuts from premises at Thewet. Space was provided on the river bank by the municipalities when they banned coconut movement on Khlong Padung Krung Kasem in an effort to reduce congestion.

are among the least represented. Shipment by rail requires links with other means of transport at both origin and destination of the rail journey, which entails both cost and delay. Railways, once the sole land connection from southern provinces, are already beginning to find their loads reduced as road networks are improved. An increase in trucking from the northeast and from the north where even a decade ago the railway was paramount has been recorded for the last six years or so.

However, localized rail use remains. For example, products from northern Thailand such as onions and garlic from Chiangmai, Lampang and Lamphun are still transported by rail, and some coconuts and other fruits come from the south by train. In addition, small quantities of the more perishable fruits and vegetables may go by train if the producers are close to the rail line and to the cities. One example can be seen at Makkasan station, when the 11:00 a.m. train from Kanchanaburi arrives. Of about seven goodswaggons, four are usually filled with fresh water fish in metal containers and the others carry live poultry in baskets and vegetables. The unloading and dispersal of all the goods is extremely rapid, since buyers who have regular arrangements are waiting with minitrucks and pushcarts. These same goods may be encountered later in Makkasan, Si Dindaeng and other markets. Similar scenes take place at Wongwean Yai in Thonburi.[29] The highly seasonal fruit, lamyai, is also shipped by rail and the organizational links involved in bringing this fruit to the city markets are cited in more detail in Appendix 11.

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[29]Statistics available from the Royal State Railways of Thailand list undifferentiated garden crops and are not sufficiently detailed to include here.

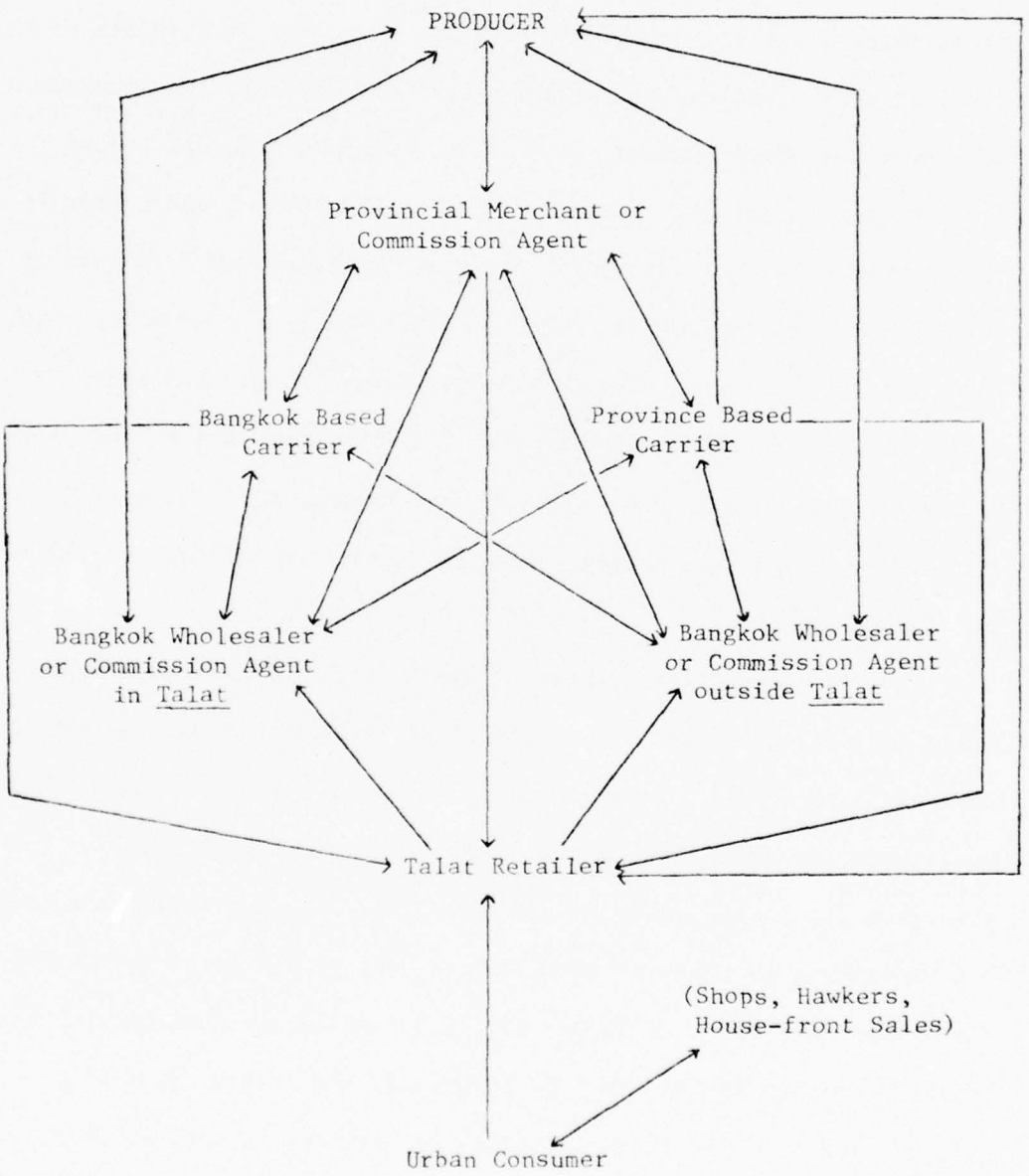
Organization

Although the linkages to consumers for most commodities are relatively unorganized, it is incorrect to assume that the supply patterns are made up of completely chaotic collections of individual arrangements. But while it is often possible to identify the individuals involved, it is very difficult to determine precisely what is involved in developing or maintaining these contacts. For example, arrangements often involve more than a simple sale of goods to the highest bidder and may include arrangements to manage debts incurred through the extension of credit or loans of insecticide, fertilizer or seed. Understandably, informants are often reticent about discussing these aspects of a business.

Generalizing from the interview data gathered, the linkages from producer to consumer might be summarized as shown in the following diagram (Figure 1). The arrow suggests by its direction which participant makes the effort to set up the linkage, although in many cases initial contact is made by either party. Thus, while paeng holders in retail markets usually go to the various wholesalers of fruit and vegetables in search of produce, the wholesaler may either go to the provincial merchant or be contacted by a merchant in search of an outlet. The operational relationships involved in the linkages shown may be illustrated by a series of examples which include Bangkok wholesalers, provincial merchants and transportation and commission agents.

As stated earlier, an established linkage may continue to operate over a long period of time once, for example, the Bangkok wholesaler goes to the source area and establishes the capacity of the producer,

Figure 1: Fruit and Vegetable Supply Linkages to Bangkok and Thonburi Consumers



the merchant or the carrier to maintain a supply. When there is a direct linkage between the producer and the Bangkok based wholesaler, the former usually ships the produce after contacting the wholesaler as to time and quantity; sometimes a regular schedule is agreed upon. This arrangement may also include an extension of credit or supplies to the producer by the wholesaler, although some claimed that this gentlemen's agreement was often tenuous. Where the wholesalers go out to the orchards and gardens, as some do in nearby Khlong Khut and Nakhon Pathom, they may buy the whole crop at harvest or planting time. In some of the these cases, the wholesaler checks for just the growth point he requires and sets the harvesting date for the producer. Credit and supplies are given not only to producers but also to the intermediary who is probably more often the recipient of advances from Bangkok wholesalers. He, in turn, makes arrangements with producers, either on his own account or for a commission.

This provincial merchant or agent is extremely important in fruit and vegetable linkages. Several of Bangkok's wholesale market sellers claimed that it was too risky to buy produce directly because of uncertainty in market demand and that it was well worth while to deal through a provincial collector of some sort. In some cases, the crops the provincial merchant sells have been sold to him by producers who have sought him out, and in others, he initiates the contact with producers. In this latter case, it is usually the intermediary who arranges and pays for transport costs to Bangkok and who may go to the city to solicit regular customers. The method of determining the price paid by the wholesaler for the produce may vary according to who seeks

out whom. If the city based merchant goes to the provincial agent for fruits or vegetables, the price is often set through bargaining; however, if the provincial merchant comes to Bangkok to find a wholesaler, the price may be established only after the wholesaler sells the produce.

The boatman or trucker is also an important part of the maintenance of linkages, since he may carry money, orders and information about price and supply and demand back and forth. This use of a person to transmit information and money is probably more common than telegraphing or letterwriting. One person who is extremely important, and who is not shown on the diagram, is the 'long chu.' Usually employed by a provincial transport company, his responsibilities entail continual visits to Pakkhlong Talat/Yod Phiman to check on prices and estimate demand and solicit customers there for his company; he is also in charge of finding provincial producers to supply his company. Rather than draw a salary, the 'long chu' is usually paid a commission (for example, 2 ฿ per basket); he is always mentioned as someone who must be trustworthy and is considered a great asset to his company.

As well as those who transport, and/or buy and sell the goods in the provinces, a considerable number of the wholesale suppliers in the cities who were cited as sources for talat supply in the previous chapter are actually agents operating for a commission, usually around 5 percent of the selling price. With the rest of the sale price, this agent arranges for payment of the transport cost to the carrier and of the balance to the provincial merchant who had collected the fruits at the gardens of the producers.

The amount of vegetables and fruits which are sold directly to paeng sellers in Bangkok and Thonburi markets by the producers themselves is unimportant compared to that which reaches the markets through wholesalers and agents. One possible exception is the market which was set up by the Department of Internal Trade specifically for the purpose of encouraging farmers to sell their produce directly and thus by-pass the middleman.

Thus, the cast involved in supplying fresh fruit and vegetables to city markets and consumers includes producers; provincial merchants, carriers and commission agents; city based merchants, carriers and commission agents; and city retailers. All of these groups are linked by flows of money, information agreements, commodities, trust and tradition. These networks operate over much of the urban and rural landscape, and the everyday event of housewives bargaining in the fresh food markets for a bunch of green vegetables or a kilogram of oranges takes on a greater significance than the exchange of a few baht would seem to suggest.[30]

Summary

In summary, it is clear that the areal extent of production of fruit and vegetables is both widespread and fluid. The most recent extensions are being linked by road to the cities so that trucks bring most of the present supply area within a day's journey of city markets,

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[30] In 1970-71 the Marketing Economics section of the Agricultural Economics Division, Ministry of Agriculture was carrying out work on major fruit and vegetable wholesale markets in Bangkok. This should make possible more detailed analysis.

a sufficiently short time for spoilage en route to be comparatively unimportant. Thus, distance is not necessarily the dominant factor in the system's responsiveness to change in producing or consuming areas. Transportation changes may, however, have a catalytic effect on the whole range of changes which result from interaction. But for the moment, in the Bangkok and Thonburi food supply system, the effect of transportation changes has been to widen the extent of the existing food marketing system rather than to change the structure of the many networks. A whole range of oral and seemingly informal contracts, information passed by word-of-mouth, and very many small scale transactions are found throughout the linkages. This is not to suggest, however, that most important transitions in function and organization may not be taking place.

The discussion here also gives a deeper sense of the importance of the city talat identified in Chapter I as primary foci from which the distribution of fruit and vegetables in Bangkok and Thonburi takes place. This is especially so since there is no duplication of that concentration at urban locations outside fresh food markets. It is also here that strains generated both by consumers and producers are to be expected and where some clues as to the future may perhaps be sought.

However, to look only at fruit and vegetable supply would make a balanced assessment of the role of the urban fresh food market very difficult. Therefore in the next chapter, several commodities which diverge from the patterns described above are analyzed.

CHAPTER III

URBAN-RURAL SUPPLY LINKAGES AND URBAN DISTRIBUTION OF FISH, POULTRY PRODUCTS AND SELECTED GROCERIES IN BANGKOK AND THONBURI

This chapter, while continuing the investigation of rural-urban supply linkages, is mainly concerned with widening the perspective of the urban context within which the markets operate.

The emphasis of the previous chapter was set deliberately on those commodities which are not only made available to urban households predominantly through talat, but for which the talat is the major focus of rural-urban contact. The commodities discussed in this chapter were chosen to provide a contrast. First, fish and poultry are presented as examples of commodities which are usually bought in talat by urban consumers, but for which the tracing of urban supply linkages identified a strong focussing on urban sources outside the fresh food markets. Secondly, eggs and a variety of staples such as salt, rice and sugar are presented as examples of foods which are not channelled primarily through the talat but which are available through a wide variety of sources.

By looking at the variations in patterns of supply among different types of commodities, one can more easily appreciate the flexibility inherent in both the locational and internal structures of the food supply system. Furthermore, one is reminded that talat are not the only

source through which some food needs of the urban population are satisfied.

Supplying Fish to the Urban Population

According to seller counts taken in licensed markets in 1969, 11 percent of those trading from paeng in Bangkok and Thonburi fresh food markets were fish sellers. This is a larger percentage than for any of the other meats, and is probably an underestimate; no special facilities beyond the sellers' own containers are necessary, and fish sellers squatting around the paeng areas are quite a common sight. Although there is a large and changing variety of fish and sea creatures in the markets, mackerel is by far the most important of the fresh marine fish sold, and catfish and snakehead are the most common types of fresh water fish.[31] For puposes of discussion in this section, however, the various kinds of fish will not be distinguished beyond that of salt or fresh water.

Fresh water fish sellers were interviewed in eighty-six markets and fresh marine fish sellers in 121. When the supply linkages cited by these sellers were analyzed, two major findings emerged. First, the urban supply linkages are very strongly concentrated on the Fish Marketing Organization which is known throughout the cities simply as Saphan Pla. This is particularly true for the supply of fresh marine fish. The secondary centers drawn upon by the market sellers, although they provide mainly fresh water fish, are much less important. Second, the

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[31] Fish Marketing Organization Annual Reports provide a wide variety of very useful data.

supply of both marine and fresh water fish to talat in Bangkok and Thonburi is achieved through direct contacts between the talat and sources outside the cities to a greater degree than for any other commodity group investigated except pork. Twenty-eight percent of the markets draw fresh water fish exclusively and a further 15 percent partly from extra urban locations. For marine fish, 28 percent of the markets depended entirely on non-city sources and a further 18 percent had both city and outside sources.

Analysis of the extra-urban contacts made it clear that large numbers of fresh marine fish sellers go daily to Samut Prakan, known more commonly as Paknam, and a smaller number go to Samut Sakhon, known as Mahachai. They deal with both merchants and fishing boats, trading privately or at Fish Marketing Organization facilities. For fresh water fish, the external sources commonly cited were Wat Sai, Bangbuathong and Nonthaburi market in changwat Nonthaburi, Saraburi and Hinkong in changwat Saraburi, Bang Pli and Phrapadaeng in Samut Prakan, Huatakate and Paed Riew in Chachoengsao, Nakhon Pathom in Ratburi, and Ayutthaya. All of these sources are close to the cities, and their scattered locations reflect the raising of fresh water fish throughout the plains.[32] It was decided in this study to focus mainly on marine fish supply with its unusually concentrated non-urban source pattern. Therefore, a number of wholesale commission merchants were interviewed at Paknam, Mahachai and

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[32]Kazuo Inoue and Sumon Swegwan, "Economic Survey on Cat Fish Culture in Suphanburi Province, Thailand" (mimeographed paper; Bangkok, 1970).

the Fish Marketing Organization in Bangkok to supplement information provided by sellers in city markets.[33]

The Fish Marketing Organization facility off Charoen Krung road in Bangkok has been in existence since 1953, when regulation of the fish trade required marine fish merchants, who had previously clustered in the Songwat area, to move to the newly opened Saphan Pla.[34] There, a changing group of ten or eleven wholesaling commission agents sell at auction every morning, and it is from this congested site that so many of the market sellers in Bangkok and Thonburi buy their stock. Questions about the extent to which the government should, or indeed is able, to participate efficiently in trading are still debated, as is the question of the language of the auction which is usually held in Chinese.[35]

The Bangkok Fish Marketing Organization's annual reports show that fish are drawn from all the changwat located along the coasts of Thailand, with the major catches being landed at Samut Prakan and Samut Sakhon; these latter two, for example, accounted for almost a third of the 1969 catch. Chumphon, Trang, Ranong, Phetburi, Songkhlaa, Samut Songkhram and Chanthaburi each had between 5 percent and 9 percent of that year's catch.[36] Sources of fresh water fish are scattered

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[33]The help of the Fish Marketing Organization in providing information about its operations is gratefully acknowledged.

[34]Fresh water fish merchants were required to move later. Several theses written in Thai for first degrees at Kasetsart University give brief descriptions of the background of the fish trade and Bangkok and Thonburi marine fish trade in 2504-2508.

[35]Perry F. Philipp and Vinai Jatuthong, "Marketing of Fresh Marine Fishery Products and Government in Thailand" (mimeographed paper; Bangkok, n.d.)

[36]Fish Marketing Organization, Annual Report 1969 (Bangkok), 1970.

throughout the central plain and the southeast, and especially in Suphanburi and Chachoengsao.

According to estimates by the Organization, on an average about 10 percent of the provincial catch is actually auctioned at the facilities in Bangkok. The catch arrives in the city not only by boat, but now increasingly by road, and less importantly, by rail (see Table 4).

TABLE 4

TRANSPORTATION OF FISH TO BANGKOK FISH MARKETS: 1960-69[a]

	Truck Trips	Boat Trips	Train Trips	Total
1960	10,674	3,774	151	14,599
1961	12,425	3,108	285	15,818
1962	17,071	3,292	447	20,810
1963	18,324	3,707	469	22,500
1964	21,995	3,219	464	25,678
1965	24,443	2,856	536	27,835
1966	30,129	2,961	558	33,648
1967	29,924	2,869	731	33,524
1968	29,108	2,879	864	32,851
1969	28,963	2,534	999	32,496

Source: *Fish Marketing Organization.*

[a]Includes fresh water fish, which made up about 6 percent of the fish auctioned in 1969.

The data refers only to numbers of trips, and thus the different carriers can not be equated in terms of capacity. But it seems clear that the growth of road and rail use with the more than doubling of the

catch since the mid-1960s has not been matched by an equivalent increase in the number of boat trips, which have actually shown a decrease. The attendant problems of improving roads worn by growing numbers of often overloaded trucks, improving landings and their road connections, and of the availability of ice at a reasonable price, all have a bearing on the quality of fish in the Bangkok and Thonburi markets where freshness is valued highly. The speed with which fish could be transported and increasing use of land-sea communications were often discussed by merchants.

Only some of the fish auctioned in Bangkok actually ends up in the fresh food markets with the rest destined for provincial supply, for processing or for export, and only some of the fish entering the cities passes through the Fish Marketing Organization. Thus, in September 1969,[37] officials carried out a survey at checkpoints on routes entering the cities at Tat Mai on Sukhumwit Road and at Si Ton Ron weighing station in Thonburi to establish the destinations of fish entering changwat Bangkok and Thonburi. The results showed that about 64 percent of the fish went to Saphan Pla. Of the 36 percent which did not, about 29 percent was en route directly to Bangkok and Thonburi fresh food markets. The markets receiving the largest amounts in that year's survey were Kao Yaowarat, Bangsu, Phlu and Bangrak, but this ordering in terms of quantity changed considerably in a check made a year later in September 1970.

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[37] September is considered the peak for marine fishery, which is least active in the dry season, unlike fresh water fish which are more plentiful after the wet season and into the early months of the year. This survey was planned as the first annual check.

However, the 1969 survey seems to support the description gleaned from talking to those actually selling fish in the urban markets.

Most fish sellers, like fruit and vegetable sellers, go to pick up their goods. Those using urban sources usually hire transportation to carry back their goods, while those who normally go to Paknam or Mahachai for supplies often are owners or part-owners of a minitruck.

At Paknam there are two municipality owned piers which are rented annually to individuals who charge the vessels docking there a mooring fee. The newer of the two was less than three years old at the time of interviewing and was more heavily used than the older pier. Smaller boats were said to stop at Paknam, while the larger ones travel up the river to Bangkok. The most active selling time at Paknam is in the afternoon and evening, since the fishing boats, most of which are owned locally although they are sometimes purchased with the help of merchant investment, come in in the morning and set out their catch in cases on the pier. Buying from the boats is handled by a group of about ten merchants who then sell the fish on a commission basis. These merchants maintain arrangements with a sufficient number of boats on a regular basis to keep them supplied continuously, since each fishing trip usually lasts for eight to ten days. An outsider would find it very difficult to buy directly from the boats, as would the wholesalers trading from paeng in the market which is adjacent to the pier. That market is active from mid-afternoon until 10:00 or 11:00 p.m., and the market sellers there buy from the commission wholesalers at the pier and sell mostly to buyers who may come from Bangkok and Thonburi or who live locally but may sell in Bangkok and Thonburi markets. There are also

several shrimp companies at Paknam which export their catch or supply hotels, restaurants, and supermarkets, rather than supply the fresh food markets of the urban areas.

In Mahachai, there is a Fish Marketing Organization facility and also a municipality owned pier. The group of merchants selling on commision at the latter claimed that the former was too expensive. There are several auctions at the piers daily, at 1:00, 7:00, and 9:00 a.m., with up to fifty or sixty boats selling at the latest one.

One informant represents the not uncommon carrying of several linkages in one person and documents a pattern of extension of interests which was also found among enterprising sellers of other commodities. He had begun by selling fish at a paeng in Wongwean Yai market in Thonburi to which he added another paeng where his wife still sells; he then established himself in the commission wholesaling business at Mahachai and now also owns three fishing boats which fish as far south as Prachuab.[38]

The marketing linkages in fish trading are usefully summarized in the chart which accompanies the Fish Marketing Organization Annual Reports. It is reproduced in Appendix 12.

Supplying Poultry to the Urban Population

Approximately 4 percent of the fresh-food traders in Bangkok and Thonburi talat sell poultry, a slightly higher proportion than sell beef

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[38]The same kind of overlapping of interests exists in the more nebulous form of credit or investment and is not confined to any particular commodity or group of people in the supply networks. A large proportion of the sellers from paeng in talat buy their wares on a two or three day credit.

but lower than the proportion which sell fish. As stated in Chapter I, poultry sellers are not always present in markets all day long, and they rarely stock large numbers of birds. Questioning showed that most of them bought chickens or ducks alive and killed them themselves at home before coming to market. Geese are rarely sold in talat but are used in relatively small quantities for restaurant supply. The centers of poultry trading cited by poultry sellers were Soi Aree, Talat Kao, Khlong Toei and Wongwean Yai, and it was in these areas that wholesaling merchants were sought.[39] From the interviews in those areas, in the Mahachai area and in Thonburi, a distinctive supply pattern emerged which differed not only from that of other commodities, but also internally in that ducks pass through one more link than chickens before reaching the markets. A detailed investigation showed that while the wholesale merchants and commission agents based in the two cities show strong locational focussing, the foci are not the same in that live poultry and dressed poultry are drawn from different sources.

The present dominant urban centers of supply, Soi Aree and Tha Rua Khlong Toei, are of only recent origin. About seven to nine years ago, live poultry merchants dealing at the then major center of Soi Mangkon were pressured to move by authorities concerned about public health. According to informants, those merchants with sufficient capital chose to move to the newly built shophouse complex at Tha Rua Khong Toei, while the rest clustered in temporary shelters in a lane off the southern end of Soi Aree (Sukhumwit Soi 26). Currently, there are

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[39] An additional fifteen merchants and fattening places were interviewed to supplement the market based information.

thirty traders in the latter not including those in several adjoining shophouses. A company which represents this group in official government contacts and to which they pay a fee controls the use of buildings, sets prices and has limited the total number of traders permitted to operate at Soi Aree over the past several years. Plans were afoot in 1970 to build permanent structures in Soi Aree, no doubt in an effort to reduce the dust and mud produced by the passage of some sixty to seventy trucks and 20,000 live birds in baskets per day. Most of the traders handle about 500 birds daily, often on a commission basis.

Although equally large numbers pass through the hands of the smaller number of merchants at Tha Rua Khlong Toei, the extent of this activity is much less obvious to passers by, since a flow is maintained in response to orders and pre-arrangements. These prior arrangements make it unnecessary to hold many live birds at the shophouse at any one time or to keep them more than a day. Again, some of this business is conducted on a commission basis (quoted as 6 percent, although this was not verified), and some buy and sell on their own account.

Thus, these two locations in Bangkok, Soi Aree and Tha Rua Khlong Toei, along with one or two companies around Wongwean Yai, are the main providers of live poultry for urban buyers. The proportion of the buyers who make up the 4 percent sellers from talat paeng is impossible to determine precisely, since hotels, restaurants and institutions are also heavy users.

The discussion so far has not included the earlier primary foci of Soi Mangkon and Talat Kao, and these are now especially important for

urban buyers who sell dressed poultry.[40] Most of the merchants selling dressed poultry buy the birds live from the commission agents at Soi Aree rather than directly from provincial producers. The birds are killed during the evening hours and sold from about 1:00 a.m. until 8:00 a.m. for direct use or market retail that same day; a thousand or more birds may be killed daily by a merchant here.

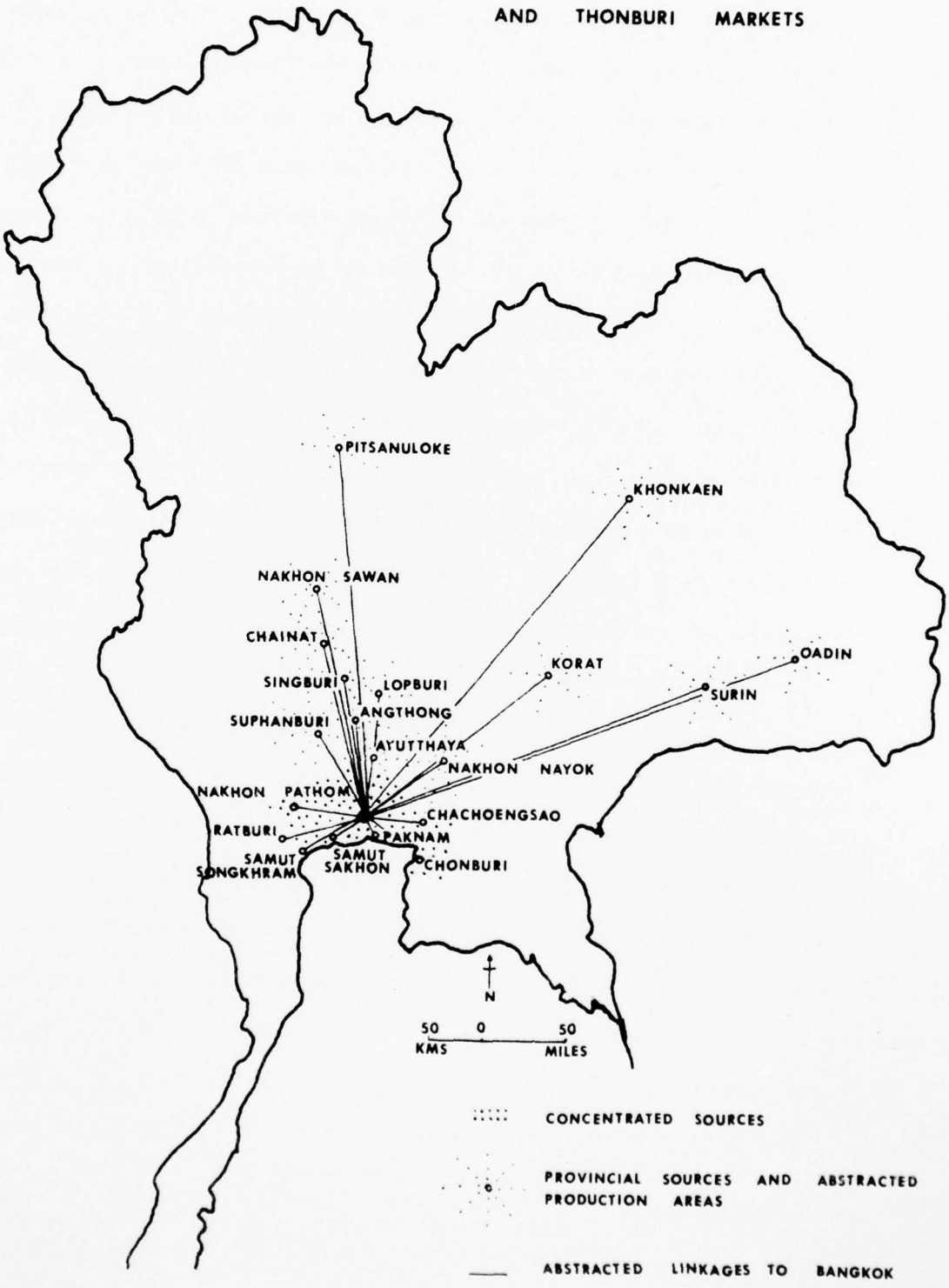
Similar business is carried on by several large scale firms in the Kao Yaowarat area, since killing is no longer restricted to the municipality slaughterhouse, a regulation which proved unenforceable. Several of the merchants are now deep freezing poultry to reduce periodic fluctuations in supply, although this innovation in the trade is very recent and is not yet widespread.

The provincial producing areas for the poultry consumed in Bangkok and Thonburi are scattered throughout the Chao Phraya valley, along the nearby canals to the east and also in the northeast. Interview data is summarized in Map 14 and Appendix 13. Ayutthaya, Suphanburi, Angthong, Chonburi and Nakhon Ratchasima (Korat) were stressed as being large producers, and there is a further concentration in Thonburi and around Mahachai. This proved to be distinctive in that dispersed throughout these areas which are within easy reach of the cities are large numbers of duck fattening farms to which Bangkok merchants bring ducks from provincial sources. One merchant at Tha Rua Khlong Toei claimed to have

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[40]For example, a dead end pedestrian alley off Soi Mangkon is flanked by small shophouses, from which merchants do considerable business in dressed poultry. Perhaps because of the pressures mentioned earlier, they were unwilling informants, but not all were as small and unimportant as they suggested. For example, many not only sold poultry but also owned poultry fattening places around the cities.

Map 14 PROVINCIAL POULTRY SUPPLY SOURCES FOR BANGKOK AND THONBURI MARKETS



twenty-one farms in the Mahachai region fattening his ducks; another claimed twenty in that region and around the Tha Chin river to the west. Other such farms are found at Soi On Nut and throughout Thonburi.[41] This additional loop in supply is necessary only for ducks and geese; these poultry need from fifteen to twenty days for fattening. Sometimes the poultry are brought to the wholesalers in the cities, but more often the latter arrange direct transportation to the fattening farms. One locational consideration for the fattening farms is the availability of food, such as rice bran from ricemills in the central plains and small waste fish in Mahachai. Although several informants thought there was more seasonal fluctuation in the supply of poultry a decade ago, ducks are still more plentiful around the Chinese New Year to meet increased demand and are often hatched around rice harvest time. Chickens apparently show less variation.

Given the locations of the major provincial sources, it is not surprising that the bulk of the movement of poultry towards Bangkok and Thonburi has been by water. But here, too, the last decade has brought changes, and most merchants say that they now receive only 10 to 20 percent of their supply by boat compared to the 80 or 90 percent that used to arrive by water. However, water transport remains very important from places like Angthong. The Tha Tien piers are the major city landing places for poultry arriving by water, and from there they are

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[41] The capacity of the fattening places seemed to be between 10,000 and 20,000 ducks, although one company near Mahachai had 100,000 at the time of the visit and also maintains businesses at Soi Aree, Tha Rua Khlong Toei, two shops at Talat Kao and other fattening places at Ratburana and Ban Bon.

trucked to the various concentrations of the urban trade. Road transport is, of course, dominant from the northeast, but it has also made inroads into the established water transportation from central and southeastern provinces as well as from Thonburi. For example, duck raising has been important along Khlong Bon for many years, and whereas previously all the ducks had been transported by water, this method of transport vanished with the building of a road about ten years ago.

The wholesalers in Bangkok and Thonburi claimed that they did most of their business with producers in the provinces rather than with provincial intermediaries who only arrange about 30 percent of the supply. The urban wholesalers keep in very close contact with one another by telephone, exchanging information about prices and quantities supplied and demanded, and may make up one another's deficits. The linkages through which the poultry pass between the provincial producer and the urban consumer are summarized in the diagram below (Figure 2). The double lines represent the larger part of the trade and single lines the movement of only relatively small quantities.

Supplying Fresh Eggs to the Urban Population

Generally eggs are sold in city markets along with other commodities making up that great variety of goods referred to in this study as 'groceries.' It is evident to even a casual observer that many of these same items are part of the stock of the multitude of large and small general shops and coffee shops throughout the cities. The supply links of eggs to markets and other household serving locations are explored here because eggs seem to be one of a very few fresh and perishable

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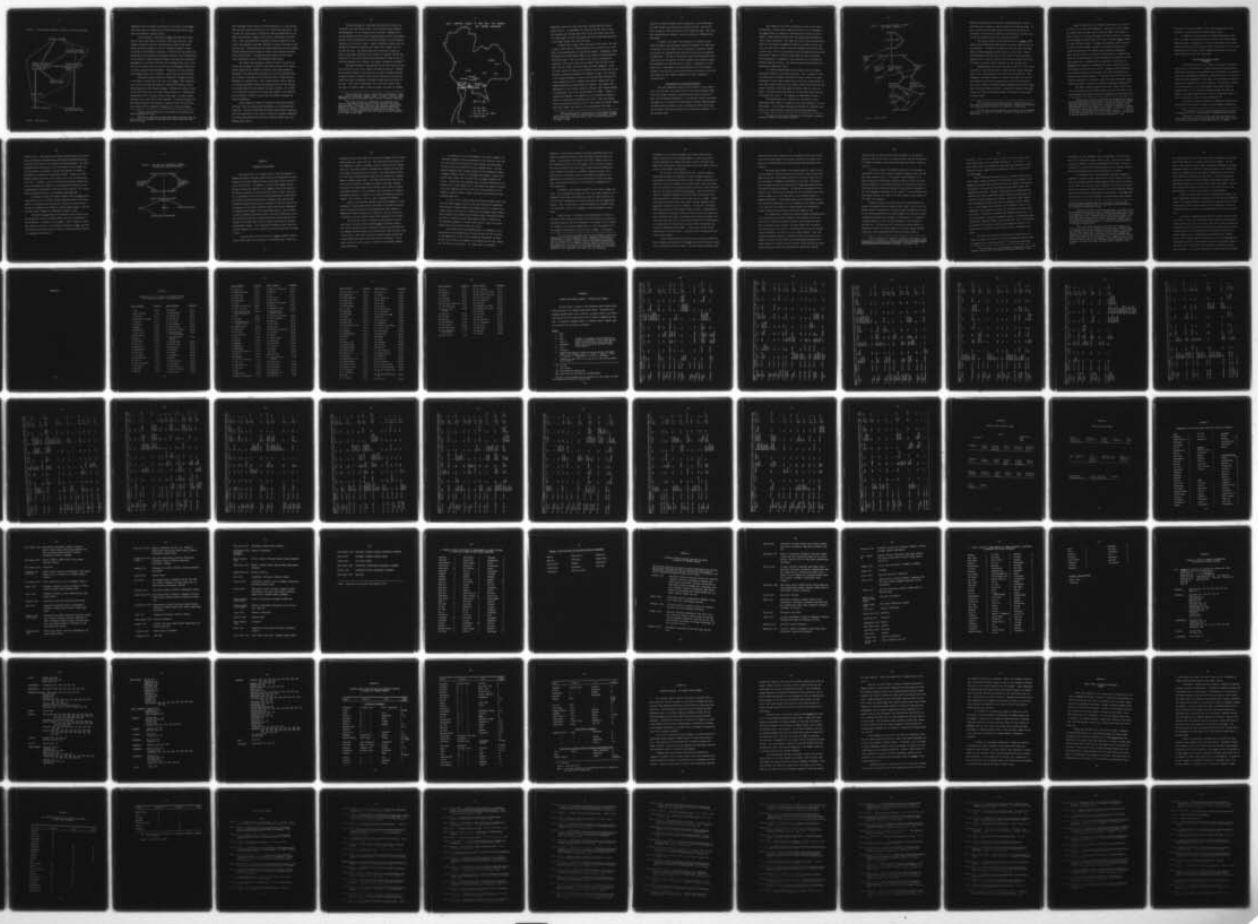
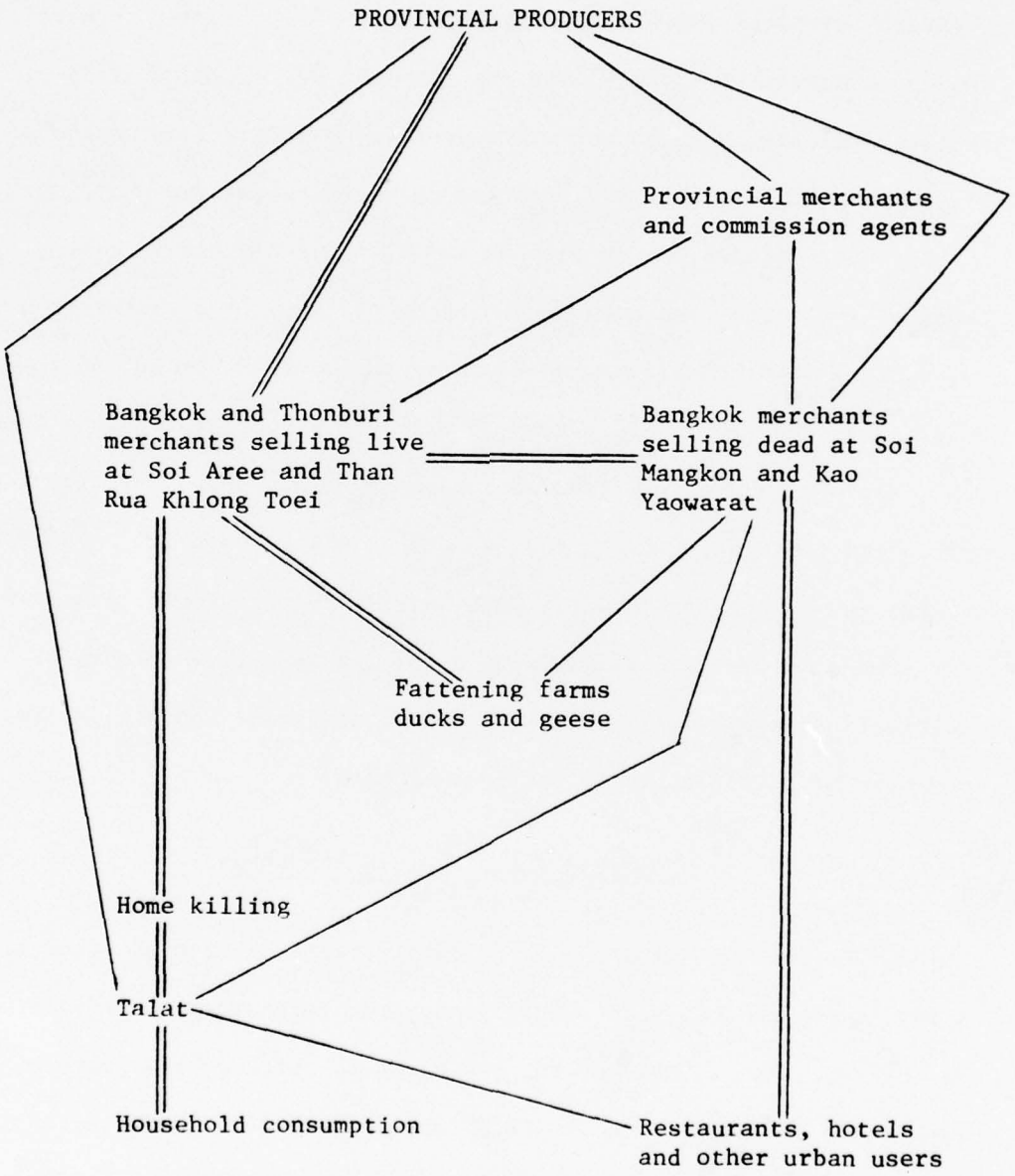


Figure 2: Poultry Supply Linkages to Bangkok and Thonburi Consumers



Source: Interview data.

commodities which are bought by housewives at locations outside talat. Since duck eggs are consumed in much larger quantities than hen eggs, they are considered in greater detail.

Some preliminary questioning of paeng enters who did include eggs in their stock failed to establish clear supply patterns. Most claimed to depend on delivery from merchants or agents whose whereabouts they often claimed not to know. Gradually, however, through interviews with wholesalers registered to trade through the central duck egg market and by following up overlapping contacts, some concentrations in the pattern of widely diffused wholesaler locations were discerned.[42] Wholesalers are clustered around Tha Tien and Maharat Road, with a scatter over the larger area both east and west of Hualamphong station and on streets around the duck egg market. Wholesalers are also clustered around Bangsu market, and in Thonburi around Talat Plu and Wat Klang.

Wholesalers operate mostly from shophouses, although a few are on the edge of a market where they also have a paeng. Their capacities vary, but most of those who supply city retailers could store several hundred egg cases, each holding 408 eggs. Merchants with export or provincial trade often have much larger storage capacities. Although most wholesalers trade in hen eggs as well as duck eggs, the former usually comprises only a minor part of their business. In hen egg trading, contact between producer and wholesaler is generally direct, while provincial collectors[43] are important intermediaries in duck egg trading.

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[42]Around forty wholesalers were interviewed at locations scattered throughout the cities.

[43]Provincial collectors buy eggs from farmers with whom they may have a variety of agreements involving credit, feed, young birds, and the sale of eggs.

They bring eggs either directly to urban wholesalers or to the auctions which are held several times daily at the central duck egg market. The auctions are a major source of supply for urban wholesalers who in turn supply egg retailers in talat, shops, hotels, restaurants and institutions. Since wholesalers have customers scattered throughout the two cities, they generally have small vehicles for making deliveries of more than one case. These deliveries are usually made after the busy morning selling period and before buying new stocks at the afternoon auctions, which are the busiest. The eggs are bought unsorted and are often sorted according to size by the wholesaler before resale.

The central duck egg market, referred to above, was set up in 1958 by the government in order to reduce what were felt to be excess profits being made by a handful of powerful price fixing merchants. According to the regulations established at that time, merchants wishing to trade in duck eggs in the cities must hold a license from the Department of Internal Trade. This license entitles them to trade at the central egg market in which all duck eggs in lots of over 200 must be auctioned openly and the quantity and price recorded. It is difficult to know what proportion of the duck eggs coming to the cities bypass the market; although 40 percent was one estimate recorded, any figure is guesswork.

Because demand for eggs has increased as the urban population has grown. there are now many more wholesalers in the business than a decade ago. The older established wholesalers make frequent complaints that this large influx of new traders, along with the higher transportation costs resulting from wider and more dispersed supply areas, has reduced their profits.

The urban wholesalers interviewed cited sources of supply concentrated in the Chao Phraya valley, in the southeast around Chonburi and Chachoengsao, in the northeast and in the south, although much of the egg production from the latter supplies Malaysia rather than Bangkok. Supplies from the northeast are particularly seasonal, as they depend on variations of wet and dry season. Several wholesalers insisted that the northeast had become an important area rather than a supply source in the last few years. One reason given was the increase in maize and garden crop growing resulting in less interest in seasonal sideline egg production.[44] The sources derived from interviews are shown on Map 15 and while coverage is not complete, the largest suppliers are included.[45]

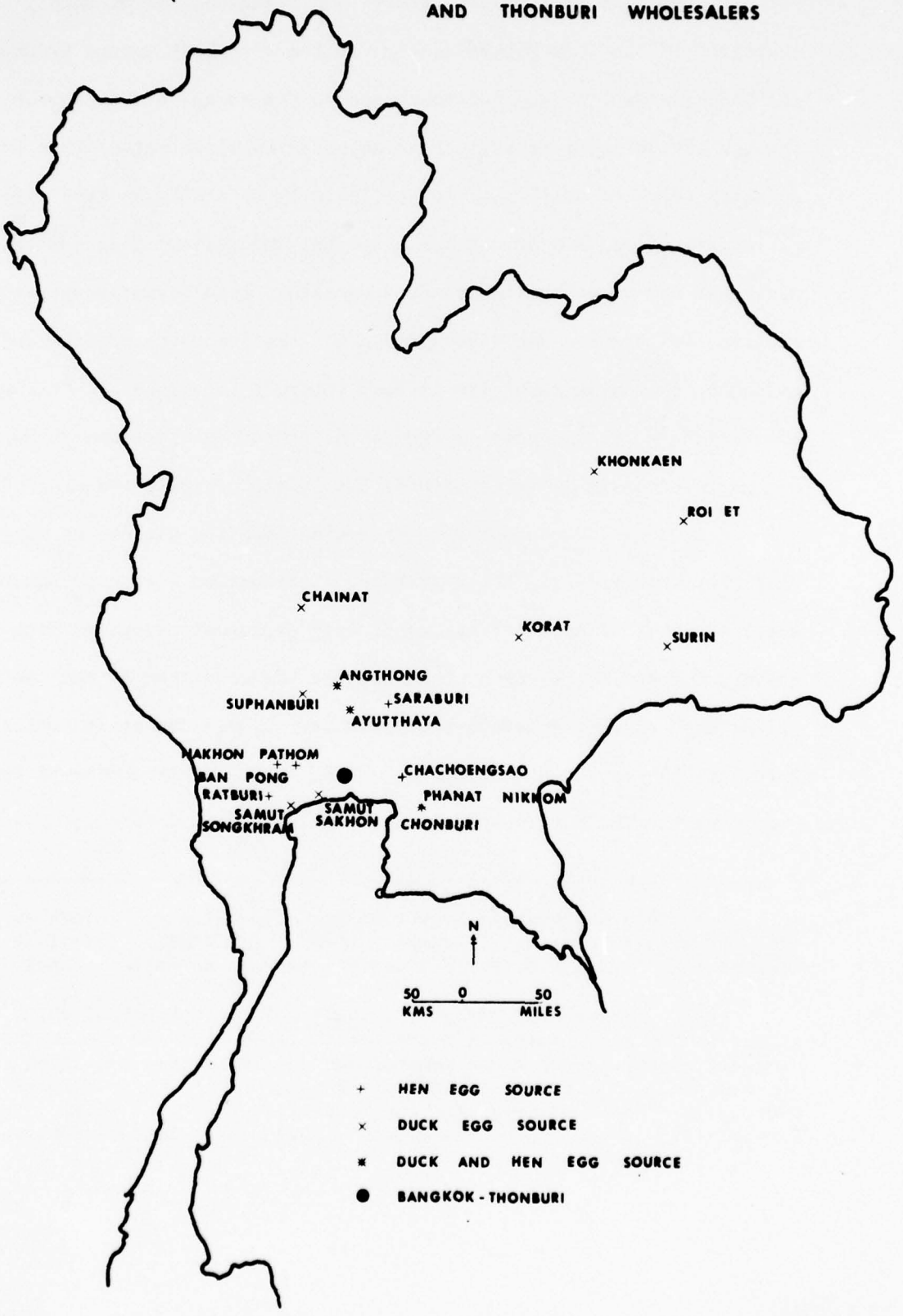
Although the number of eggs moving into the cities may vary somewhat from year to year, their seasonal distribution does not. Chonburi sources peak from April or May until July or August; supplies from Chachoengsao increase in March or April; and the provinces in the central plains send eggs from November or December through the early months of the year. Surat shows a double peak, one in the early months of the year when the Chonburi supply is low and another in October or November.

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[44]Uthis Naksawasdi, Report on Egg Production Conditions in Thailand (Kasetwart University, Bangkok, 1960). (In Thai.) This is a very comprehensive study and provides useful contrast to present conditions.

[45]Not shown are Phetburi, Pathumthani and Uthaithani which appear as important seasonal suppliers in the records of the central duck egg market. Both these records and the interviews suggested the dominance of Chonburi, Chachoengsao and Samut Sakhon as year round sources with Phetburi supplying large quantities in some years. The localization of egg production within the provinces is well documented by Dr. Uthis in his study.

Map 15 PROVINCIAL SOURCES OF FRESH EGGS FOR BANGKOK AND THONBURI WHOLESALERS



Wholesalers agreed that trade fluctuates, although generally within expected limits. To compensate for these fluctuations, most of them also preserve any duck eggs which they can not sell fresh, since there is a ready market for white salted eggs and dark colored eggs which have a much longer keeping time than fresh eggs.

Keeping time for eggs varies from three or four days to ten days or more, so that speed of transportation is not as crucial as it is for some of the goods mentioned in the previous chapter. Nonetheless, every wholesaler interviewed noted changes in the method of transporting both hen and duck eggs. Only from places on the route to Ayutthaya and Anthong are boats still a major mover of eggs,[46] and they still carry about half the traffic from Samut Sakhon and Samut Songkhram. Except for these sources and those in the southeast and north which rely on the railways, trucking now dominates the transport of eggs. This increase in the use and importance of roads, which has been noted previously for other commodities as well, engenders more general changes which have complex repercussions through marketing networks. For example, with improvement of cross country contacts, routing of goods through Bangkok to destinations close to the source becomes less common. Changes in movement and trading of one commodity are not untouched by changes in others, as wholesalers in Pakkhlong Talat noted. Their egg trading, which had included provincial as well as city supply was feeling changes which were brought about partly by the international rice trade. A

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[46]The Bangkok-Thonburi destination for water transported eggs is Tha Tien where a number of egg wholesalers are clustered. Although many of these deal with urban supply, some are involved primarily in the export of eggs.

reduction in external demand and less metropolitan rice milling meant that some Chonburi egg raisers were now going directly to provincial mills in search of feed and taking a load of eggs with them. Thus, they were establishing new linkages, thereby by-passing the Pakkhlong Talat wholesalers.

In summary, the primary urban suppliers to retailers in the fresh food markets are wholesalers dispersed throughout the urban area. At least part of their supply from the producers is channeled through the central duck egg market where provincial collections are important intermediaries. Contrary to expectation, most of the wholesalers interviewed said that the majority of their customers were sellers in talat. Egg wholesalers and retailers keep in contact by telephone or an occasional visit. Wholesalers often make deliveries when they estimate a resupply to the retailer is due; these usually occur weekly or every few days unlike the daily supply arrangements for other commodities discussed above.

Supplying Salt to the Urban Population

The final commodities chosen for brief comment in this chapter, salt, rice and sugar, are staples which are not fresh perishable foods. Salt, which though consumed in relatively small quantities and not a major item of household expenditure, is an essential dietary requirement. Like eggs, salt is available to urban domestic consumers through general retailing shops and hawkers as well as through the fresh food markets. And like most of the other commodities in the groceries category, it is not purchased daily.

Salt appears in the fresh food markets in bulk, by the sack or increasingly, in small plastic bags which weigh 0.2 or 0.3 kilograms. The paeng sellers are supplied by wholesalers who deliver the salt on demand. These suppliers include small and medium sized businesses as well as large wholesalers. The former buy in bulk from the large wholesalers or from barges in Bangkok and Thonburi, and wash and grind the salt, and then sell it either by the sack or bagged into smaller units. In some cases, there is an even smaller scale intermediary who buys small quantities to weigh out into the plastic bags for sale to retailers. This intermediary is sometimes a truck owner who does not necessarily maintain shophouse premises. The numerous medium sized wholesalers are dispersed throughout the cities.

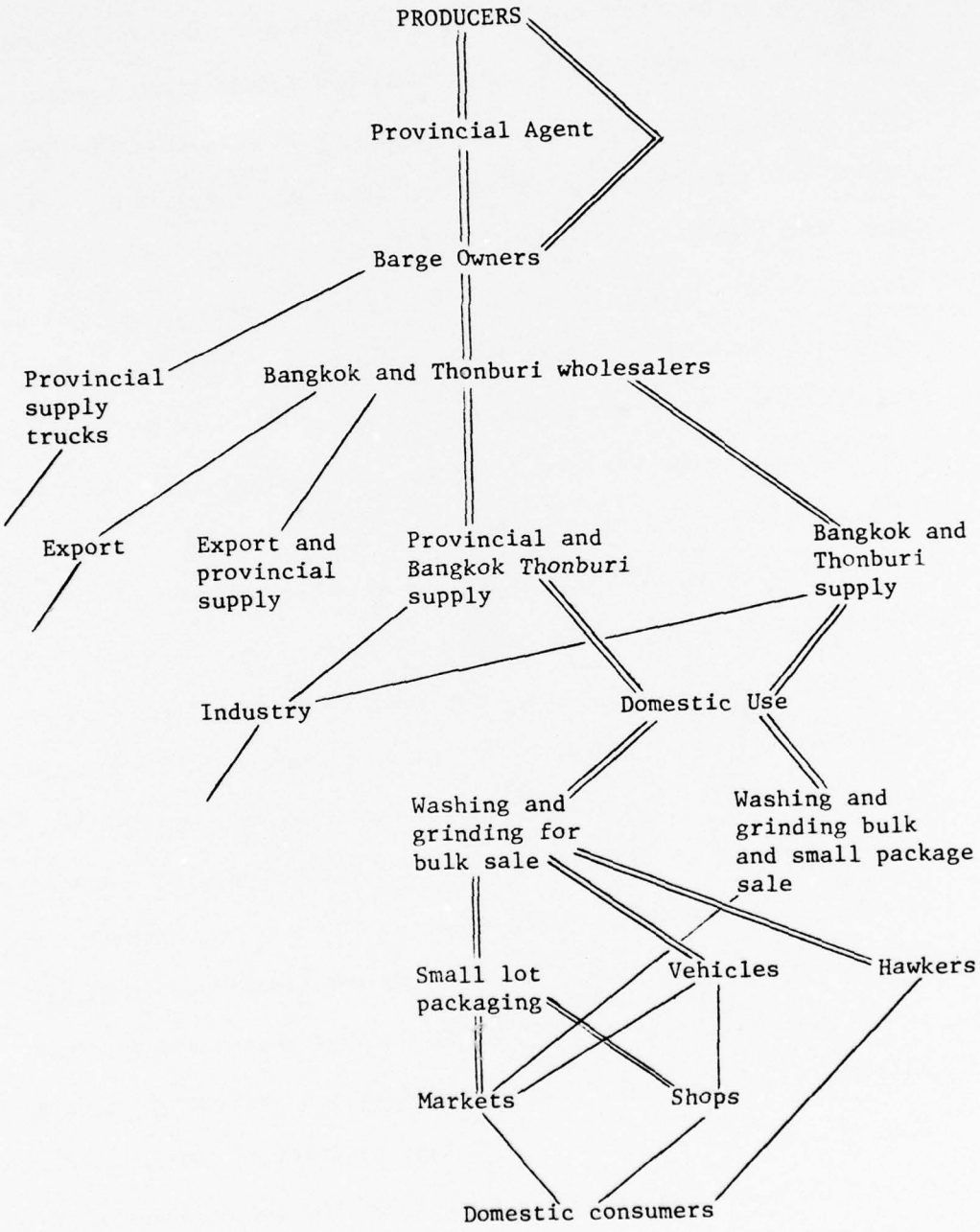
The large wholesalers and the salt barges show the strongest locational focussing in the urban salt trade. Salt is unusual in that the primary mode of transport from rural to urban centers is by water. Furthermore, in most cases, barges serve as more than transportation for salt; their owners actually buy the cargoes either directly from the producers or through a provincial agent who directs them to certain producers. The barge owners then resell it to urban wholesalers once they have reached the cities.[47] The linkages are summarized in Figure 3.

The diagram serves as a reminder that the demand for salt generated by urban domestic consumers is but a small proportion of total urban demand. A much larger percentage is destined for industrial uses such as ice cream factories, tanneries and the dyeing industries.

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[47] A total of twenty salt merchants were interviewed, including exporters, hawkers and five barge operators.

Figure 3: Salt Supply Linkages to Bangkok and Thonburi Consumers



Source: Interview data.

Wholesalers providing both provincial and Bangkok-Thonburi supplies found less than a quarter of their business in the domestic market. In fact, the four or five large exporters felt that it was simply not worthwhile to trade both for export and local demand at the same time, and the two businesses were very rarely found mixed.[48]

The dominant sources of salt production are in changwat Samut Sakhon, Samut Songkhram and Samut Prakan, with Samut Sakhon by far the most important. In addition, villages all along the canal from Samut Sakhon to Samut Songkgram are also involved in salt trade. However, some wholesalers said that they felt the quality of salt from Samut Prakan was not as high as from the other two areas because the process was pushed too quickly, and in addition, the salt was not clean.

Considering the process by which salt is made,[49] it is at first surprising to find that more salt is moved from the coastal producing areas to the cities during the wet season than during the dry. This phenomena is explained, however, by the fact that barges are the primary transport mode for salt; barges find it easier to load and are more able to navigate the inland valley waterways during the wet season when river water levels have risen. Although the length of the season varies, salt production generally begins in December and lasts until the rainy season.

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[48]The Indonesian and Japanese market has largely been lost to the cheaper, better quality salt from Pakistan. Singapore and Hong Kong have also reduced their imports from Thailand in recent years.

[49]In the salt production process, sea water is let into embanked salt fields and allowed to evaporate, gradually leaving the salt in a solid form.

Speed of delivery from the source to the cities is not crucial for salt as it is for other commodities. From Ban Bo in Samut Sakhon the journey takes six hours with the tide and eight to ten against it. Tows of four or five barges are common, and each usually has a capacity of twenty kwien, although barges with a sixty to seventy kwien capacity are used from Samut Prakan. At Bangkok and Thonburi, strong focussing of rural to urban linkages is found at the mooring locations where barges delivering salt for domestic urban consumption congregate. These foci are located at the mouth of Khlong Ong Ang, in Khlong Krung Kasem near Si Phraya market, in Khlong Daokhanong in Thonburi, near Soi Plang Anuson and on Suksawat Road, at Chong Non Si beside both the khlong and the railroad, at Khlong Tan Sai, and on both sides of the Chao Phraya in the center of the cities. Although several wholesalers have premises adjacent to the moorings, the smaller wholesalers are generally more widely scattered. In contrast to all of the other commodities described in this chapter, none of the salt wholesalers interviewed had located or relocated according to government regulations.[50]

The hawker walking through the city with a sack of salt on one end of a carrying pole and a heaped basket of salt on the other is now an increasingly rare sight, and the only hawkers of salt encountered were

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[50]Little salt now passes through the former Bangkok Salt Marketing Cooperative Society Limited which was set up in 1942 to help members deal with middlemen in the local market. By the early 1960s, it was considered sufficiently successful as a cooperative operating in the export market that it was renamed and the number of products it handled increased to include maize, gypsum, and sorghum. It was never active in the household serving market but supplied local industries. In addition, at the end of 1969 the Thai Salt Co. was being dissolved by the Ministry of National Development since it had been operating at a loss.

old people.[51] Much more common are the small packaged bags of salt available in shops and markets serving household needs.

In summary, the salt destined for Bangkok and Thonburi comes from a few highly localized sources and is moved to the cities predominantly by water. Increasingly, it arrives in the markets and to other household suppliers neatly packaged in small plastic bags. All of these characteristics of the salt supply linkages differentiate it from any other product with which this study deals.

Rice and Sugar Supply to Urban Consumers

In this final section of the chapter, the supply and distribution of rice, which consumes the largest proportion of household food expenditure, and sugar, which consumes one of the smallest, are explored. These two non-perishables demonstrate a locational pattern of urban distribution already suggested in salt supply, but one without the latter's peculiarity of dominant ties to the waterways. This pattern of supply to the city dweller is very common among non-perishable foods and involves both a lack of dominant channeling through the fresh food markets and highly dispersed retail outlets for household buying as well as a pattern of widely scattered wholesalers.[52]

The large scale sugar wholesalers in Bangkok and Thonburi deal directly with sugar mills in Chonburi and Kanchanaburi through their

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[51] In contrast, fruit and vegetable hawking attracts people of all ages and is still a common method of supplementing other income.

[52] Fifteen rice wholesalers and eight sugar wholesalers were interviewed at some length to supplement the data from market sellers and to define the pattern of supply described in this chapter.

offices in Bangkok and not with provincial intermediaries as has been shown to be the case for many other foods. Sugar wholesalers are found in the July 22nd Circle, Anuwong Road and Songwat area. Sugar is delivered to them from the mills by truck in one hundred kilogram sacks. Although no mention was made in the interviews of any recent changes in transportation, a major change in the dominant source of supply was noted. Whereas Chonburi produced about two-thirds of the supply ten years ago, it now produces less than a third, and Kanchanaburi has become the largest producer.

These large wholesalers may supply provincial demand, candy factories, bakeries, and the medium and small scale wholesalers rather than market sellers and small users directly. Most sell twenty to fifty sacks in a sale and would rarely sell or deliver fewer than ten sacks. One wholesaler could handle individual sales of one thousand sacks by hiring additional godown storage when necessary. There are probably about twenty large wholesale sugar businesses in the cities, although this estimate suggested by several informants was impossible to verify. They keep in close telephone touch with one another and often provide short term credit of around two weeks for their customers who are usually the smaller wholesalers. A bill collector-salesman is one of the carriers of orders and payments commonly found linking large and smaller scale wholesalers.

The smaller scale wholesalers scattered throughout the two cities often handle more than one commodity: sugar, coffee, and maize;[53]

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[53]Maize is added to coffee, which is very expensive, to make a commonly drunk iced coffee.

sugar, flour and canned goods; and sugar and rice were combinations found. This group of merchants usually buys from the large wholesalers rather than directly from the mill outlet and sells to paeng renters in fresh food markets, to general stores, coffee shops, soft drink venders, usually delivering sack sales on demand. They do not worry about seasonality of supply, since although milling is only carried out from November until February, or in the early months of the year, sufficient sugar is kept in storage at the mills and in the cities to be available all year; prices do vary, however. Urban demand peaks at the Chinese New Year and other festivals and in the hot season when soft drinks are consumed in large quantities. When the schools are on holiday and fresh fruits are in season in April and May, demand is noticeably less.

For rice the linkages and locational patterns are similar in that the groceries' sellers in fresh food markets who do stock rice generally draw on scattered wholesalers who deliver to them. As is the case for sugar, the small scale wholesalers often stock other commodities like sugar or charcoal. They, in turn, are supplied by large wholesalers or salesmen working for brokerage companies. The contrast between the supply of the two commodities is in the contacts between urban wholesalers and mills in the producing provinces. For rice these are handled more often by salesmen of the brokerage companies representing the rice mills for a commission, rather than by mill offices or outlets in Bangkok and Thonburi.

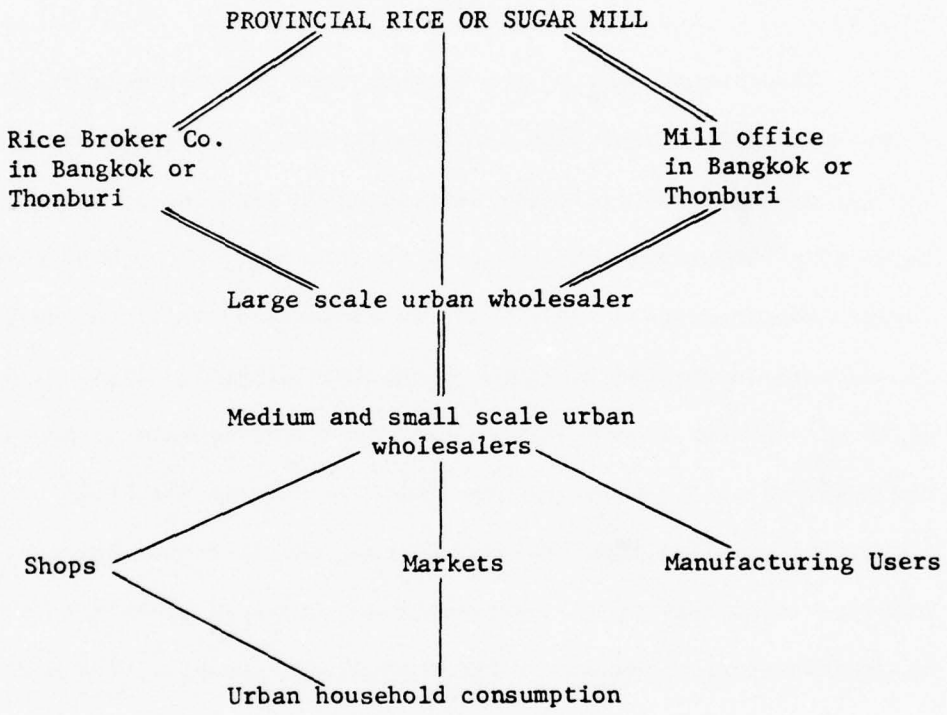
The great importance of effective information networks was evident from the interviews; those with poorer information about the trade provided additional profits to their suppliers, which well-informed

traders did not. Many noted the increasing competitiveness of the business, particularly among wholesalers and brokers' representatives going around with briefcases of rice samples soliciting customers. The urban wholesalers said that they buy rice not by named place of origin, but for the quality of the sample; its aroma and response to cooking is considered very important in the domestic market. However, the urban domestic demand accounts for only a small part of the rice moving into the cities. In general, some of the long operating water movement patterns are feeling the pressures of the increased availability of road transportation, particularly in the major milling centers in the central plains provinces as well as in the growing areas themselves.

Interviews in fresh food markets revealed that few paeng renters large stocks of rice, although they were sometimes present in the shophouses in surrounding lanes and were thus available to market users to satisfy an irregularly felt demand for non-perishable staples. The rice and sugar supply linkages are summarized in Figure 4 below.

Although the talat which are the subject of this study are primarily handlers of fresh perishable foods, this brief description of non-perishables is included for two reasons. They do comprise a component, albeit a minor one, of the business transacted in talat, and they show locational contrasts which are useful in assessing market viability in a changing urban situation.

Figure 4. Rice and Sugar Urban Supply Linkages to Bangkok and Thonburi Consumers



CHAPTER IV

SUMMARY AND CONCLUSIONS

This second part of the larger study of fresh food markets in Bangkok and Thonburi has dealt primarily with the organization and functioning of the supply linkages between urban markets and the sources of their stock in trade. The emphasis is shifted from consumer service through the fresh food markets to the linkages by which the sellers in the markets accumulate the foods which they offer for sale. The focus of the discussion is not only on the fresh food markets as nodes where the greatest constriction and spatial focussing in the whole pattern channeling supplies from producer to consumer is found, but also on the convergence of both visible movements and the less visible information or organizational linkages of the centralizing points. The discussion is based on commodity differences rather than market differences, since this proved more pertinent to understanding the organization and functioning of the market based fresh food supply system and to assessing ongoing market change. As the substantive findings of this report are given in summary form, their context in the larger study should be borne in mind.

Interview data provided by sellers at paeng in markets showed a supply pattern where over 80 percent of the markets draw at least one

commodity directly from outside the cities; this suggests that the urban supply system is a rather open one. The urban-rural contact points in the channeling of goods to consumers buying in markets are not confined solely to a few urban locations, although later analysis did show them to be highly concentrated in a few places. Thus rather than a pattern of a few large wholesale markets being the sole suppliers of a greater number of smaller retail ones, it was found that actually only 18 percent of all the markets of Bangkok and Thonburi draw their supplies exclusively from urban-based sources located either inside or outside the markets themselves. This finding is only surprising if a largely impermeable boundary to a distinctively urban food marketing system is assumed. This, however, is not the case in Bangkok and Thonburi.

However, the different commodity groups varied greatly in their dependence on urban supply sources; 86 percent of the beef and 92 percent of the groceries sellers interviewed located their sources in Bangkok and Thonburi whereas only 53 percent of the fish sellers and 42 percent of the pork sellers located their suppliers in the cities.

The study also found a difference in the location of out of town contacts quoted by sellers renting paeng in different markets. Most of the non-urban sources identified by sellers not operating from the dominant wholesale markets were short distance links to places close to the cities. These links were often contacts between peripherally located markets and adjacent suburban orchards and gardens. On the other hand, out of town contacts of sellers in the wholesale markets ranged countrywide.

In dealing with the urban segment of the supply linkages, the individual commodity analyses presented the interview data in the form of a map series which described the urban sources from which market sellers in each of the markets draw each commodity group. The maps showed strikingly simple focussed patterns in each commodity's market to market linkages as well as in linkages from markets to other urban sources which supply food on a daily basis to talat throughout the cities. In addition, each commodity group was quite distinctive in the location of its urban supply foci, in the pattern and degree of channeling of the linkages within the cities and in the permeability of the channels to direct contacts between producing areas and market outlets bypassing major foci.

In all, a set of eight primary and thirteen secondary urban locations from which talat in the two cities are supplied were identified. The distinction between primary and secondary source is a relative one. Primary sources are those which supply many other markets while drawing their own goods from producers and merchants widely distributed outside the cities. Secondary sources supply smaller numbers of markets but are themselves dependent on primary urban sources as well as on goods drawn directly from sources outside the cities.

The primary sources are Pakkhlong Talat for vegetables, fruits and groceries; the slaughterhouse at Kluai Nam Thai for pork and beef; Si Yaek Mahanak for fruits; the Fish Marketing Organization at Saphan Pla for fish; Talat Kao and Songwat for groceries; and Soi Aree, Khlong Toei and Talat Kao for poultry. All these places are extremely

important for they mark the greatest locational concentrations in the linking of dispersed production areas and widely scattered urban consumers. The location of the primary foci differ, however; while five have developed at places other than talat, three are found in markets. The latter situation, where both rural to urban contacts and distribution to markets and directly to household consumers co-exist in the same location, puts greater stress on the smooth functioning of the talat system, and especially on the distribution of fruits and vegetables, as ever greater quantities of fresh foods are demanded by the urban population.

In contrast, the secondary sources[54] are all found in talat locations. Thus, although the primary and first rural-urban contacts in the movement of fish, meats and groceries are made at urban locations outside the fresh food markets, all except groceries move into talat immediately. Seen in this context, fresh food markets are extremely important channelers of goods to the paeng at which the household consumer shops.

These findings, in clarifying the identification of places in the cities where provincial supplies of food are fed into the urban distribution system and the great importance of the markets in this respect, are relevant to any planned reorganization of either the markets or of the transport systems which facilitate their linkages. The on-going

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[54]Of the thirteen secondary sources of food supply to sellers in markets six are single commodity sources: Bangkok Noi (vegetables), Si Yaek Mahanak (groceries), Makkasan (fish), Pratunam (beef), Si Phraya (fruit), Bangrak (beef), Thewarat (beef) and Wat Amarin (vegetables); two are the focus for two commodity groups: Talat Kao (pork and beef), and Wongwean Yai (fish and beef); three commodities are centered at Wat Chantharam (fruit, vegetables and groceries); and Bangsu is a secondary center for four commodities (pork, beef, fish and vegetables).

discussions of city traffic problems and of restrictions on heavy traffic, particularly the increasing numbers of large trucks which include especially the primary food supply points in the urban area among their destinations, should take into account the highly localized nature of these present destinations.

On the basis of the findings noted above, several commodity groups were selected for exploration of supply linkages outside the urban network into production areas in order to assess the pressures on urban foci at a time of change in the supply system. Fruit and vegetables were chosen for more detailed analysis since their rural-urban linkages are very largely channeled through talat. Fish and poultry were chosen to represent commodities which have highly concentrated rural-urban connections at locations in the cities but not in talat. Finally, selected grocery staples which move largely through linkages outside talat were included to provide a contrast. In each case, information about three aspects of the extended context is noted: establishment of the dispersion of provincial sources on which the two cities depend and which indicates their reach; the workings of the various transport systems which move goods into the cities; and recognition of a wide variety of informational and organizational contacts which link together producers, intermediaries and consumers. These topics are not treated exhaustively but rather through a large selection of illustrative examples and case studies.

Several generalizations may be made from tracing the provisioning of Bangkok and Thonburi out from talat and from other primary centers into the provincial production areas. The two cities are dominant among

urban concentrations in Thailand, and the suggestion that their demands for food are great enough to focus trade over much of the country was borne out in conversations with several hundred urban wholesalers and carriers.

As the map series showed, the greatest reach for foods in terms of areal spread of provincial suppliers was found in fruit sources which range all the way from Chiangmai and Nan in the north to Roi Et in the east and Nakhon Si Thammarat and Songkhlaa in the south. New sources are continuing to extend the supply area for vegetables which also come from widely distributed producers. The expected concentration of food sources in the central plains provinces for all but perennial tree crops was most marked, as was the importance of the provinces adjacent to Bangkok and Thonburi. Urban demand appears to be sufficient to encourage extension of production of all the commodities, and notable flexibility in land use, the extension of growing seasons and technological change in agriculture was reported where that demand is felt.

The commodities discussed show striking changes in transportation into the cities with a marked increase in road transport for all but salt, which is produced in highly localized canal-oriented provinces. Most of the food sources tapped by the urban markets are now within a days road journey of the cities, a sufficiently short time for spoilage of most perishables in transit not to be a major problem. Thus, time distance supersedes mileage in defining the cities' food source area. Changes in travel time and timing have reverberations throughout the supply system; for instance, the ban on heavy trucks entering the cities during rush hours affects the organization of provincial commodity

collection and the timing of the journey to market, or the effective movement closer to the cities of a production area with the redefinition of distance according to time rather than miles may generate changes in land use.

Trucking has proved irresistably attractive in the movement of perishables to the cities in spite of general complaints about the high and rising transport costs. The increase in road transport is not simply taking up the additional quantities needed to satisfy the growing urban demand as the population increases but has been sufficient to break down earlier established patterns of water and rail transport of the food commodities considered in this report.[55] As road extension and improvement continue, the trends of the last decade in this respect are not likely to be reversed.

Therefore, plans in the urban areas for facilities which can handle the increased traffic become ever more urgent. And it is at the primary urban foci identified in this study where problems will be acute as the strains generated by both urban consumers and producers or their intermediaries moving foods through the system overlap. As transport technology changes, so does the appropriateness of the locations of existing foci. The canal and river orientation of major markets in Bangkok and Thonburi may become weaker as the trends towards trucking become more firmly established and bring unacceptable levels of

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[55]The concentration of transport changes in the provinces close to the cities is reported in a study by James Hafner, The Impact of Road Development in the Central Plain of Thailand (unpublished Ph.D. dissertation, Department of Geography, University of Michigan, 1970).

congestion. Thus, it may be necessary either to modify existing rural urban contact places or to encourage alternatives. Peripheral locations for at least some of the primary foci may become more attractive, particularly for those commodities which wholesalers deliver to the sellers at market paeng.

While transportation changes may have a catalytic effect on the whole range of changes resulting from interaction, for the moment in the Bangkok and Thonburi food supply system they have enabled the casting of the networks of the existing food marketing system wider rather than changing its structure. Important transitions may be taking place but numerous small scale transactions between individual entrepreneurs continue to be found throughout the linkages, along with a whole range of oral and seemingly informal contracts and personally carried information. In the diagrams and discussion of the handling of each of the commodities, several groups of people were identified as playing important roles. In addition to producers and consumers they include: provincial merchants, carriers and commission agents; city-based merchants, carriers and commission agents; and city retailers. All of these groups are linked in the marketing networks which operate over much of the urban and rural landscape by the transfer of money, information and goods.

The group most directly involved with the functioning of the urban food markets was found to be the urban wholesalers selling either on commission or on their own account.[56] They deal with provincial

[56] The importance of urban wholesalers is especially clear in the vegetable trade in which they operate from market locations. Thus,

equivalents for some commodities such as vegetables, fruits and fish, but not for others like poultry, sugar or rice. They have an enormous capacity to respond to changing circumstances[57] and offer a variety of services[58] in a system which depends largely on trust and oral contracts with an effectiveness which has proved difficult to emulate.

The locations of the urban wholesalers vary from commodity to commodity. As noted earlier, some products, such as fruits and vegetables, are strongly channeled through talat for their entire circulation in the cities, and therefore, many wholesalers are found in the markets. This is not the case for other products, and the Fish Marketing Organization and the municipal slaughterhouse were identified as non talat foci, while for most of the less perishable or non-perishable foods consumed

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during the Chinese New Year holidays, the busiest of primary urban source locations, Pakkhlong Talat, is deserted by people and goods and its lanes may be resurfaced in peace.

[57]The fact that many of the food wholesalers are Chinese in cultural orientation has been a source of tension from time to time, which is reflected in the political overtones of marketing regulations. Their importance has remained unimpaired in spite of various attempts to bypass them, whether by setting up special markets for producers as at the Department of Internal Trade, or by defining and exposing trading through the central duck egg market, the Fish Marketing Organization or the municipal slaughterhouse.

[58]The ties between wholesalers and both their suppliers and those to whom they sell are distinctive in being more formalized than, for example, those between consumers and retail sellers. The transference of credit, inputs and a variety of services makes dependence on experience and custom and the existence of long term agreements more likely. The length of time for which credit is given was found to vary with the size and scope of the business. Thus, hawkers buy in markets on one or two day credit, small wholesalers supplying markets may grant two weeks, and large wholesalers may grant months, seasons or even years.

the centralizing pull of the fresh food markets throughout the breaking down of bulk from place to place in the cities is weakest. For the latter, large scale and often product specialized wholesalers receiving provincial shipments in bulk were found grouped not in one building but rather in a general area such as Songwat, Anuwong Road, in the streets around Talat Kao and around July 22nd Circle. The large wholesalers then supply the smaller scaled wholesalers who generally operate from shophouses throughout the cities and only rarely from markets. They, in turn, supply food sellers in markets and in the shops which are even more important in serving family demand for non-perishables.

There is, however, another facet to wholesalers locational decisions, operational problems and relationship to the fresh food marketing system. The large wholesalers, especially those drawing heavily on non-urban sources, must not only consider their accessibility to their out of town suppliers but also their relationships with those who buy from them.

At present in Bangkok and Thonburi two different types of situations exist. In one, the wholesaling location besides receiving goods from the provinces is also a focus for buyers who go there in person and take away the goods, and for these wholesalers, customer access is also a major concern. The congestion which has developed in some of the primary supply nodes is understandable particularly where customer access and provincial supply of goods access are both overlapping and physically restricted. The importance of access for customers from all over the cities would naturally make changes to peripheral locations much less easy. In the other situation, the buyers rarely go in person

to the wholesaling place, thus freeing the wholesaler's locational decision somewhat. Provincial supplies must be received, but the service rendered to a variety of markets, shops and other users is generally through a delivery service on order.[59]

Thus, the pressures felt among wholesalers and in the most active market centers come not only from changes in consumer preferences, which are still minor, but also from changes in scale of demand, from changes in producing areas and from changes in the connecting transportation systems. In this respect, the wholesaler is indeed the man in the middle.

The larger study has described a decentralized urban fresh food supply system with close to two hundred fresh food markets and fluctuating numbers of entrepreneurs bringing daily necessities from throughout Thailand within easy reach of almost every urban dweller. Households were found to be almost completely dependent on talat for supplies of fruit, vegetables, meats, fish and eggs and much less dependent on talat for sugar, rice or salt which were more usually bought at the nearest shop. The recently established supermarkets in the Sukhumwit area are supported largely by foreign residents and others who have used them elsewhere, and they are not presently a challenge to the primacy of talat as the purveyors of perishables. Families may draw on the wares of itinerant peddlers for small quantities of a variety of foods, but their role is supplemental to that of talat and is unlikely to increase

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[59]The medium and small scale wholesalers located outside the markets and identified as important in intermediate urban trading of rice or sugar also deliver most of their sales. They tend to compensate for their reduced reach for customers by offering several commodities for sale, and they are widely scattered, as might be expected.

in importance. Similarly, the five or six one day a week food markets are additions to the talat system rather than competitors. Thus the working out of changes affecting the fresh food markets is of vital importance to the urban population at large.

In the first report, some pressures affecting the spatial pattern and operation of the directly household serving retail markets were identified. They included changes in consuming household densities, increased mobility and affluence resulting in greater spatial ranges, acquisition of consumer goods such as refrigerated storage, and the clowly changing perceptions of quality standards and food preferences. These are all closely related to consumer needs and wants. It has become clear in this second part of the study, however, that pressures on the existing marketing system come also from changes outside the cities and have a particularly direct affect on the wholesaling part of the system and the most active and heavily used markets.

The fresh food market system of the cities has been presented as one which has been responsive to change in the past. The new and increasing problems of congestion at bottlenecks in this as in other varied services which support the urban population may arouse a greater interest in the overall planning process than has been the case to date. It is hoped that this study, along with its considerable data base, may make a contribution to the better understanding of one facet of the life of Bangkok and Thonburi.

APPENDICES

APPENDIX 1

ALPHABETICAL LIST OF BANGKOK AND THONBURI MARKETS
WITH INDEX MAP LOCATIONS TO ACCOMPANY MAP 1

Name of Market	Location	Name of Market	Location
1 Asia	C3:ne	24 Bukkhalo	H2:ne
2 Asoke Wattana	F5:se	25 Chaiyamonkon	C4:nw
3 Attakawee	G5:se	26 Chalerm Lap	F4:ne
4 Bamrung Suk Wattana	G4:se	27 Chalerm Lok	F4:ne
5 Bang Bua	A6:se	28 Chan Kasem	C4:ne
6 Bang Chak	H7:ne	29 Chan Samoson	D3:ne
7 Bangkhe	H2:sw	30 Chao Phraya	F3:sw
8 Bangkok Noi	F2:nw	31 Charoendi (Phlu)	G2:sw
9 Bang Luang	G2:nw	32 Charoen Muang (Wat Duang Khae)	F4:sw
10 Bang Na Nok	J6:ne	33 Charoen Nakhon (Bombay)	H2:ne
11 Bang Or	D3:ne	34 Charoen Phat	F2:se
12 Bang Phlat	D3:nw	35 Charoen Phon	F4:nw
13 Bang Pho	C4:sw	36 Charoen Rat	G2:ne
14 Bangrak Mai	G3:se	37 Chomthong	H1:ne
15 Bangrak Kao	G3:se	38 Chuchip	F3:ne
16 Bang Saen	C4:sw	39 Daokhanong	H2:sw
17 Bang Sakae	G2:sw	40 Ekamai	F7:sw
18 Bang Saothong	F1:se	41 Hiranyapradit	G2:sw
19 Bang Son	C4:ne	42 Huai Kwang	E6:nw
20 Bang Son Railway	C4:ne	43 Hualamphong	F3:se
21 Ban Khamin	F2:ne	44 July 22nd Circle	F3:se
22 Ban Mai	H3:nw	45 Kao Yawarat	F3:se
23 Ban Moh	F3:nw		

Name of Market	Location
46 Kasem Suk	C6:sw
47 Kiakkai Wattana	D4:nw
48 King Phet	F4:nw
49 Khlong Tan	F7:sw
50 Khlong Toei	G5:nw
51 Klang	E5:se
52 Klang Soi Thong Loh	F6:se
53 Kluai Nam Thai	G6:se
54 Kluai Nam Thai RR (Sam Yaek Rong Mu)	H6:ne
55 Kobo	H2:ne
56 Kraisak	D5:sw
57 Kromkankhaphainai (Internal Trade)	F2:ne
58 Kromphuttaret	F3:se
59 Krung Thon	D3:sw
60 Lad Prao	C5:se
61 Lad Prao Mai	D6:ne
62 Lad Ya	G3:nw
63 Lumpini	G5:nw
64 Mahanak	F3:ne
65 Makkasan	F5:nw
66 Malithong	G2:sw
67 Ming Kwan Bang Na	D5:se
68 Mochit	D5:nw
69 Morrakot	F2:se
70 Nai Lert Si Phraya	G3:ne
71 Nai Lert	F5:nw
72 Nakhon Chai Si	D3:se
73 Nam Thip	J4:nw
74 Nana	E3:sw
75 Nang Loeng	E3:se
76 Nang Loi (Bangkok)	F3:sw
77 Nang Loi (Thonburi)	F1:se
78 Nimnuan	G2:se
79 Noi	F3:se
80 Nokkrachok	F2:se
81 Nutchanet	H1:ne
82 Padung Krung Kasem	F3:ne
83 Pahurat	F3:sw
84 Pakkhlong Talat	F2:se
85 Pathumwan (Kao Saphan Luang)	F4:sw
86 Phanthulap Wattana	H5:nw
87 Pha Si Charoen	G1:ne
88 Phetburi	F4:ne
89 Phet Phloy	G4:nw
90 Phosamton	F2:sw
91 Phraram Si (Rama IV)	F4:sw
92 Phumhiran	H2:ne
93 Piraka	F3:nw
94 Plang Anuson	H2:sw
95 Phong Sap	D2:se
96 Prachachin	E4:sw
97 Prachuab	D4:ne
98 Prakob	G6:ne
99 Pranok	F2:nw
100 Prathipsin	G2:se
101 Pratunam Pha Si Charoen	G1:ne
102 Prempracha	C4:se
103 Prok Phama	G4:sw
104 Ratchawasu	D5:nw
105 Ratchawat	E4:nw
106 Rongliang Dek	F3:ne
107 Rung Arun	G7:sw

Name of Market	Location	Name of Market	Location
108 Rung Ruam Rit Im	D6:sw	140 Sirichan	H4:nw
109 Saeng Chan	G3:se	141 Sirin	G3:ne
110 Saeng Charoen	G3:se	142 Si Suppharat	D5:nw
111 Saeng Suk	G6:sw	143 Si Thai	D5:nw
112 Saeng Thip	G7:sw	144 Si Thon	G2:ne
113 Saha Wattana	F3:ne	145 Si Wanit	E5:sw
114 Sai Thai	F1:ne	146 Si Wong Thong	D7:nw
115 Saladaeng	G4:ne	147 Si Worachak	F3:ne
116 Samranrat	F3:nw	148 Si Yaek Ban Khek	G2:ne
117 Samre	G2:se	149 Si Yan	D3:se
118 Samre Mai	H2:ne	150 Soi Prachum	G4:nw
119 Samsen Nai	E5:ne	151 Sombunkit	G2:ne
120 Sam Yaek Fai Chai	F1:ne	152 Somdet Chao Phraya	F3:sw
121 Sam Yan	F4:sw	153 St Louis Sam	G4:sw
122 Sanampao	E4:se	154 Suan Luang	F4:sw
123 Sanchaophosua	F3:nw	155 Suan Phlu	G4:se
124 Santhi	H2:ne	156 Sukchai	B6:sw
125 Sap	G1:nw	157 Sutha	G2:se
126 Saphan Kwai	D5:sw	158 Suthanma	H4:nw
127 Saphan Luang	F4:sw	159 Suthisan	D5:se
128 Sapsin Bangsu	D4:ne	160 Tang Ah	G2:ne
129 Sathorn Thip	H4:se	161 Tha Dindaeng	F3:sw
130 Sathupradit	H4:se	162 Thanma (Bo Be)	F3:ne
131 Sawatdi	F3:se	163 Thanon Tuk	H2:se
132 Sawaeng Phai San	F4:sw	164 Tha Phra	G2:nw
133 Serin Sawatdi	D1:se	165 Tha Phrachan	F2:ne
134 Sesawet (west)	G2:ne	166 Tha Phrachan Mai	F2:ne
135 Sesawet (east)	G2:ne	167 Tha Phra Rong Ruam	G2:nw
136 Si Bang Pho	D4:nw	168 Tha Rua Khlong Toei (1)	G5:se
137 Si Dindaeng	E5:se		
138 Silom	G3:ne	169 Tha Rua Khlong Toei (2)	G5:se
139 Si Phraya	G3:ne		
		170 Tha Tien	F2:ne

Name of Market	Location
171 Thesa	F3:nw
172 Thewarat	E3:nw
173 Thewet	E3:nw
174 Tho Rung	H2:sw
175 Trok Chan	H2:ne
176 Trok Chan Saphan Sam	H4:nw
177 Trok Wang Lang	F2:ne
178 Ua Aree (Soi On Nut)	H7:nw
179 Udom Suk	H7:se
180 Wan Chan	H3:ne
181 Wanchat	E3:sw
182 Wang Mahanak	F3:ne
183 Wat Amarin	E2:se
184 Wat Bang Phlat	D3:nw
185 Wat Chantharam (Wat Klang)	G2:nw
186 Wat Dok Mai	J4:nw
187 Wat Dowadung	E2:ne
188 Wat Phraya Krai Kao	H3:nw
189 Wat Phraya Krai Mai	H3:nw
190 Wat Sawettachat	G3:sw
191 Wat Suwanaram	E2:sw
192 Wisetkan	E2:sw
193 Wongwean Yai North	G2:ne
194 Wongwean Yai South	G2:ne
195 Worachak	F3:nw
196 Wuttichai	E3:se
197 Yannawa	G3:se
198 Yod Bangkabue	D3:se
199 Yod Banglamphu	E3:sw
200 Yod Kwan	E6:nw
201 Yod Phiman	F3:sw
202 Unnamed	E5:sw
203 Unnamed	H3:sw

APPENDIX 2

BANGKOK AND THONBURI MARKETS: INTERVIEW DATA SUMMARY

The key below is a guide to the information about market supply links presented in the summary sheets which follow. The markets are arranged alphabetically; their locations, as shown in Map 1, are identified here by the grid system found on all the maps of Bangkok and Thonburi. B signifies a Bangkok market, T a Thonburi market. Market names and locations are also given in Appendix 1.

Column

1	Pork	Columns 1-7 represent sources drawn upon by sellers in the markets. Out of town and non-market urban sources are named, and urban market sources are given by market number (see Appendix 1).
2	Beef	
3[a]	Fish	
4	Poultry	
5	Vegetables	
6	Fruit	
7	Groceries	
8	Commodities drawing on urban sources are noted by the number given to the commodity group. 1 - pork; 2 - beef; 3 - fish; 4 - poultry; 5 - vegetables; 6 - fruit; 7 - groceries	
9	Commodities drawn from out of town sources are noted by number as in column 8.	

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n.d no data

-- not relevant

FMO Fish Marketing Organization

KNT Kluai Nam Thai (Municipality Slaughterhouse)

[a]Column 3 is sub-divided into two columns; the first refers to fresh water fish and the second to marine fish.

Market	Location	1	2	3	4	5	6	7	8	9
1 Asia	C3:ne B	Nontha-buri	27	128	45	n.d	84, Non-thaburi	64	n.d	2,3,5 6	1,5
2 Asoke Wattana	F5:se B	KNT	KNT	FMO	FMO	45	84, Pak Chong, Bangkapi, Chiangmai, Bang Son	84, Bangkhae	n.d	1,2,3 4,5,6	3,5,6
3 Attakawee	G5:se B	KNT,Nong Khem	n.d	n.d	n.d	homes	84, 50	189, 64	45	1,4,5 6,7	1
4 Bamrung Suk Wattana	G4:se B	KNT	n.d	n.d	FMO, Paknam	n.d	84	64	n.d	1,3,5 6	3
5 Bang Bua	A6:se B	Minburi	Minburi	Min-buri	FMO,170 Paknam	Nongchok	84	64, 177	n.d	3,5,6	1,2,3 4
6 Bang Chak	H7:ne B	KNT	193	n.d	Paknam	n.d	84, gardens	64	n.d	1,2,5 6	3,5
7 Bangkhe	H2:sw T	--	--	--	--	--	--	--	--	--	--
8 Bangkok Noi	F2:nw T	KNT, Nakhon Pathom	KNT	n.d	n.d	n.d	84	64,Bang-kunthien Bangkhae BangKruai	Songwat, Mahachai	1,2,5 6,7	1,6,7
9 Bang Luang	G2:nw T	---	--	--	--	--	--	--	--	--	--
10 Bang Na Nok	J6:ne B	KNT	n.d	Paknam	Paknam	n.d	84	64	n.d	1,5,6	3
11 Bang Or	D3:ne B	--	--	--	--	--	--	--	--	--	--
12 Bang Phlat	D3:nw T	149	170,172	Samsen market	Paknam, Maha-chai	Nontha-buri	84,Samsen Nontha-buri,Bang-buathong	64	84, Songwat	1,2,3 5,6,7	3,4,5
13 Bang Pho	C4:sw B	Nontha-buri	128,97	128, FMO, Paknam	128, FMO, Paknam	128	84	64	n.d	2,3,4 5,6	1,3

Market	Location	1	2	3	4	5	6	7	8	9
14 Bangrak Mai	G3:se B	homes	n.d	n.d	n.d	n.d	84,Trok Chan	n.d	n.d	5	1,5
15 Bangrak Kao	G3:se B	KNT,Sam Rong	KNT Ratburi Pathum-thani	FMO	FMO, Paknam	Nakhon Pathom, Soi Aree	84,Trok Chan	84,64	n.d	1,2,3 4,5,6	1,2,3 4,5
16 Bang Saen	C4:sw B	--	--	--	--	--	--	--	--	--	--
17 Bang Sakae	G2:sw T	n.d	n.d	n.d	FMO	n.d	84,185	84,185	n.d	3,5,6	0
18 Bang Saothong	F1:se T	KNT	n.d	n.d	n.d	n.d	183	183	84,170	1,5,6 7	0
19 Bang Son	C4:ne B	n.d	n.d	n.d	FMO	n.d	84	--	--	3,5	0
20 Bang Son Railway	C4:ne B	128	KNT	Bang bua-thong	Paknam	n.d	84,128	64	n.d	1,2,5 6	3
21 Ban Khamin	F2:ne T	Ban Pong Phetburi Nakhon Pathom	8,KNT	Nakhon Pathom	FMO	45	84	84	n.d	2,3,4 5,6	1,3
22 Ban Mai	H3:nw B	Nakhon Pathom	KNT	n.d	FMO	n.d	84	64	n.d	2,3,5 6	1
23 Ban Moh	F3:nw B	KNT	93,172	170, FMO	n.d	n.d	84	n.d	n.d	1,2,3 5	0
24 Bukkhalo	H2:ne T	Bangkhe	45,193	193	193	45,Soi Mangkon	84	84	84	2,3,4 5,6,7	1
25 Chaiya-monkon	C4:nw B	Nakhon Pathom Kampaeng Sen,KNT	173,172	FMO, Bang-bua thong	FMO, 45	n.d	84,Non-thaburi market	64	n.d	1,2,3 5,6	1,3,5
26 Chalerm Lap	F4:ne B	Phrapa-daeng	n.d	n.d	Paknam	n.d	26,84	n.d	n.d	5	1,3

Market	Location	1	2	3	4	5	6	7	8	9
27 Chalerm Lok	F4:ne B	KNT, Nakhon Pathom, Bangkhe	KNT, Pakkret	FMO, Makka-san, Ayut-thaya	Paknam	Soi Aree Minburi, 45	84,Prak-hanong Bangkapi, Lad Prao, Chiaya-pruk,Lad-krabang	64,84 Bangkhae Nontha-buri	Songwat, 45	1,2,3 4,5,6 7	1,2,3 4,5,6
28 Chan Kasem	C4:ne B	128	128	n.d	n.d	n.d	128	n.d	n.d	1,2,5	0
29 Chan Samosan	D3:ne B	Nontha-buri	KNT	FMO, Non-tha-buri	Makka-san RR	45 Paknam	84	n.d	n.d	2,3,4 5	1,3,4
30 Chao Phraya	F3:sw T	KNT, Bangkhe	n.d	193	FMO	Khlong Toei	185,84	n.d	84	1,3,4 4,5,7	1
31 Charoendi (Phlu)	G2:sw T	Bangkhe	n.d	31	FMO	45	84	64	170	3,4,5 6,7	1
32 Charoen Muang (Wat Duang Khae)	F4:sw B	KNT	45	FMO	FMO, Paknam	n.d	84	64	n.d	1,2,3 5,6	3
33 Charoen Nakhon (Bombay)	H2:ne T	Nong Khem	193	Maha-chai	FMO	189	84	84	185	2,3,4 5,6,7	1,3
34 Charoen Phlat	F2:se T	Ratburi, Bangkhe	KNT	Bang-bua-thong, Ratburi	193, FMO, 197	n.d	170,84, Thewet ferry	170	170	2,3,5 6,7	1,3
35 Charoen Phon	F4:nw B	KNT	KNT	--	FMO	n.d	84	64	n.d	1,2,3 5,6	0
36 Charoen Rat	G2:ne T	--	--	--	--	--	--	--	--	--	--
37 Chomthong	H1:ne T	Bangkhe	Daokha-nong	n.d	n.d	n.d	84,185	64,84	84	5,6,7	1,2

Market	Location	1	2	3		4	5	6	7	8	9
38 Chuchip	F3:ne B	KNT,Don Muang, Pakkret, Nontha-buri	45	n.d	n.d	45	84	64	64,45	1,2,4 5,6,7	1
39 Daokhanong	H2:sw T	Bangkhe, Bang Wa	KNT	Bang Pli	FMO	45, Soi Aree	Wat Sai, 84	84,64 Wat Sai, Bang Mot	45,84	2,3,4 5,6,7	1,3,5 6
40 Ekamai	F7:sw B	KNT	27	Makka-san RR	FMO, Paknam	n.d	84	64	84	1,2,3 5,6,7	3
41 Hiranya-pradit	G2:sw T	--	--	--	--	--	--	--	--	--	--
42 Huai Kwang	E6:nw B	Bangkhe, Minburi, Taling-chan, KNT	27	27	FMO	n.d	84	84,64	n.d	1,2,3 5,6	1
43 Hualam-phong	F3:se B	KNT	KNT	FMO	FMO	n.d	84	70	n.d	1,2,3 5,6	0
44 July 22nd Circle	F3:ne B	KNT	n.d	n.d	n.d	n.d	84	n.d	n.d	1,5	0
45 Kao Yawaret	F3:se B	KNT,Non-thaburi, Nakhon Pathom	KNT	--	FMO	n.d	84	n.d	n.d	1,2,3 5	1
46 Kasem Suk	C6:sw B	Nontha-buri	n.d	n.d	n.d	n.d	84,128	64	n.d	1,5,6	1
47 Kiakkai Wattana	D4:nw B	KNT, Nakhon Pathom	142,45	128	Paknam	n.d	84,128	64,Ban Bong	170	1,2,3 5,6,7	1,3,6
48 King Phet	F4:nw B	n.d	n.d	n.d	n.d	n.d	84	64,81	170	5,6,7	0
49 Khlong Tan	F7:sw B	KNT	KNT	Nong Chok	50,107	n.d	84,27,50 Lad Prao	64	n.d	1,2,3 5,6	3,5

Market	Location	1	2	3	4	5	6	7	8	9
50 Khlong Toei	G5:nw B	KNT	Minburi	FMO	Paknam	n.d	84	64	n.d	1,3,5 6	2,3
51 Klang	E5:se B	KNT, Bangkhe	173	Makka- san	170	n.d	84	64	n.d	1,2,3 5,6	1,3
52 Klang Soi Thong Loh	F6:se B	KNT	KNT	Paknam	Paknam	n.d	84	84	84,170	1,2,5 6,7	3
53 Kluai Nam Thai	G6:se B	KNT	KNT	FMO, Paknam Bang Pli	FMO, Paknam	Paknam, Sam Rong	84,172	64,84	84,48	1,2,3 5,6,7	3,4
54 Kluai Nam Thai RR (Sam Yaek Rong Mu)	H6:ne B	KNT	KNT	Paknam	Paknam FMO	n.d	84, Bangkabu	82,64	50	1,2,3 5,6,7	3,5
55 Kobo	H2:ne T	n.d	n.d	Phra- pa- daeng	193	n.d	84	84	84,45	3,5,6 7	3
56 Kraisak	D5:sw B	--	--	--	--	--	--	--	--	--	--
57 Kromkan- khaphainai (Internal Trade)	F2:ne B	KNT	n.d	FMO	Maha- chai, FMO	n.d	84,Bang Chang, Angthong, Nakhon Pathom, Bangkhae	84,Bang- waek,Non- thaburi, Khlong Mon,Chan- thaburi, Phanat Nikkom, BangChang, Pranburi, Sam Roi Yot,Bang- kok Noi, Bang Mot, BangKruai, Rayong	84,170, Angthong, Ayutthaya, Chachoeng- sao	1,3,5 6,7	3,5,6 7

Market	Location	1	2	3	4	5	6	7	8	9
58 Kromphut-taret	F3:se B	KNT	KNT	--	FMO	n.d	84	n.d	n.d	1,2,3 5	0
59 Krung Thon	D3:sw T	Bangkhe, Nakhon Pathom, Bang Phlat	KNT	170, Nakhon Chai Si	Paknam	n.d	84,8	64	84	2,3,5 6,7	1,3
60 Lad Prao	C5:se B	128,Non-thaburi, Bangkhe	KNT	Sara-buri	Paknam	n.d	84, Rangsit	84,64	n.d	1,2,5 6	1,3,5
61 Lad Prao Mai	D6:ne B	KNT,143	Bangsu	Min-buri	Paknam	n.d	84,128	84,64	64	1,2,5 6,7	3
62 Lad Ya	G3:nw T	NongKhem Nakhon Pathom, Taling-chan	KNT	Wat Sai, 183	185	n.d	84	84,64	84	2,3,5 6,7	1,3
63 Lumpini	G5:nw B	--	--	--	--	--	--	--	--	--	--
64 Mahanak	F3:ne B	KNT,Sam Pran, Prachin-buri, Rangsit, Nakhon Nayok	KNT	n.d	FMO	169	84	64,many provin-cial sources	n.d	1,2,3 4,5,6	1,6
65 Makkasan	F5:nw B	KNT	KNT	Makka-san RR	FMO	n.d	84	Phetburi Sam Roi Yot	n.d	1,2,3 5	3,6
66 Malithong	G2:sw T	Bangkhe	n.d	n.d	n.d	n.d	31,185	84	30,43	5,6,7	1
67 Ming Kwan Bang Na	D5:se B	KNT,50	143	Hin-kong	Paknam	45	84,128	64	Songwat	1,2,4 5,6,7	3
68 Mochit	D5:nw B	--	--	--	--	--	--	--	--	--	--

Market	Location	1	2	3	4	5	6	7	8	9
69 Morrakot	F2:se B	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
70 Nai Lert Si Phraya	G3:ne B	--	--	--	--	--	--	64,many provincial sources	--	6	6
71 Nai Lert	F5:nw B	--	--	--	--	--	--	--	--	--	--
72 Nakhon Chai Si	D3:se B	KNT	n.d	n.d	n.d	n.d	n.d	n.d	Pramane grounds	1,7	0
73 Nam Thip	J4:nw B	128	n.d	FMO	128	n.d	128	n.d	n.d	1,3,5	0
74 Nana	E3:sw B	--	--	--	--	--	--	--	--	--	--
75 Nang Loeng	E3:se B	KNT	KNT, Ban Pong	FMO, 64	Paknam	n.d	84	64	n.d	1,2,3 5,6	2,3
76 Nang Loi (Bangkok)	F3:sw B	KNT,45	45	n.d	FMO, 193	n.d	84	84	n.d	1,2,3 5,6	0
77 Nang Loi (Thonburi)	F1:se T	193	193	n.d	n.d	n.d	183,185	185	180,167	1,2,5 6,7	0
78 Nimnuan	G2:se T	Bangkhe, Damnoen Saduak	n.d	n.d	Maha-chai	31	84	84,Khlong Thewet	185,170, 45	4,5,6 7	1,3
79 Noi	F3:se B	Bangkhe	n.d	n.d	n.d	n.d	84	70,64	n.d	5,6	1
80 Nokkra-chok	F2:se T	n.d	n.d	Ayut-thaya	FMO	45	84	84	84	3,4,5 6,7	3
81 Nutcha-net	H1:ne T	Bangkhe, KNT	45	193	Maha-chai	n.d	185	185	185	1,2,3 5,6,7	1,3
82 Padung Krung Kasem	F3:ne B	n.d	n.d	n.d	n.d	n.d	many provin-cial sources	many provin-cial sources	n.d	0	5,6
83 Pahurat	F3:sw B	--	--	--	--	--	--	--	--	--	--

Market	Location	1	2	3	4	5	6	7	8	9
84 Pakkhlong Talat	F2:se B	n.d	n.d	n.d	n.d	n.d	many provincial sources	many provincial sources	many provincial sources	0	5,6,7
85 Pathumwan (KaoSaphan Luang)	F4:sw B	Hua Mak	n.d	n.d	FMO	n.d	84	n.d	n.d	3,5	1
86 Phanthulap Wattana	H5:nw B	KNT	15	n.d	Paknam	Soi Aree	169,84	84	n.d	1,2,4 5,6	3
87 Pha Si Charoen	G1:ne T	n.d	n.d	n.d	n.d	n.d	84	101, Bang Mot	185	5,6,7	6
88 Phetburi	F4:ne B	Nontha-buri	KNT,27	Makka-san, FMO	FMO	Soi Aree Khlong Toei	64,84, 42,121	64	84,45, 170	2,3,4 5,6,7	1,3
89 Phet Phloy	G4:nw B	Kam-paeng Sen	Sampeng	193	193	n.d	84	70	n.d	1,2,3 5,6	0
90 Phosamton	F2:sw T	n.d	193	n.d	n.d	31,45	84,183	84	170	2,4,5 6,7	0
91 Phraram Si (Rama IV)	F4:sw B	KNT	n.d	n.d	Maha-chai	n.d	84	n.d	n.d	1,5	3
92 Phumhiran	H2:ne T	n.d	n.d	n.d	n.d	n.d	84	n.d	84,45, 185	5,7	0
93 Piraka	F3:nw B	KNT	KNT	n.d	57,170	n.d	84	84	n.d	1,2,3 5,6	0
94 Plang Anuson	H2:sw T	192, Ratburi, Phrapa-daeng	n.d	195	195	n.d	84	Thonburi gardens	84	1,3,5 7	1,6
95 Phong Sap	D2:se T	Bangkhe, Taling-chan, Nakhon Pathom	Thewet, 172	Maha-chai, Thon-buri	n.d	Soi Mangkon Nakhon Pathom	149,8,84 183	84	45,84	2,4,5 6,7	1,3,4

Market	Location	1	2	3	4	5	6	7	8	9
96 Pracha-chin	E4:sw B	KNT,45	KNT,27	n.d	FMO, Paknam	Soi Aree	84	64	n.d	1,2,3 4,5,6	3
97 Prachuab	D4:ne B	45, Non-thaburi, Nakhon Pathom	KNT	FMO	FMO Maha-chai	n.d	84, Rangsit, Nakhon Pathom	64, Bang Saphan, Phetburi, Ratburi	n.d	1,2,3 5,6	1,3,5 6
98 Prakob	G6:ne B	KNT	KNT	n.d	Paknam	n.d	84	84,64	n.d	1,2,5 6	3
99 Pranok	F2:nw T	Bangkhe	Pakkret KNT	FMO	Maha-chai, FMO	Khlong Toei	183,84 Thonburi, Bangkhae	183,64 Sam Pran, Nontha-buri, Nakhon Chai Si	170,84 Songwat	2,3,4 5,6,7	1,2,3 5,6
100 Prathip-sin	G2:se T	KNT	KNT,193	n.d	FMO	n.d	84	Khlong Thewet	84,45	1,2,3 5,6,7	0
101 Pratunam Pha Si Charoen	G1:ne T	Bangkhe	KNT	n.d	n.d	n.d	185	n.d	n.d	2,5	1
102 Prempra-cha	C4:se B	128,Dao-khanong	128	128	128	n.d	84	Nontha-buri	n.d	1,2,3 5	1,6
103 Prok Phama	G4:sw B	--	--	--	--	--	--	--	--	--	--
104 Ratcha-wasu	D5:nw B	--	--	--	--	--	--	--	--	--	--
105 Ratchawat	E4:nw B	Nontha-buri	KNT	FMO Paknam	FMO	n.d	84	64,84	n.d	2,3,5 6	1,3
106 Rongliang Dek	F3:ne B	KNT	KNT	n.d	Paknam	n.d	84	64	n.d.	1,2,5 6	3
107 Rung Arun	G7:sw B	KNT	KNT	n.d	Maha-chai, Paknam	n.d	84	n.d	n.d	1,2,5	3
108 Rung Ruam Rit Im	D6:sw B	KNT	172	n.d	n.d	n.d	84	84	n.d	1,2,5 6	0

Market	Location	1	2	3	4	5	6	7	8	9
109 Saeng Chan	G3:se B	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
110 Saeng Charoen	G3:se B	Bangkhe	n.d	n.d	n.d	84	n.d	n.d	5	1
111 Saeng Suk	G6:sw B	--	--	--	--	--	--	--	--	--
112 Saeng Thip	G7:sw B	KNT	KNT	Bang Pli, Huatha-kate	n.d	Khlong Tan, Suan Luang, Huatha-kate	64, Suan Luang	Songwat	1,2,6 7	3,5,6
113 Saha Wattana	F3:ne B	n.d	n.d	n.d	n.d	many pro-vincial sources	many pro-vincial sources	many pro-vincial sources	0	5,6,7
114 Sai Thai	F1:ne T	30	n.d	n.d	n.d	84	n.d	n.d	1,5	0
115 Sala-daeng	G4:ne B	KNT	27	n.d	FMO	84	64	n.d	1,2,3 5,6	0
116 Samranrat	F3:nw B	KNT	KNT	8	FMO, Paknam	Thonburi	84	84	n.d	1,2,3 5,6
117 Samre	G2:se T	KNT,45 Bangkhe	KNT,45	170	FMO	Khlong Toei	84	84,64	31,45,84 Mahachai	1,2,3 4,5,6 7
118 Samre Mai	H2:ne T	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
119 Samsen Nai	E5:ne B	Nontha-buri	Nontha-buri	Makka-san RR	Paknam	n.d	84	none	n.d	5
120 Sam Yaek Fai Chai	F1:ne T	199,99	199	n.d	FMO	n.d	8,99,84	84	183,199 142,84, 143	1,2,3 5,6,7
121 Sam Yan	F4:sw B	Bangkhe, Ban Pong KNT	KNT, Thonburi	n.d	FMO, Paknam	n.d	84	64,84	84,170 45	1,2,3 5,6,7
122 Sanampao	E4:se B	45,149, Taling-chan,KNT	27,128	FMO Ayut-thaya	FMO, Paknam	n.d	84	64	n.d	1,2,3 5,6

Market	Location	1	2	3		4	5	6	7	8	9
123 Sanchao-phosua	F3:nw B	KNT	KNT	n.d	n.d	170,84 45	84	84,64 Sam Pran	170,199, 84,45	1,2,4 5,6,7	6
124 Santhi	H2:ne T	Nong Khem	n.d	193	193	n.d	193,84	n.d	n.d	3,5	1
125 Sap	G1:nw T	n.d	n.d	n.d	n.d	n.d	84	Bangkhae	84,185	5,7	6
126 Saphan Kwai	D5:sw B	143	n.d	n.d	n.d	n.d	84	n.d	45	1,5,7	0
127 Saphan Luang	F4:sw B	KNT	KNT	n.d	Paknam	n.d	84	84,64	45	1,2,5 6,7	3
128 Sapsin Bangsu	D4:ne B	KNT,	KNT	Paknam Bang-bua-thong	FMO	n.d	84, Rangsit, Nakhon Pathom, Chiangrak	64	n.d	1,2,3 5,6	1,3,5
129 Sathorn Thip	H4:se B	Minburi Nontha-buri	n.d	n.d	n.d	n.d	84,107	Phetburi 64	n.d	5,6	1,6
130 Sathu-pradit	H4:se B	121	KNT	n.d	FMO, Paknam	n.d	84,Chong Non Si	nearby gardens	n.d	1,2,3 5	3,5,6
131 Sawatdi	F3:se B	KNT	n.d	n.d	FMO	n.d	BangMot, 84,Bang Chang, Bang Ko, Daokha-nong	84,64 Thonburi	84	1,3,5 6,7	5,6
132 Sawaeng Phai San	F4:sw B	Bangkhe	45	n.d	FMO	n.d	84	84	n.d	2,3,5 6	1
133 Serim Sawatdi	D1:se T	--	--	--	--	--	--	--	--	--	--
134 Sesawet (west)	G2:ne T	Bangkhe	n.d	170	193 FMO	45	185,84	185,84, 64	185	3,5,6 6,7	1
135 Sesawet (east)	G2:ne T	--	--	--	--	--	--	--	--	--	--

Market	Location	1	2	3	4	5	6	7	8	9
136 Si Bang Pho	D4:nw B	128	149	n.d	149	n.d	84	64	170	1,2,3 5,6,7	0
137 Si Din-daeng	E5:se B	Nontha-buri	KNT	FMO	FMO	n.d	84	84	n.d	2,3,5 6	1
138 Silon	G3:ne B	--	--	--	--	--	--	--	--	--	--
139 Si Phraya	G3:ne B	Bangkhe, KNT,45	45	n.d	FMO	n.d	84	n.d	n.d	1,2,3 5	1
140 Sirichan	H4:nw B	Kampaeng Sen	n.d	n.d	n.d	n.d	84,Sathu-pradit gardens	n.d	n.d	5	1,5
141 Sirin	G3:ne T	Bangkhe	n.d	193	193 FMO	45,Rat-burana	84,185	70	84	3,4,5 6,7	1,4
142 Si Supp-harat	D5:nw B	Bangkhe, BangKruai, Bangkabu, Bangkhen	Ban Pong	Paed Riew, 27	FMO, Paknam	Soi Aree	Minburi, Bangkapi, Hinkong, 84,128	64	170,84	3,4,5 6,7	1,2,3 5
143 Si Thai	D5:nw B	Bangkhe, KNT, 121 Bang Kruai	Minburi	FMO	Paknam Maha-chai	Nakhon Pathom, Soi On Nut, Soi Aree, 45	84	64, Bang Son, Bang Chang, Thewet	170	1,3,4 5,6,7	1,2,3 4,6
144 Si Thon	G2:ne T	Nakhon Pathom	n.d	n.d	n.d	n.d	84	n.d	n.d	5	1
145 Si Wanit	E5:sw B	KNT	KNT	n.d	Paknam	n.d	84	84	n.d	1,2,5 6	3
146 Si Wong Thong	D7:nw B	143	Bangkapi	n.d	128	n.d	84,128	64	113,142	1,3,5 6,7	2
147 Si Worachak	F3:ne B	KNT	n.d	n.d	n.d	n.d	84	64	n.d	1,5,6	0
148 Si Yaek Ban Khek	G2:ne T	Bangkhe, Phrapa-daeng	KNT	Siri-rat	FMO	n.d	84	84	170	2,3,5 6,7	1

Market	Location	1	2	3	4	5	6	7	8	9
149 Si Yan	D3:se B	KNT	KNT	126, Bang-kabu	Paknam	n.d	84,8,183	84,64	n.d	1,2,3 5,6	3
150 Soi Prachum	G4:nw B	Pakkret	KNT	FMO	Paknam	Soi Aree	84	84,64,70	n.d	2,3,4 5,6	1,3
151 Sombunkit	G2:ne T	--	--	--	--	--	--	--	--	--	--
152 Somdet Chao Phraya	F3:sw T	KNT, Taling-chan, Bangkhe	Itsara-phap	193	FMO	193,Soi Aree, Phasi Charoen	84	84	84	1,3,4 5,6,7	1,2,4
153 St Louis Sam	G4:sw B	KNT	15	n.d	FMO	n.d	84	84	n.d	1,2,3 5,6	0
154 Suan Luang	F4:sw B	KNT	15	Makka-san	Maha-chai FMO	45	84	64,70	n.d	1,2,3 4,5,6	3
155 Suan Phlu	G4:se B	KNT	n.d	27,154	FMO	n.d	84, gardens	64	n.d	1,3,5 6	5
156 Sukchai	B6:sw B	Saphan Mai,128	128	n.d	128	n.d	128	64,84	27,82,60	1,2,3 5,6,7	1
157 Sutha	G2:se T	--	--	--	--	--	--	--	--	--	--
158 Suthanma	H4:nw B	Kam-paeng Sen	15	n.d	FMO	Nakhon Pathom	84,183, Sathu-pradit gardens	64	n.d	2,3,5 6	1,4,5
159 Suthisan	D5:se B	Bangkhe, Ratburi, Taling-chan, KNT	KNT	Makka-san RR	FMO	Bangkapi, Mochit	128, gardens	64	n.d	1,2,3 4,5,6	1,3,4 5
160 Tang Ah	G2:ne T	Bangkhe, Phota-ram, Phrapa-daeng	Ban Pong	FMO, 170	Maha-chai	Kluai Nam Thai	Bangkhe 84	84,64 Minburi, Bang Mot, Wat Sai	Songwat 185,84, 45	3,4,5 6,7	1,2,3 5,6

Market	Location	1	2	3	4	5	6	7	8	9
161 Tha Din-Daeng	F3:sw T	Bangkhe Nakhon Pathom	KNT, 45	n.d	n.d	45	84	84,185	n.d	2,4,5 6	1
162 Thanma (Bo Be)	F3:ne B	--	--	--	--	--	--	--	--	--	--
163 Thanon Tuk	H2:se B	n.d	n.d	n.d	n.d	n.d	167,84 gardens	n.d	n.d	5	5
164 Tha Phra	G2:nw T	Bangkhe	n.d	n.d	n.d	Nakhon Pathom	185,84	185	170	5,6,7	1,4
165 Tha Phrachan	F2:ne B	45	n.d	99	99,170	198	84,183	84	n.d	1,3,4 5,6	0
166 Tha Phrachan Mai	F2:ne B	--	--	--	--	--	--	--	--	--	--
167 Tha Phra Rong Ruam	G2:nw T	Bangkhe	n.d	n.d	185	Nakhon Pathom, 170	84	185	45	3,4,5 6,7	1,4
168 Tha Rua Khlong Toei (1)	G5:se B	Pakkret, many provincial sources	Ban Pong, KNT	FMO Paknam	Paknam	Khlong Toei, Soi Aree	84	64,70, 182,Phra-padaeng, Khlong Thewet	Songwat, 84,45	2,3,4 5,6,7	1,2,3 6
169 Tha Rua Khlong Toei (2)	G5:se B										
170 Tha Tien	F2:ne B	n.d	n.d	n.d	n.d	n.d	84	170, provincial source	Songwat, provincial source	5,6,7	6,7
171 Thesa	F3:nw B	Pakkret	n.d	n.d	n.d	n.d	84	n.d	n.d	5	1
172 Thewarat	E3:nw B	KNT	KNT, Ban Pong	FMO, 45	FMO	Soi Mangkon	84,183 boats	Bangkhae, Bang Chang, 64	45	1,2,3 4,5,6 7	2,5,6

Market	Location	1	2	3	4	5	6	7	8	9
173 Thewet	E3:nw B	Taling-chan, Nontha-buri	170	193	n.d	n.d	84	201,64	170	2,3,5 6,7	1
174 Tho Rung	H2:sw T	--	--	--	--	--	--	--	--	--	--
175 Trok Chan	H2:ne B	84	n.d	n.d	n.d	n.d	84	n.d	n.d	1,5	0
176 Trok Chan Saphan Sam	H4:nw B	KNT	KNT	64	FMO Pakkret	Soi Aree	84	64	n.d	1,2,3 4,5,6	3
177 Trok Wang Lang	F2:ne T	Nakhon Pathom, Pathum-thani	99	170	21	n.d	84,183	170,84 Khlong Bang Ramat	n.d	2,3,5 6	1,6
178 Ua Aree (Soi On Nut)	H7:nw B	KNT	KNT	n.d	Paknam	n.d	84,107 gardens	64	n.d	1,2,5 6	3,5
179 Udom Suk	H7:se B	Pakkret	KNT	Paknam	n.d	n.d	84	64, Bang Chang	n.d	2,5,6	1,3,6
180 Wan Chan	H3:ne B	KNT, Nakhon Pathom	n.d	n.d	n.d	n.d	84	64	n.d	1,5,6	1
181 Wanchat	E3:sw B	Bangkhe	172,KNT	193	193,FMO	n.d	84	n.d	n.d	2,3,5	1
182 Wang Mahanak	F3:ne B	n.d	n.d	n.d	n.d	n.d	n.d	many changwat	n.d	0	6
183 Wat Amarin	E2:se T	Photaram	KNT	170 FMO	Maha-chai	45	84,Ban Pong, Photaram, Nakhon Pathom	84,64 Ban Pong	170	2,3,4 5,6,7	1,3,5 6

Market	Location	1	2	3	4	5	6	7	8	9
184 Wat Bang Phlat	D3:nw T	149	170,172	Samsen	Maha-chai, Paknam	Nontha-buri	84, Bangkhae, Thonburi gardens, Nakhon Pathom, Nontha-buri	Bang Mot, Nakhon Pathom,64	84, Songwat	1,2,3 4,5,6 7	3,4,5 6
185 Wat Chantharam (Wat Klang)	G2:nw T	KNT, Photaram	193	FMO	FMO Hualam-phong	n.d	Thonburi, Bangkhae, 84	Bang Mot Nakhon Pathom	n.d	1,2,3 5	1,5,6
186 Wat Dok Mai	J4:nw B	--	--	--	--	--	--	--	--	--	--
187 Wat Dowadung	E2:ne T	170	n.d	Bang-kok Noi RR	173	n.d	84,170	n.d	84	1,3,5 7	0
188 Wat Phraya Krai Kao	H3:nw B	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
189 Wat Phraya Krai Mai	H3:nw B	KNT, Nakhon Pathom	193	FMO	FMO	n.d	84	84, Nontha-buri	n.d	1,2,3 5,6	1,6
190 Wat Sawet-tachat	G3:sw T	Bangkhe, Taling-chan	KNT	n.d	FMO	n.d	84	201	n.d	2,3,5 6	1
191 Wat Suwa-naram	E2:sw T	KNT	n.d	n.d	FMO	n.d	183	183,84	n.d	1,3,5 6	0
192 Wisetkan	E2:sw T	n.d	n.d	n.d	n.d	45	27,84,8	84	45,170	4,5,6 7	0
193 Wongwean Yai North	G2:ne T	Bangkhe	KNT	170, FMO	Maha-chai	45	84	84,185	Songwat, Pramane Grounds	2,3,4 5,6,7	1,3

Market	Location	1	2	3	4	5	6	7	8	9
194 Wongwean Yai South	G2:ne T	KNT	KNT	FMO	FMO	45	Wat Sai, 84	185 Bangkapi, Wat Sai	45,84, 185	1,2,3 4,5,6 7	5,6
195 Worachak	F3:nw B	KNT,45 Taling-chan	45	FMO	Paknam	n.d	84	64	n.d	1,2,3 5,6	1,3
196 Wuttichai	E3:se B	provin-cial source	n.d	n.d	193	n.d	84	n.d	n.d	3,5	1
197 Yannawa	G3:se B	Minburi	KNT	FMO	FMO	n.d	84	64	n.d	2,3,5 6	1
198 Yod Bang-kabue	D3:se B	--	--	--	--	--	--	--	--	--	--
199 Yod Bang-lamphu	E3:sw B	27	KNT	FMO	FMO Pak-nam, Maha-chai	45, Soi Aree	84	Rangsit, Sam Roi Yot, 64	n.d	1,2,3 4,5,6	3,6
200 Yod Kwan	E6:nw B	Bang-kapi, Nontha-buri	173	27	FMO, Paknam	n.d	84, Paknam gardens	64	n.d	2,3,5 6	1,3,5
201 Yod Phiman	F3:sw B	n.d	n.d	n.d	n.d	n.d	many changwat	many changwat	n.d	0	5,6
202 Unnamed	E5:sw B	--	--	--	--	--	--	--	--	--	--
203 Unnamed	H3:sw B	--	--	--	--	--	--	--	--	--	--

APPENDIX 3

MARKET SELLER INTERVIEW FORMAT

Market

Location

Interviewer
Date
Time

Commodity	Origin Season	Purchase Location and Type	Source Person	Fetch or Delivered	Transport Vehicle in
Transport Cost	Buying Frequency	Amount Bought	Selling Time Daily	# Years Selling Location	Age of Market
Selling Elsewhere	Previous Occupation	Paeng Rent Daily	Deposit Period	Paeng Type	Wholesale or Retail
Seller Sex Age	Remarks				

APPENDIX 4

CARRIER INTERVIEW FORMAT

Vehicle Description and Location	Origin/ Destination	Pickup Points En Route	Trip Frequency	Travel Time In

Load: In	Commodity Out	Load Capacity Unit and Weight	Transport Cost Unit and Load	Number of Vehicles on this Run

Other Common Loads/Seasonality	Vehicle Ownership Business Operation	Remarks

APPENDIX 5

FREQUENCY OF CITING EXTRA-URBAN FRESH FOOD SOURCES BY COMMODITY

Pork	
Bangkhae	37
Nakhon Pathom	17
Nonthaburi	15
Talingchan	9
Pakkret	5
Kampaeng Sen	5
Minburi	5
Nong Khem	5
Phrapadaeng	5
Photaram	3
Ratburi	3
Ban Pong	2
Bang Kruai	2
Bangkapi	1
Bangkhen	1
Bangkabu	1
Bang Wa	1
Bang Phlat	1
Daokhanong	1
Don Muang	1
Damnoen Saduak	1
Nakhon Nayok	1
Phetburi	1
Prachinburi	1
Pathumthani	1
Rangsit	1
Sam Pran	1
Sam Rong	1
Saphan Mai	1

Poultry	
Nakhon Pathom	6
Nonthaburi	2
Paknam	2
Bangkapi	1
Minburi	1
Nong Chok	1
Phasi Charoen	1
Thonburi	1

Beef	
Ban Pong	5
Minburi	3
Nonthaburi	2
Pakkret	2
Bangsu	1
Bangkapi	1
Daokhanong	1
Ratburi	1
Pathumthani	1

Sea Fish	
Paknam	45
Mahachai	16
Hualamphong RR	1
Makkasan RR	1
Pakkret	1

Fresh Water Fish	
Paknam	10
Bangbuathong	4
Makkasan	4
Makkasan RR	4
Ayutthaya	3
Bang Pli	3
Mahachai	2
Minburi	2
Nonthaburi	2
Bangkabu	1
Bangkok Noi RR	1
Hinkong	1
Huathakate	1
Nakhon Chai Si	1
Nakhon Pathom	1
Nong Chok	1
Paed Riew	1
Phrapadaeng	1

Ratburi	1
Saraburi	1
Wat Sai	1

Groceries

Mahachai	2
Angthong	1
Ayutthaya	1
Chachoengsao	1

Vegetables

Bangkhae	5
Nakhon Pathom	5
Bangkapi	3
Nonthaburi	3
Rangsit	3
Bang Chang	2
Lad Prao	2
Sathupradit gardens	2
Thonburi	2
Trok Chan	2
Wat Sai	2
Angthong	1
Bang Ko	1
Bangbuathong	1
Bang Son	1
Ban Pong	1
Bang Mot	1
Bangkabu	1
Chiayapruk	1
Chiangmai	1
Chong Nong Si	1
Daokhanong	1
Hinkong	1
Huathakate	1
Khlong Tan	1
Ladkrabang	1
Minburi	1
Nonthaburi market	1
Pak Chong	1
Paknam gardens	1
Photaram	1
Prakhanong	1
Suan Luang	1
Thonburi gardens	1
Thewet ferry	1

Fruit

Bang Mot	6
Nonthaburi	5
Bangkhae	5
Bang Chang	4
Khlong Thewet	3
Wat Sai	3
Sam Roi Yot	3
Phetburi	3
Ban Pong	2
Bang Kruai	2
Nakhon Pathom	2
Sam Pran	2
Bangkunthien	1
Bang Waek	1
Bang Saphan	1
Bang Son	1
Bangkapi	1
Bangkok Noi	1
Chanthaburi	1
Khlong Bang Ramat	1
Khlong Mon	1
Minburi	1
Nakhon Chai Si	1
Phrapadaeng	1
Phanat Nikkom	1
Pranburi	1
Rangsit	1
Rayong	1
Ratburi	1
Suan Luang	1
Thonburi	1
Thonburi gardens	1
Thewet	1

Source: 1970 interviews of sellers in talat.

APPENDIX 6

INTERVIEW IDENTIFIED SOURCE LOCATIONS FOR VEGETABLES IN BANGKOK AND THONBURI MARKETS

This listing represents only those locations identified by the merchants and carriers interviews and does not include other known sources. Because these locations are noted as they were given by informants, they are not necessarily mutually exclusive source areas.

Mushroom (201)	Rangsit (Khlong 4 and 5); Khlong Kwang; Om Noi; Nong Khem; Minburi
Bamboo Shoot (202)	Chanthaburi; Phanat Nikkom; Prachinburi; Chonburi; Pitsanuloke
Cucumber (203)	Pokeow; Nakhon Pathom; Bangkhae; Ratburi; Damnoen Saduak; Kanchanaburi; Pathumthani; Rangsit; Bang Chang; Photaram; Khlong Khut
String Bean (204)	Angthong; Bang Chang; Bang Phai; Bangkhae; Rangsit; Ratburi; Ban Pong; Kanchanaburi; Damnoen Saduak
Tomato (205)	Nakhon Pathom; Chiangmai; Ratburi; Prachuab; Bang Mot; Bang Chang; Samut Sakhon; Bangkhae
Pak Bong (206) (Often compared to morning glory)	Nakhon Pathom; Thonburi; Bang Waek; Bangramaud; Chiangrak; Lat Krabang
Egg Plants (207)	Kanchanaburi; Nakhon Pathom; Bangkhae; Ratburi; Angthong; Tha Rua; Bangkabu; Samut Sakhon; Ayutthaya; Damnoen Saduak; Bangkobua

Chili Pepper (208)	Bangbuathong; Pathumthani; Rangsit; Bang Pho; Ratburi; Nakhon Pathom; Bang Chang; Bangkhae; Sam Pran; Don Muang; Damnoen Saduak; Photaram; Phrapadaeng; Thonburi; Chiangmai
Bird Pepper (209)	Ratburi; Rangsit; Nakhon Chai Si; Bang Chang; Prachuab; Pranburi
Bell Pepper (210)	Pathumthani
Coriander (211) or Pak Chi	Nakhon Pathom; Khlong Mon; Pathumthani; Samut Sakhon; Damnoen Saduak; Chiangrak; Lat Krabang; Lopburi; Saraburi
Dried Beans (212)	Takli; Nakhon Sawan; Pichit; Chiangmai; Chonburi
Onions (213)	Chiangmai; Lampang; Pa Sang; Bang Chang; Si Saket; Phetburi; Nakhon Pathom; Damnoen Saduak
Garlic (214)	Chiangmai; Lampang; Pa Sang; Damnoen Saduak; Bang Chang; Lamphun
Tamarind (215)	Prachinburi; Lang Suan; Photaram; Nakhon Sawan
Corn (216)	Angthong; Pathumthani; Ratburi; Kanchanaburi; Suphanburi; Nakhon Sawan; Chonburi; Takli; Bang Chang
Pumpkin (217) or Fak Thong	Thapsakae; Bang Saphan; Paed Riew; Bang Khla; Khlong Khut; Salaya; Saladaeng; Bang Mot; Sukhothai; Si Saket; Petchabun; Kuiburi; Lomsak; Prachuab; Phetburi; Bang Chang; Nonthaburi; Photaram; Sai Yok; Bang Bueng; Khok Samrong
Chinese Radish (218)	Khlong Khut; Rangsit; Bang Waek; Pathumthani; Pak Chong; Damnoen Saduak

White Gourd (219)	Rangsit; Pathumthani; Sam Roi Yot; Thonburi; Bangbuathong; Pitsanuloke; Nakhon Sawan; Chonburi; Kanchanaburi; Nakhon Pathom
Chinese kale (220) or Kana	Bang Phai; Bangbuathong; Bang Pho; Khlong Khut; Talingchan; Ratburi; Thonburi; Bang Waek; Pathumthani; Bangkapi
Cabbage (221)	Chiangmai; Pathumthani; Thonburi; Lomsak; Thapsakae; Bang Saphan
Cassava (222)	Damnoen Saduak
Taro (223)	Bang Chang; Rangsit; Thapsakae; Sam Roi Yot; Bang So; Pranburi; Angthong; Tha Yang; Nakhon Chai Si; Nakhon Pathom; Pathumthani; Prachuab
Yam Bean (224)	Bang Chang; Chonburi; Phetburi; Pathumthani; Ratburi
Sweet Potato (225)	Bang Chang; Rangsit; Phetburi; Thapsakae; Prachuab; Nakhon Pathom; Damnoen Saduak; Prachinburi; Suphanburi
Spring Onion (226)	Bangbuathong; Chonburi; Bang Waek; Damnoen Saduak; Khlong Khut; Nakhon Pathom; Samut Sakhon; Bang Chang; Kanchanaburi
Peas (227)	Chiangmai; Pitsanuloke; Ratburi; Lampang
Green Pepper (228)	Thonburi; Nonthaburi
Ginger (229)	Prachuab; Pak Chong; Nakhon Pathom; Bang Chang; Lat Krabang; Bang Waek
Turmeric (230)	Nakhon Pathom; Pathumthani
Galingale (231)	Bang Waek

Thai Celery (232)	Pathumthani; Nakhon Pathom; Thonburi
Pak Kwantung (233) (floating vegetable)	Thonburi; Pathumthani
Bitter Cucumber (234)	Ratburi; Rangsit; Photaram; Damnoen Saduak; Bangkhae
Snake Gourd (235)	Ratburi; Damnoen Saduak; Nakhon Pathom; Bang Saphan; Thapsakae
Winged Bean (236)	Ratburi; Photaram
Mint (237)	Pathumthani; Talingchan; Thonburi; Ratburi
Lettuce (238)	Pathumthani; Thonburi; Cha Am; Bangkapi; Khlong Khut; Bang Waek; Damnoen Saduak
Peanuts (239)	Bang Chang; Saraburi; Ban Maw; Singburi; Pichit; Kanchanaburi; Pak Chong; Nakhon Sawan; Prachuab; Nakhon Pathom; Damnoen Saduak; Chiangmai
Chinese Cabbage (240) (white)	Thonburi; Pathumthani; Chiangmai; Khlong Khut
Chinese Cabbage (241) (leafy)	Thonburi; Pathumthani; Khlong Khut; Om Yai; Nong Phai; Bang Lat
Celery (242)	Thonburi; Pathumthani
Beetroot (243)	Damnoen Saduak
Water Chestnut (244)	Suphanburi
Melon (245)	Bangbuathong; Bang Chang; Uthaithani; Sukhothai; Chonburi
Lemon Grass (246)	Samut Sakhon; Bang Waek,; Bangkhae; Nakhon Pathom

Lotus Flower (247)	Bang Waek; Chumphon; Lomsak; Prachinburi; Photaram
Potato (248)	Chiangmai; Bangkhae; Damnoen Saduak
Carrot (249)	Pak Chong; Lampang
Small Melon (250)	Khlong Khut; Bangbuathong; Bangramaud; Bangkhae
Krachet (251)	Bangramaud; Pokeow; Bang Saphan; Thapsakae
Sweet Basil (252)	Bang Waek

Source: Interviews in and around urban markets, 1970.

B. NUMBER OF KINDS OF VEGETABLES IN URBAN MARKETS BY SOURCE LOCATION AS IDENTIFIED IN MERCHANT AND VEHICLE INTERVIEWS

Angthong	4	Kanchanaburi	7	Photaram	7
Ayutthaya	1	Khlong Khut	9	Phrapadaeng	1
Bangbuathong	6	Khlong Kwang	1	Pichit	2
Bang Bueng	1	Khlong Mon	1	Pitsanuloke	3
Bang Chang	16	Khok Samrong	1	Pokeow	2
Bangkobua	1	Kuiburi	1	Prachinburi	4
Bangkabu	1	Lampang	4	Prachuab	7
Bangkapi	2	Lamphun	1	Pranburi	2
Bangkhae	9	Lang Suan	1	Rangsit	10
Bang Lat	1	Lat Krabang	3	Ratburi	14
Bang Mot	2	Lomsak	3	Sai Yok	1
Bang Phai	2	Lopburi	1	Saladaeng	1
Bang Khla	1	Minburi	1	Salaya	1
Bang Pho	2	Nakhon Chai Si	2	Sam Pran	1
Bangramaud	3	Nakhon Pathom	17	Sam Roi Yot	2
Bang Saphan	4	Nakhon Sawan	5	Samut Sakhon	5
Bang So	1	Nong Khem	1	Saraburi	2
Bang Waek	10	Nong Phai	1	Singburi	1
Ban Maw	1	Nonthaburi	2	Si Saket	2
Ban Pong	1	Om Noi	1	Sukhothai	2
Cha Am	1	Om Yai	1	Suphanburi	3
Chanthaburi	1	Paed Riew	1	Takli	2
Chiangmai	10	Pak Chong	4	Talingchan	2
Chiangrak	2	Pa Sang	2	Thapsakae	6
Chonburi	7	Pathumthani	19	Tha Rua	1
Chumphon	1	Petchabun	1	Tha Yang	1
Damnoen Saduak	17	Phanat Nikkom	1	Thonburi	13
Don Muang	1	Phetburi	4	Uthaithani	1

Addenda: Other Locations Not Specified by Kind of Vegetable

Bang Ko

Bang Son

Charoen Phat

Chiang Rong

Chiayaphruk

Chong Non Si

Daokhanong

Hinkong

Huathakate

Khlong San Saeb

Khlong Tan

Samut Prakan

Sathupradit

Trok Chan

APPENDIX 7

INTERVIEW IDENTIFIED SOURCE LOCATIONS FOR FRUITS IN BANGKOK AND THONBURI MARKETS

This listing represents only those locations identified by the merchants and carriers interviewed and does not include other known sources. Because these locations are noted as they were given by informants, they are not necessarily mutually exclusive source areas.

Bananas (101)	Bang Phlat; Phetburi; Prachuab; Sam Roi Yot; Pranburi; Chumphon; Lang Suan; Kanchanaburi; Kampaeng Phet; Nakhon Sawan; Nonthaburi; Ban Phaen; Nakhon Chai Si; Bang Chang; Bang Mot; Bangkunthien; Talingchan; Saraburi; Bangkhae; Thonburi; Phrapadaeng; Bang Saphan; Ratburi; Khlong Bangkok Noi; Khlong Bangkok Yai; Ban Pakaeo; Damnoen Saduak; Sam Pran
Papaya (102)	Bang Chang; Bang Mot; Bangkunthien; Bangkhae; Nonthaburi; Bang Phlat; Phrapadaeng; Photaram
Pineapple (103)	Si Racha; Phetburi; Prachuab; Sam Roi Yot; Pranburi; Sam Pran; Paed Riew; Bangkhae; Nonthaburi
Oranges (104)	Bang Mot; Petchabun; Chanthaburi; Nan; Phrae; Phetburi; Sam Pran; Chonburi; Khlong Luang Yai; Sam Kha; Sam Yan (Rayong); Nonthaburi; Lang Suan; Na San; Ban Song; Ban Maw; Ban Pakaeo; Don Muang; Phrapadaeng; Om Yai; Prachuab; Rayong
Rambutan (105)	Chanthaburi; Lang Suan; Na San; Ban Song; Sam Yan; Trad

Durian (106)	Chanthaburi; Ma Kham; Khlung; Huai Sa Thon; Rayong; Bang Kruai; Prachinburi; Lang Suan; Nonthaburi; Sam Yan
Watermelon (107)	Rangsit; Pitsanuloke; Suphanburi; Bang Phai; Ratbualuang; Lang Suan; Rayong; Don Chedi; Roi Et; Surat; Banduad; Wang Noi; Bua Yai; Bang Chang; Bangbuathong; Chanthaburi
Coconut (108)	Ko Samui; Chumphon; Thapsakae; Bang Chang; Pathiu; Bang Waek; Khlong Mon; Nonthaburi; Bangkunthien; Bang Mot; Nakhon Chai Si; Prachuab; Lang Suan; Korat; Ratburi; Surat; Bangkok Noi; Paed Riew; Khlong Luang Yai; Chonburi; Chongburi; Phrapadaeng; Sawee; Thonburi
Sugar Cane (109)	Bang Chang; Ratburi; Nakhon Pathom; Khlong Bangchueknang; Bangbuathong; Pakkret; Rangsit; Nakhon Chai Si; Pathumthani; Thonburi; Suphanburi
Lychee (110)	Bang Kruai; Bang Mot
Mango (111)	Bang Chang; Nonthaburi; Damnoen Saduak; Roi Et; Kanchanaburi; Chaiyaphum; Suphanburi; Ban Pong; Bang Mot; Bangkunthien; Bang Luang; Thanyaburi; Khonkaen; Chiangmai; Wat Kanlaya
Putsa (112)	Uthaithani; Bang Chang
Lemons (113)	Ban Pong; Kanchanaburi; Nakhon Si Thammarat; Thonburi; Bangkabu; Ban Pakaeo; Phrapadaeng; Tha Yang
Tamarind (114)	Photaram; Lomsak; Prachinburi
Mangostein (115)	Lang Suan; Nakhon Si Thammarat; Surat; Bang Kruai; Chanthaburi; Bang Phlat; Nonthaburi

Jackfruit (116)	Nonthaburi; Sam Roi Yot; Prachuab; Chonburi; Si Racha; Sattahip; Rayong; Kanchanaburi
Custard Apple (11	Muaklek; Chonburi; Thapsakae; Klang Tung; Saraburi; Pak Chong; Phraphuttabat; Kuiburi; Nakhon Pathom; Sam Roi Yot
Langsat (118)	Surat; Lang Suan; Nakhon Si Thammarat; Chumphon
Lamyai (119)	Chiangmai
Ma Fai (120)	Bang Yai; Bang Kruai; Nonthaburi
Pomelo (121)	Nakhon Chai Si; Sam Pran; Phetburi; Sukhothai; Pak Lat; Samut Praken; Bangkhae; Ratburana; Om Yai; Phrapadaeng
Grapes (122)	Sam Pran; Bang Chang; Chonburi; Nakhon Chai Si; Damnoen Saduak
Makrut (123) (Rough skinned lemon)	Bang Waek; Kanchanaburi
Coconut Sugar (126)	Bang Chang; Phrapadaeng; Amphawa
Guava (125)	Thonburi; Phrapadaeng
Marian Plum (126)	Nonthaburi
Sapodilla (127)	Talingchan
Pomegranate (128)	Chonburi
Water Olive (129)	Chonburi
Breadfruit (130)	Lang Suan
Sakae (131)	Thonburi
Chomphu (132)	Thonburi; Nonthaburi
Luk Kha (133) (Nuts)	Surat; Songkhlaa; Haat Yai

B. KINDS OF FRUITS IN URBAN MARKETS BY SOURCE LOCATIONS AS IDENTIFIED IN MERCHANT AND VEHICLE INTERVIEWS

Amphawa	1	Don Chedi	1	Phetburi	4
Bang Phlat	3	Don Muang	1	Prachuab	5
Bang Chang	9	Huai Sa Thon	1	Pranburi	2
Bang Mot	6	Haat Yai	1	Phrapadaeng	8
Bangkunthien	4	Khonkaen	1	Photaram	2
Ban Phaen	1	Kanchanaburi	5	Paed Riew	2
Bangkhae	4	Kampaeng Phet	1	Petchabun	1
Bang Saphan	1	Khlong Bangkok Noi	1	Phrae	1
Ban Pakaeo	3	Khlong Bangkok Yai	1	Prachinburi	2
Ban Song	2	Khlong Luang Yai	2	Pitsanuloke	1
Bang Kruai	4	Khlung	1	Pakkret	1
Bang Phai	1	Ko Samui	1	Pathumthani	1
Ban Maw	1	Khlong Mon	1	Pak Chong	1
Banduad	1	Korat	1	Pak Lat	1
Bua Yai	1	Khlong Bangcheuknang	1	Pathiu	1
Bangbuathong	2	Klang Tung	1	Phraphuttabat	1
Bang Waek	2	Kuiburi	1	Ratburi	3
Bangkok Noi	1	Lang Suan	9	Rangsit	2
Ban Pong	2	Lomsak	1	Ratbualuang	1
Bang Luang	1	Ma Kham	1	Rayong	4
Bangkabu	1	Muaklek	1	Roi Et	2
Bang Yai	1	Nakhon Si Thammarat	3	Ratburana	1
Chumphon	3	Nakhon Sawan	1	Sam Roi Yot	4
Chanthaburi	5	Nonthaburi	12	Sam Pran	5
Chonburi	7	Nakhon Chai Si	5	Saraburi	2
Chongburi	1	Nan	1	Si Racha	2
Chaiyaphum	1	Na San	2	Sam Kha	1
Chiangmai	2	Nakhon Pathom	2	Sam Yan	3
Damnoen Saduak	3	Om Yai	2	Suphanburi	3

Surat	5
Sawee	1
Sattahip	1
Sukhothai	1
Samut Prakan	1
Songkhlaa	1
Thonburi	7
Thapsakae	2
Thanyaburi	1
Tha Yang	1
Talingchan	2
Trad	1
Uthaithani	1
Wang Noi	1
Wat Kanlaya	1

Addenda: Fruits General

Nakhon Sawan

Daokhanong

APPENDIX 8

SUMMARY OF PROVINCIAL SOURCES OF COMMODITIES FOR BANGKOK AND THONBURI MARKETS

Note: Changwat or provinces are arranged in alphabetical order.
Commodities are given a numerical key.
Fruits are 101 . . . as in Appendix 7.
Vegetables 201 . . . as in Appendix 6.
Dried fish 301 Fresh water fish 302 Sea fish 303
Dried beef 401 Fresh beef 402 Pork 403 Poultry 404
Hen eggs 501 Duck eggs 502
Rice 601
Salt 701

ANGTHONG:
Angthong--204, 207, 216, 223, 401, 404, 501
Pamon--502

AYUTTHAYA:
Ayutthaya--207, 302, 404, 501, 502
Bang Ban--301
Bang Krathum--501
Bang Pain--501
Bang So--223
Ban Phaen--101, 302
Chiangrak--206, 211
Ladbualuang--301, 502
Pak Hai--301, 501, 601
Ratbualuang--107
Sena--501
Tha Rua--207
Wang Noi--107

CHACHOENGSAO:
Bang Khla--217
Banpakong--501, 502
Khlong Suan--501
Paed Riew--103, 108, 217, 302, 404, 501, 502
Huathakate--302

CHAINAT:
Chainat--404
Wat Sing--502

CHAIYAPHUM:
Chaiyaphum--111

CHANTHABURI: Chanthaburi--104, 105, 106, 107, 115, 202
Huai Sa Thon--106
Khlung--106
Ma Kham--106

CHIANGMAI: Chiangmai--111, 119, 205, 208, 212, 213, 214, 221, 227, 239, 240, 248

CHONBURI: Bang Bueng--217
Chonburi--104, 108, 116, 117, 122, 128, 129, 202, 212, 216, 219, 224, 226, 245, 301, 404, 502
Phanat Nikhon--202, 501
Sattahip--116
Si Racha--103, 116

CHUMPHON: Chumphon--101, 108, 118, 247
Lang Suan--101, 104, 105, 106, 107, 108, 115, 118, 130
Pathiu--108
Sawee--108
Sai Yok--217

KAMPHAENG PHET: Kamphaeng Phet--101

KANCHANABURI: Kanchanaburi--101, 111, 113, 116, 123, 203, 204, 207, 216, 219, 226, 239

KHONKAEN: Khonkaen--111, 404, 502, 601
Ban Phai--502

LAMPANG: Lampang--213, 214, 227, 249

LAMPHUN: Lamphun--214
Pa Sang--213, 214

LOPBURI: Khok Samrong--217
Lopburi--211, 404
Phraphuttabat--117

NAKHON NAYOK: Nakhon Nayok--403, 404

NAKHON PATHOM: Kampaeng Sen--403
Nakhon Chai Si--101, 108, 109, 121, 122, 209, 223, 502, 601
Nakhon Pathom--109, 117, 203, 205, 206, 207, 208, 211, 213, 219, 223, 225, 226, 229, 230, 232, 235, 239, 246, 302, 403, 404, 501, 502
Om Yai--104, 121, 241
Pokeow--203, 251
Sam Pran--101, 103, 104, 121, 122, 208, 403

NAKHON RATCHASIMA: Bua Yai--107
Klang Tung--117
Korat--108, 404
Muaklek--117
Pak Chong--117, 218, 229, 239, 249
Pak Thong Chai--601

NAKHON SAWAN: Nakhon Sawan (Pak Nam Pho)--101, 212, 215, 216, 219, 239, 404
Takli--212, 216

NAKHON SI THAMMARAT: Nakhon Si Thammarat--113, 115, 118

NAN: Nan--104

NONTHABURI: Bangbuathong--107, 109, 208, 219, 220, 226, 245, 250, 302, 502
Bang Kruai--106, 110, 115, 120, 403
Nonthaburi--101, 102, 103, 104, 106, 108, 111, 115, 116, 120, 126, 132, 217, 228, 302, 402, 403, 404
Pakkret--109, 402, 403

PATHUMTHANI: Bang Pho--208, 220
Pathumthani--109, 203, 208, 210, 211, 216, 218, 219, 220, 221, 223, 224, 230, 232, 233, 237, 238, 240, 241, 242, 402, 403
Rangsit--107, 109, 201, 203, 204, 208, 209, 218, 219, 223, 225, 234, 403
Thanyaburi--111

PETCHABUN: Lomsak--114, 217, 221, 247
Petchabun--104, 217, 601

PHETBURI: Cha Am--238
Phetburi--101, 103, 104, 121, 213, 217, 224, 225, 301, 403
Sam Kha--104
Tha Yang--113, 223

PHRAE: Phrae--104

PHRANAKHON: Bangkabu--113, 207, 401, 403
Bangkapi--220, 238, 402, 403
Bangkhen--403, 404
Don Muang--103, 208, 403
Lad Prao--501
Minburi--201, 402, 403, 404
Nong Chok--404, 302
Samaphon--403
Lat Krabang--206, 211, 229

PICHIT:
Bang Mun Nak--601
Pichit--212, 239, 601
Taphin Hin--601

PITSANULOKE:
Pitsanuloke--107, 202, 219, 227, 404

PRACHINBURI:
Prachinburi--106, 114, 202, 215, 225, 247, 403

PRACHUAB KHIRIKHAN:
Bang Saphan--101, 217, 221, 235, 251
Chongburi--108
Hua Hin--301
Kuiburi--117, 217
Prachuab--101, 103, 104, 108, 116, 205, 209, 217, 223, 225, 229, 239
Pranburi--101, 103, 209, 223
Sam Roi Yot--101, 103, 116, 117, 219, 223
Thapsakae--108, 117, 217, 221, 223, 225, 235, 251

RANONG:
Ranong--301

RATBURI:
Bang Chang--101, 102, 107, 108, 109, 111, 112, 122, 124, 203, 204, 205, 208, 209, 213, 214, 216, 217, 223, 224, 225, 226, 229, 239, 245
Ban Pong--111, 113, 204, 402, 403
Damnoen Saduak--101, 111, 122, 203, 204, 207, 208, 211, 213, 214, 218, 222, 225, 226, 234, 235, 238, 239, 243, 248, 404
Photaram--102, 114, 203, 208, 215, 217, 234, 236, 247, 403, 404
Ratburi--101, 108, 109, 203, 204, 205, 207, 208, 209, 216, 220, 224, 227, 234, 235, 236, 237, 302, 402, 404

RAYONG:
Rayong--104, 106, 107, 116
Sam Yan--104, 105, 106

ROI ET:
Roi Et--107, 111

SAMUT PRAKAN:
Bang Bo--301, 302
Bangkobua--207
Bang Na--404, 501, 502
Bang Pli--302, 404
Samut Prakan--121, 303, 302, 404
Phrapadaeng--101, 102, 104, 108, 113, 121, 124, 125, 208, 301, 302, 403, 404, 501, 502
Sakhloa--701
Sam Rong--403, 501, 502
Pak Lat--121

SAMUT SAKHON: Ban Bo--701
Bangkanrat--701
Bangsikut--701
Bangyaprek--701
Banthikat--701
Bantholat--701
Banyapleng--701
Kalong--701
Khokham--701
Kratumben--404
Na Fang--701
Nakhok--701
Sahakon--701
Samut Sakhon--205, 207, 211, 226, 246, 302, 303, 404, 502, 701

SAMUT SONGKHRAM: Amphawa--124
Bangkrabung--701
Maeklong--301
Samut Songkhram--404

SARABURI: Hinkong--302
Pak Sara Phrieo--601
Prabat--501
Sao Hai--601
Saraburi--101, 117, 211, 239, 302, 601

SINGBURI: Singburi--239, 404
Ban Maw--104, 239

SI SAKET: Oadin--404
Si Saket--213, 217

SONGKHLAA: Haat Yai--133
Songkhlaa--133

SUKHOTHAI: Sukhothai--121, 217, 245

SUPHANBURI: Bang Li--501, 502
Don Chedi--107
Suphanburi--107, 109, 111, 216, 225, 244, 302, 404

SURATHANI: Banduad--107
Ban Song--104, 105
Ko Samui--108
Na San--104, 105
Surat--107, 108, 115, 118, 130, 502

SURIN: Surin--404

THONBURI:
Bangkhae--101, 102, 103, 121, 203, 204, 205, 207, 208, 234, 246, 248, 250
Bangkhe--302, 403, 404, 501
Bangkok Noi--108
Bangkunthien--101, 102, 108, 111, 501
Bang Lat--241
Bang Luang--111
Bang Mot--101, 102, 104, 108, 110, 111, 205, 217, 501
Bang Phlat--101, 102, 115, 403
Bangramaud--206, 250, 251
Bang Waek--108, 123, 206, 218, 220, 226, 229, 231, 238, 246, 247, 252
Bang Phai--107, 204, 220
Ban Pakaeo--101, 104, 113
Daokhanong--402
Khlong Bangchuaknang--109
Khlong Khut--203, 217, 218, 220, 226, 238, 240, 241, 250
Khlong Kwang--201
Khlong Luang Yai--104, 108
Khlong Mon--108, 211
Nong Khem--201, 403, 404
Nong Phai--241
Om Noi--201
Ratburana--121, 404
Saladaeng--217
Salaya--217
Talingchan--101, 127, 220, 237, 403
Thonburi--101, 108, 109, 113, 125, 131, 132, 206, 208, 219, 220, 221, 228, 232, 233, 237, 238, 240, 241, 242, 404, 501
Wat Kanlaya--111
Wat Sai--402

TRAD:
Trad--105

UTHAITHANI:
Uthaithani--112, 245, 302

APPENDIX 9

SELECTED TRAVEL TIMES FOR FRUIT AND VEGETABLES ARRIVING AT BANGKOK AND THONBURI MARKETS

Origin	Vehicle	Load	Time in Hours
	Interviewed in Bangkok		
Thapsakae	10 wheel truck	Fruit, vegetables	6
Pokeow	6 " "	"	40 mins.
Sawee	10 " "	Fruit	10
Photaram	10 " "	Vegetables	1 1/2
Ayutthaya	6 " "	Fruit	2
Chonburi	10 " "	Pumpkin	2
Phetburi	10 " "	Bananas	4-5
Kampaeng Phet	10 " "	"	11-12
Phetburi	4 " "	"	3
Sam Roi Yot	10 " "	Pineapple	4-6
Bangkhae	Longtail boat	Papaya	1 1/2
Damnoen Saduak	Small barge	Bananas	7-8 (4-5 at locks)
Bang Waek	Small motorboat	Vegetables	1/2
Ban Paen	Barge (7-8 tons)	Fruits	9
Bang Mot	Longtail boat	Oranges	1 1/2
Suphanburi	10 wheel truck	Watermelon	4
Khonkaen	10 " "	Mango	10 (6 empty)
Ratburi	4 " "	Corn	2
Prachuab	10 " "	Pineapple	7
Sam Yan	6 " "	Fruits	--

Origin	Vehicle	Load	Time in Hours
Thapsakae	10 wheel truck	Coconuts	8
Taphanhin	10 " "	Mung bean, rice	9
Petchabun	10 " "	Fruit, rice	6
Chonburi	10 " "	Tapioca flour	3
Chanthaburi	6 " "	Durian, Rambutan	6
Petchabun	6 " "	Vegetables	6-7
Ratburi	10 " "	"	1 1/2
Ranong	6 " "	Dried fish	12
Chonburi	6 " "	Fruits	2
Chanthaburi	6 " "	"	5
Pathumthani	6 " "	Vegetables, mango	1 1/2
Chumphon	10 " "	Coconuts	12
Roi Et	10 " "	Mango	12
Kanchanaburi	10 " "	Vegetable, mango	3-4
Kanchanaburi	10 " "	Vegetables	2 1/2
Tha Yang	10 " "	Lemons	2 1/2
Mahachai	4 " "	Fish	1 1/4
Ban Pong	6 " "	Baskets	1 3/4
Damnoen Saduak	6 " "	Vegetables	2 1/2
Khlong Khut	Passenger/cargo boat	"	1/2
Khlong Khut	Motorboat	"	1/2
Bang Waek	Longtail boat	Vegetables, coconuts	50 mins.
Bang Waek	Motorboat	"	50 mins.
Korat	10 wheel truck	Charcoal	4-4 1/2
Takli	6 " "	Corn	4-4 1/2
Ubon	10 " "	Pigs	12
Kampaeng Phet	10 " "	Bananas	10
Om Yai	4 " "	Fruits	1/2
Chanthaburi	6 " "	Rambutan	--
Khok Samrong	6 " "	Pumpkin	< 5

Origin	Vehicle	Load	Time in Hours
Chumphon	6 wheel truck	Coconuts	12
Om Yai	6 " "	Vegetables	< 1
Chanthaburi	4 " "	Oranges	6-7
Wang Noi	6 " "	Watermelon	--
Rangsit	Boat	"	1 day round trip
Bua Yai	Boat	"	2 "
Bang Chang	Boat	"	3 "
Damnoen Saduak	Barge	Bananas	3 "
Bangkhae	Boat	Bananas	1 "
Nakhon Chai Si	Truck	Pomelo	2 hours
Bang Pakaeo	Boat	Lemons	1/2
Chanthaburi	6 wheel truck	Mangostein	5
Bang Chang	Barge	Yam bean	10
	Interviewed at Bangkhae		
Damnoen Saduak	Barge	Vegetables	6
"	"	"	8
"	"	Bananas	10
"	"	Vegetables	6
"	"	Fruits	8-9
	Interviewed at Damnoen Saduak and Along Khlong Phasicharoen		
Lak 4	Barge	Fruit, vegetables	10
Lak 5	"	Vegetables	11
Damnoen Saduak	"	Papaya	6 (to Bangkhae)

--: No data

Source: Interviews 1970.

Note: A few other commodities are noted where fruit or vegetables are drawn from the same areas.

APPENDIX 10

TRANSPORT CHANGES: THE DAMNOEN SADUAK EXAMPLE

For the past decade, changes in the mode of transport used to bring fresh food from the provinces to the cities of Bangkok and Thonburi have been changing significantly local patterns of food supply and production. Rapid increases in trucking have been linking ever more widespread areas to the capital dominated marketing system, and the resulting changes are affecting areas where water transport formerly dominated. Although this study does not extend to an analysis of competition between road and water transportation, a description of changes in the Damnoen Saduak area is included here as an example of experiences which may be repeated elsewhere.

As is the case with most supply linkages, the people involved in the Damnoen Saduak transport changes make up a varied and interwoven cast. These groups now involve producers, provincial wholesale merchants, towboat, barge and trucking companies and independent operators and wholesalers both in the area and from Bangkok.

Vegetable and fruit growers have been quite responsive to changes in the market price of their produce and to the increased opportunities generated through the construction of an all-weather road into the area. Within the last decade, producers have increasingly switched

acreage from vegetable crops into fruit orchards, growing such fruit as grapes, oranges and putsa, and more recently, market prices have led some growers to switch to the production of maize. The considerable changes undergone in agricultural production have resulted not only in more acreage being converted to fruit growing but also in extending the growing season so that the area now harvests fresh produce the year round. Both these changes have occurred in part because roads and trucks have made possible the delivery of produce both quickly and on a daily basis.

Producers, most of whom live along the many khlongs which give on to the main Damnoen Saduak/Phasicharoen Canal, usually sell their produce to merchants from Damnoen Saduak; in some cases the producer delivers his harvest to the merchant in Damnoen Saduak, and in others the merchant comes to the producer. In the latter instance, the crops are usually assembled along the canal banks where they are loaded onto the merchant's boat. Producers are often also linked to merchants through credit arrangements for crop inputs such as insecticide and fertilizer. In a few instances, producers do not work through provincial merchants but rather take produce themselves to the primary urban foci or contract directly with trucking companies.

For the merchants, who may be involved in other lines of business as well as fruit and vegetable wholesaling, there are three principal means of transporting their produce to Bangkok or Bangkhae. They may use their own barges and contract with a tow going to the cities; they may use barges hired from transport companies or they may arrange

for truck transport. Most pre-arrange sales to regular buyers in the cities.

There are now three types of transport companies operating in Damnoen Saduak; five major barge companies are located along the canal, two trucking companies operate out of Damnoen Saduak and three towboat companies are found at the Bang Nok Kwaek lock at the Ratburi end of the canal. Barge companies hire out to merchants; some use their own towboat to move the loaded barges while others contract with either towboat companies or individual towboat operators located all along the canal. Arrangements with the towboat companies are often contracted for on a regular basis so that informants often insisted that they did not contact a towboat but rather that it simply appeared at the right place at a certain time. The individual towboat operators usually haul strings of ten to twenty fifteen-ton barges belonging to both merchants and transportation companies with occasionally a producer's own barge hooked onto the end.

Truck companies operate their own trucks on a commission basis and also provide name affiliation for other trucks taking vegetables and fruit to both Bangkok and Nakhon Pathom. In addition, a fee is charged to those independent truckers coming from Bangkok to contract for individual hauls who use company landings for loading. Produce hauled by truck companies is delivered to them by merchants, directly by the producers, or is collected from the producer along the khlong by small company-owned boats.

Trucking activities in the past five or six years have impinged the most on the business of the barge companies located near the road,

and several have gone out of business. Most of the transport companies draw from producers within a range of three or four kilometers although distances of up to seven kilometers are not uncommon. Those respondents living along the canal away from the road noted no changes in transport mode but did say they were anticipated if a road were built closer to them. Where there is a choice of mover, it appears that the most perishable vegetables and the highest priced fruits are sent to the cities by truck, and the less expensive or dry produce such as ripe papaya or onions and garlic go by barge.

It is difficult to estimate the number of barges and trucks involved in fruit and vegetable trade between the Damnoen Saduak area and Bangkok. Estimates of the number of barges operated by transport companies varied from fifty to sixty with twenty to forty leaving for Bangkhae every day for a round trip journey which requires two days. The number of company operated trucks is less with about twenty leaving a day; there are, in addition, an unknown number of independent operators.

In summary, in the Damnoen Saduak area, trucking has competed successfully with water transport in those areas where roads have brought a choice of mover. In these locales, water transport is supplemental to truck transport while in the unaffected areas, water transport still dominates. As was pointed out in the main text, commodities in which trucking has had the greatest impact are those where the advantages of rapid delivery outweigh the higher transport costs.

APPENDIX 11

LAMYAI SUPPLY TO BANGKOK AND THONBURI MARKETS

While rail transport is not a major mover of fresh foods to the cites of Bangkok and Thonburi, the use of railways for moving lamyai is cited in more detail here, since it represents quite an unusual organization of transportation and supply. Lamyai is a highly seasonal fruit produced in the northern provinces. In 1970, it was available from the end of June until the end of August, although in other years it has lasted until the end of September. The crop also varies a great deal in quantity; for example, 1968 was a bumper year, 1969 saw a very small crop, and 1970 although a better year, produced only about half of the 1968 crop.

During July and August with the arrival of lamyai in Bangkok, the Saha Wattana market at Si Yaek Mahanak presents an unusual sight. Transformed into an auction, sellers in over fifty paeng marking the perimeter of the market stand atop wooden piles of boxes or stands shouting for buyers and at the same time toss sample fruits to the crowd in the center. This crowd not only includes household customers but also other sellers who, having purchased the fruit from sellers at the periphery, are reselling it from baskets on the floor. This frantic pace is generally kept up from three or four o'clock in the morning until noon,

if the trains are on time, and later if they are not. Estimates put lamyai by-passing this market at less than 5 percent.

The network through which most lamyai is supplied is organized through a series of co-operatives. A committee of Bangkok merchants and transporters rent the whole market of Saha Wattana for the duration of the lamyai season and then re-rent the selling spots to local traders. This group works in co-operation with another group of agents, merchants and transporters located in the northern provinces of Chiangmai, Lampang and Lamphun. In this co-operative scheme, the Bangkok group acts as agent, collecting the transport cost from the Bangkok receiver and retaining a fee. The office set up at the market in Mahanak receives from the north lists of senders, amounts and receivers. These are displayed so that the receivers know of the fruit's arrival and can go to the office, clear the transport cost and pick up the lamyai. The northern groups are paid by sending back the receivers' receipts which are redeemable at current market price from deposits already made in northern banks.

Lamyai is transported to Bangkok both by train and by truck, although trains probably carry the larger amount. Informants claimed that during the peak of the season as many as twenty-six goods-waggons carrying from 350 to 360 baskets at 23 kilograms each (or 450 baskets in a large waggon) arrive daily at Paholythin terminal, and another four to six waggons or 1500 to 1600 baskets arrive at Hualamphong. In addition, an extra waggon is occasionally attached to a passenger train. The average, however, is probably closer to sixteen to eighteen freight

waggons arriving daily at Paholythin and 800 to 1000 baskets at Hualamphong. The Express Transport Organization, a government operated transportation company also runs five trucks regularly during the season and up to ten at the peak, and private companies run six or seven trucks regularly and between ten and fifteen at the peak. During the early part of July when the interviews were carried out, eleven trucks were arriving daily; by contrast, during the peak period, some twenty to twenty-five trucks, each with a capacity of about 450 of the 23 kilogram baskets, arrive daily.

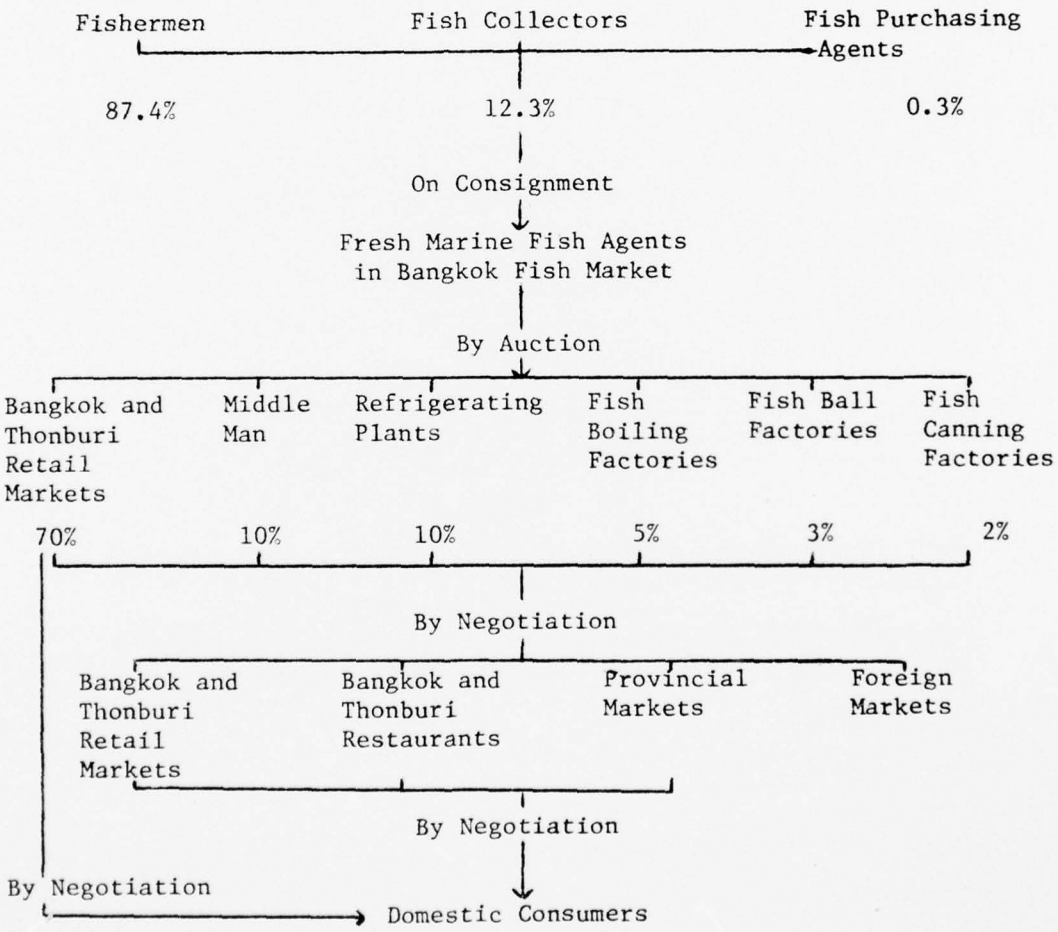
Although transport by regular slow train is by far the least expensive way to ship lamyai and shipment by truck costs slightly less than by express train, the higher rail rate is usually paid (reflecting a premium put on speed of delivery). There is an additional charge for independent operators who arrange and pay their own transport at the source but who use the market facilities in Bangkok.

No other food supplied to the urban area was found to rely on rail transport as heavily as lamyai, nor was this degree of organization of producer-consumer linkages by co-operating wholesalers in both the cities and the provinces evidenced in any of the other commodity supply networks.

APPENDIX 12

FISH MARKETING LINKAGES

FRESH MARINE FISH



Following Fish Marketing Organization of Thailand Annual Statistics

APPENDIX 13

LIVE POULTRY SOURCES OUTSIDE BANGKOK AND THONBURI
SELECTED FROM INTERVIEWS

Location	Chickens	Ducks	Geese
Chonburi	X	X	
Bangkhae	X		
Nong Khem	X		
Phrapadaeng	X		
Kratumben	X		
Angthong	X	XX	X
Ayutthaya	X	X	X
Suphanburi		XX	X
Singburi	X	X	X
Chainat		X	X
Minburi		X	X
Korat	X	X	
Samut Prakan	XX	X	
Bang Na	X	X	
Samut Songkhram	X	X	
Bang Pli	XX	XX	
Lopburi	X	X	
Nakhon Sawan	X	X	
Pitsanuloke	X	X	
Khonkaen	X	X	
Chachoengsao	X	X	
Nakhon Nayok	X		
Samut Sakhon	X		

Location	Chickens	Ducks	Geese
Nakhon Pathon	X		
Surin	X	X	
Photaram	X		
Bangkhen	X		
Oadin (Si Saket)	X	X	
Ratburi		X	
Thonburi		X	

Note: Major sources are shown XX. No attempt at complete coverage was intended.

Source: Interview data, 1970.

SELECTED BIBLIOGRAPHY

Books

Abbott, J. C. Marketing Fruit and Vegetables. 2nd ed. revised. Rome: Food and Agricultural Organisation Marketing Series, No. 2, 1970.

Amyot, Jacques. Changing Patterns of Social Structure in Thailand, 1851-1965: An Annotated Bibliography with Comments. Delhi: UNESCO Research Center, 1965.

Anschel, K. R., Brannon, R. H., and Smith, E. D., eds. Agricultural Cooperatives and Markets in Developing Countries. New York: Praeger, 1969.

Anderson, Worne. Men, Motives, and Markets. Englewood Cliffs: Prentice Hall, 1968.

Artman, Charles E. Food Costs and City Consumers: Significant Factors in Metropolitan Distribution of Perishables. New York: Columbia University Press, 1926.

Bailey, George and McCreary, James. A Survey of Housing in Thailand with Special Emphasis on the Capital City of Bangkok. Bangkok: USOM/Department of Housing and Urban Development, Government of Thailand, 1965.

Bangkok Municipality. Basic Statistics about Bangkok and Thonburi, 1969. Bangkok: Bangkok Municipality Planning Division, n.d. In Thai.

_____. The Greater Bangkok Plan for Year 2,000: Summary of Recommendations. Bangkok: Bangkok Municipality Planning Division, 1970. (Mimeographed.)

_____. Market Regulations. Bangkok: Bangkok Municipality Public Health Division, n.d. (Mimeographed.)

_____. The Municipality of Bangkok 1962. Bangkok: Bangkok Municipality, 1962.

Bartels, Robert. The Development of Marketing Thought. Homewood, Illinois: R. D. Irwin, 1962.

Beckman, Theodore, and Engle, Nathanial, H. Wholesaling: Principles and Practice. New York: Ronald Press, 1937.

Behrman, Jere R. Supply Response in Underdeveloped Agriculture: A Case Study of Four Major Annual Crops in Thailand, 1937-1963. Unpublished Ph.D. dissertation, Department of Economics, Massachusetts Institute of Technology, 1966.

Belshaw, Cyril S. Traditional Exchange and Modern Markets. Englewood Cliffs: Prentice Hall, 1965.

Berry, Brian. Essays on Community Flows and the Spatial Structure of the Indian Economy. University of Chicago Department of Geography Research Paper No. 111. Chicago: University of Chicago Press, 1966.

_____. Geography of Market Centres and Retail Distribution. Englewood Cliffs: Prentice Hall, 1967.

Bliss, Perry, ed. Marketing and the Behavioral Sciences: Selected Readings. 2nd ed. Boston: Allyn and Bacon, 1968.

Bohannan, Paul, ed. Markets in Africa. Evanston, Illinois: Northwestern University Press, 1962.

Breese, Gerald, ed. The City in Newly Developing Countries: Readings on Urbanism and Urbanisation. Englewood Cliffs: Prentice Hall, 1969.

Bangkok Profile: Selected Characteristics of Households in Bangkok and Thonburi. Bangkok: Business Research Ltd., 1966.

Carlton, Bruce D. Thailand Population: Trends, Programs, and Policy. Bangkok: USOM, 1967.

Charoenvithaya, Somsakdi. The Pork Trade in the Bangkok Market, 1959. Unpublished Masters thesis, Faculty of Economics, Kasetsart University, Bangkok, 1959. (In Thai.)

Chuchart, Chaiyong. An Economic Study of Rice Marketing in Thailand. Unpublished Ph.D. dissertation, Department of Agricultural Economics, Louisiana State University, 1957.

Clerc-Péchiné, Nicole. Les Marchés périodiques d'Approvisionnement en Lorraine. Nancy: Centre de Recherches et de Documentation Economiques, 1967-1968.

Clewitt, Richard. "The Clustering of Firms in a Wholesale Fruit and Vegetable Market." Theory in Marketing: Selected Essays. Edited by Revis Cox and Wroe Anderson. Chicago: Irwin, 1950.

Cowan, C. D., ed. The Economic Development of Southeast Asia. London: Allen and Unwin, 1964.

Davis, William George. Interaction and Sociability in a Philippine Market: The Dynamics of Personal Economic Relations. Unpublished Ph.D. dissertation, Department of Anthropology, University of California, Berkeley, 1969.

Day, Ralph, ed. Marketing Models: Quantitative and Behavioral. Scranton: International Textbook Company, 1964.

Deupree, Robert G. The Wholesale Marketing of Fruits and Vegetables in Baltimore. Baltimore: Johns Hopkins Press, 1939.

Dewey, Alice G. Peasant Marketing in Java. Glencoe: Free Press, 1962.

Duddy, Edward A, and Rezven, David. Marketing: An Institutional Approach. New York: McGraw Hill, 1947.

Erdman, Henry E. American Produce Markets. New York: Heath Co., 1928.

Plowman, E. Grovenor, ed. Coordinated Transportation: Problems and Requirements. Cambridge: Cornell Maritime Press, 1969.

Firth, Raymond W. Malay Fisherman: Their Peasant Economy. London: Routledge and Kegan Paul, 1946.

Fryer, D. W. Emerging Southeast Asia: A Study in Growth and Stagnation. New York: McGraw Hill, 1970.

Galaska, Chester F. Continuity and Change in Dalat Plu: A Chinese Middle Class Business Community in Thailand. Unpublished Ph.D. dissertation, Department of Anthropology, Syracuse University, 1969.

Gardiner, Barnum H. Market Centers and Hinterlands in Baden-Württemburg. University of Chicago, Department of Geography Research Paper No. 103. Chicago: University of Chicago Press, 1966.

Geertz, Clifford. Pedlars and Princes: Social Development and Economic Change in Two Indonesian Towns. Chicago: University of Chicago Press, 1963.

Getis, Arthur. A Theoretical and Empirical Enquiry into the Spatial Structure of Retail Activities. Unpublished Ph.D. dissertation, Department of Geography, University of Washington, 1961.

Ghosh, Arabinda. Market Structure of Indian Agriculture: An Analysis. Calcutta: Calcutta World Press, 1963.

Ginsburg, Norton S. Planning the Future of the Asian City. New York: Asia Society, 1969. (Mimeographed.)

Goldstein, Sidney. Urbanisation in Thailand. Bangkok: Chulalongkhorn University, Population Research and Training Centre, 1970.

Goldstein, Sidney. The Demography of Bangkok: A Case Study of Differentials between Big City and Rural Populations. Providence: Brown University Population Research and Training Center, 1971.

Greeley, Roland B. Toward a Plan for the Capital Area. Bangkok: USOM, 1959.

Gupta, Ranjit. Retailing in Metropolitan India. New Delhi: Indian Cooperative Union, 1964.

Hafner, James. The Impact of Road Development in the Central Plain of Thailand. Unpublished Ph.D. dissertation, Department of Geography, University of Michigan, 1970.

Hanneson, Bill. Periodic Markets and Central Places in the Chiquinquira-Ubate Area of the Eastern Cordillera of the Columbian Andes. Unpublished Ph.D. dissertation, Department of Geography, University of Oregon, 1969.

Huack, Hazel, et al. Food Habits and Nutrient Intakes in a Siamese Rice Village: Studies in Bang Chan, 1952-1954. Ithaca: Cornell University Press, 1958.

India, Directorate of Marketing and Inspection. Marketing of Fruits and Vegetables in the Cities of Calcutta, Delhi, Madras, Ammedabad, Poona and Nagpur. Agricultural Marketing Series, No. 149. Delhi: Manager of Publications, 1965.

Ingram, James C. Economic Change in Thailand since 1850. Stanford: Stanford University Press, 1955.

Isaac, Barry La Mont. Traders in Pendembu, Sierra Leone: A Case Study in Entrepreneurship. Unpublished Ph.D. dissertation, Department of Anthropology, University of Oregon, 1969.

Jacobson, Helga Eileen. Tradition and Change in Cebu City: A Study in a Philippine Provincial City. Unpublished Ph.D. dissertation, Department of Anthropology, Cornell University, 1969.

Inoue, Kazuo, and Swegwan Sumon. Economic Survey on Catfish Culture in Suphanburi Province, Thailand. Bangkok: Department of Fisheries, Ministry of Agriculture, 1970.

Kaneda, Hiromitsu. "Long Term Changes in Food Consumption Patterns in Japan." Agriculture and Economic Growth: The Relevance of the Japanese Experience. Edited by Bruce Johnston, and Kazushi Ohkawa. Princeton: Princeton University Press, 1969.

Kannita, Suwanpinit. Vegetable Trade at Central Market in Bangkok 1967-1968. Unpublished B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, Thailand, 1967. (In Thai.)

Kaplan, David. The Mexican Marketplace in Historical Perspective. Unpublished Ph.D. dissertation, Department of Anthropology, University of Michigan, 1960.

Kerblay, Basile H. Les Marches Paysans en URSS. Paris: Mouton, 1968.

Kernan, Jerome B., ed. Perspectives in Marketing Theory. New York: Appleton, 1968.

Krit, Sombutsiri. The Sugar Problem of Thailand. Proceedings of the Fourth Conference on Agricultural Economics, 1965. Bangkok: Agricultural Economics Society of Thailand, 1965.

Kulthongkham, Sawaeng. Rice Is the Strength of Economic Stability. Bangkok: Ministry of Agriculture, 1966. (Mimeographed.)

_____, and Ong, Shao-Er. The Rice Economy of Thailand. Bangkok: Ministry of Agriculture, Division of Agricultural Economics, 1964.

Lakshaman, Tiruvarur Ramaiyer. A Theoretical and Empirical Analysis of Retail Location. Unpublished Ph.D. dissertation, Department of Geography, Ohio State University, 1965.

Litchfield, Whiting, Browne and Associates in association with the Royal Thai Government. Greater Bangkok Plan. Bangkok: Ministry of the Interior, Department of Town and Country Planning, 1959.

_____. Technical Monographs prepared for the Greater Bangkok Plan, 1959 and 1960.

Lord, Jerry Dennis. Regional Marketing Patterns and Locations Advantages in the United States Broiler Industry. Unpublished Ph.D. dissertation, Department of Geography, University of Georgia, 1970.

Martinelli, Patrick Andrew. Marketing in Thailand: A Comparative Analysis with Special Reference to Wholesaling. Unpublished Ph.D. dissertation, Department of Business Administration, Ohio State University, 1968.

McColl, Daniel F. "The Koforidua Market." Markets in Africa. Edited by Paul Bohannan. Evanston, Ill.: Northwestern University Press, 1962.

McGee, T. G. The Urbanisation Process in the Third World: Exploration in Search of a Theory. London: Bell, 1971.

Meadows, Paul, and Mizruchi Ephraim, eds. Urbanism, Urbanisation and Change in Comparative Perspective. Reading, Mass.: Addison-Wesley, 1969.

Mintz, S. "Internal Market System as Mechanisms of Social Articulation." Intermediate Societies, Social Mobility and Communication. Proceedings of the 1959 Meeting of the American Ethnological Society. Seattle: American Ethnological Society, 1959.

Milindankura, Supanee. The Pressures of Nutritional Requirements Increases in Population and Per Capita Income on Thai Agriculture, 1967-1971. Unpublished M.Sc. thesis, Department of Agricultural Economics, Kasetsart University, Bangkok, Thailand, 1969.

Mossman, Frank H., and Morton, Newton. Logistics of Distribution Systems. Boston: Allyn and Bacon, 1965.

Mukwaya, A. B. "The Marketing of Staple Foods in Kampala, Uganda." Markets in Africa. Edited by Paul Bohannan. Evanston, Ill.: Northwestern University Press, 1962.

Muscat, R. J. Development Strategy in Thailand: A Study of Economic Growth. New York: Praeger, 1966.

Nakajud, Arb. Livestock Trading in Thailand. Bangkok: Kasetsart University, 1962. Kasetsart Economic Report No. 10.

_____. The Domestic and Export Market for Thai Hogs and Hog Products. Bangkok: Kasetsart University, 1967.

Naksawasdi, Uthis. A Study of Rice Farmers' Indebtedness and Paddy Marketing in the Central Plain Area of Thailand, 1957-1958. Bangkok: Kasetsart University, 1958. Kasetsart Economic Report No. 3.

_____. Report on Egg Production Conditions in Thailand. Bangkok: Kasetsart University, 1961. (In Thai.)

Narain, Dharm. Distribution of Marketed Surplus of Agricultural Produce by Size Level of Holding in India, 1950-1951. New York: Asia Publishing House, 1962.

National Commission on Food Marketing. Food from Farmer to Consumer. Washington: U.S. Government Printer, 1966.

National Council of Applied Economic Research. Market Towns and Spatial Development in India. New Delhi: Government Printer, 1965.

National Municipal League. The Relation of the City to Its Food Supply. Philadelphia: National Municipal League, 1915.

Nims, Cyrus R. City Planning in Thailand. Bangkok: USOM and Ministry of the Interior, City Planning Office, 1963.

Nongluk, Phanusathien. Production and Distribution of Oranges, Chun Khumwong Co. Ltd. Unpublished B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, 1964. (In Thai.)

Nourse, Edwin G. The Chicago Produce Market. Boston and New York, 1918.

Nutrition Survey: The Kingdom of Thailand. October-December, 1960. Interdepartmental Committee on Nutrition for National Defense. Washington: Department of Defense, 1962.

Onakomaiya, Samuel Onanuga. The Spatial Structure of Internal Trade in Delicacy Foodstuffs in Nigeria. Unpublished Ph.D. dissertation, Department of Geography, University of Wisconsin, 1970.

Organisation for Economic Cooperation and Development. Food Marketing and Economic Growth. Paris: OECD, 1970.

Pallegoix, Jean Baptiste. Déscription du Royaume Thai ou Siam. Paris: 1854.

Pendleton, Robert L., et al. Thailand: Aspects of Landscape and Life. New York: Duell, Sloan, Pearce, 1962.

Phansak, Niratpatanasai. A Survey of Fruit Trade in Bangkok, 1966. Unpublished B.Sc. thesis, Faculty of Agriculture, Kasetsart University, Bangkok, Thailand, 1966. (In Thai.)

Philipp, Perry, and Jatuthong, Vinai. Marketing of Fresh Marine Fishery Products and Government in Thailand. Bangkok: Ministry of Agriculture, Agricultural Economics Division, n.d. (1969 or 1970). (Mimeographed.)

Pitts, Forrest R., ed. Urban Systems and Economic Development. Papers and Proceedings of a Conference on Urban Systems Research in Underdeveloped and Advanced Economies. Eugene: University of Oregon, 1962.

Pradith, Prachongphim. Market Situation of Agricultural Products at Mahanak Market, 1959. Unpublished B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, Thailand, 1959. (In Thai.)

Poonanatnurak, Prakarn. The Development of City Zoning in Bangkok Metropolitan Area. Unpublished Masters thesis, Institute of Public Administration, Thammasat University, Bangkok, Thailand, 1960.

Prasarn, Watanakul. Production and Situation of Coconut, 1964. Unpublished B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, Thailand, 1964. (In Thai.)

Price, Hugh B., ed. The Marketing of Farm Products: Studies in the Organisation of the Twin Cities Market. Minneapolis: University of Minnesota Press, 1927.

Promsiri, Atinat. Beef Trade in the Bangkok Market. Unpublished B.Sc. thesis, Kasetsart University, Bangkok, Thailand, 1959. (In Thai.)

Promsiri, Trirat. Thailand's Transition: A Study of the New Approach of Developing Countries. Bangkok: Prae Pittaya Ltd., 1965.

Purcell, Victor. The Chinese in Southeast Asia. London: Oxford University Press, 1951.

Rattarasan, Sushep. "History of the Pork Trade of Thailand." Pig Husbandry. Vocational Education Department. Bangkok: Kasetsart University, 1967.

Revzan, David A. Wholesaling in Marketing Organisation. New York: Wiley, 1961.

Rimmer, Peter J. Transport in Thailand: The Railway Decision. Canberra: Australian National University, 1971.

Rogers, Andrei. A Stochastic Analysis of Intra-Urban Retail Spatial Structure. Unpublished Ph.D. dissertation, Department of Geography, University of Nebraska, 1964.

Ryan, John, and Sher, Edgar. Administration of the Bangkok Municipality. Bangkok: Institute of Public Administration, Thamassat University, 1958.

Sanittanont, Sura. Thailand's Rice Export Tax: Its Effect on the Rice Economy. Bangkok: Kurusapha Press, 1967.

Setteeton, Radom. Street Administration in the Bangkok Metropolitan Area. Unpublished thesis, Institute of Public Administration, Thammasat University, Bangkok, Thailand, 1960.

Sherman, Wells A. Merchandising Fruits and Vegetables: A New Billion Dollar Industry. New York: Shaw, 1928.

Silcock, Thomas Henry. Social and Economic Studies in Development. Canberra: Australian National University Press, 1967.

_____. The Economic Development of Thai Agriculture. New York: Cornell University Press, 1970.

Silverman, S. F. "Some Correlates of the Cyclical Market." Intermediate Societies, Social Mobility and Communication. Edited by Verne Ray. Seattle: American Ethnological Society, 1959.

Siripak, Wiwat. Patterns and Correlates of Internal Migration in Thailand. Unpublished thesis, Department of Sociology, University of Chicago, 1965.

Skinner, G. W. Chinese Society in Thailand: An Analytical History. Ithaca: Cornell University Press, 1957.

_____. Leadership and Power in the Chinese Community of Thailand. Ithaca: Cornell University Press, 1958.

Smith, Vernon Arthur. Beef Cattle Production and Marketing in Guancaste, Costa Rica. Unpublished Ph.D. dissertation, Department of Geography, University of Florida, 1970.

Somboonsong, Boontham. Diffusion of Consumer Durable Goods in Thailand: A Case Study of Bangkok and Thonburi Metropolitan Area. Unpublished Ph.D. dissertation, Department of Economics, University of Pennsylvania, Philadelphia, 1965.

Somnuk, Sriplung. Potentials in the Economic Development of Thailand's Agriculture. Bangkok: Ministry of Agriculture, Agricultural Economics Division, 1968.

Srivastava, Rama Singh. Agricultural Marketing in India and Abroad. Bombay: Vora, 1960.

Stasch, Stanley F. Systems Analysis for Marketing Planning and Control. Glenview, Ill.: Scott, Foresman & Co., 1972.

Steinberg, David J. In Search of Southeast Asia: A Modern History. New York: Praeger, 1971.

Sternstein, Larry. Greater Bangkok Metropolitan Area Population Growth and Movement 1956-1960 and Research for Planning: The Traffic Problem. Greater Bangkok Metropolitan Area Population Studies No. 2. Bangkok: Bangkok Municipality, 1969.

_____. Greater Bangkok Metropolitan Area Migration and Research for Planning: A Remark. Greater Bangkok Metropolitan Area Population Studies No. 3. Bangkok: Bangkok Municipality, 1969.

_____. Planning the Developing Primate City: Bangkok 2000. Department of Geography Occasional Paper No. 9. Canberra: Australian National University, 1971.

Suavaluck, Piampiti. Demographic Aspects of Urbanisation in Thailand. Unpublished thesis, Department of Sociology, University of Chicago, 1963.

Sombhatpiem, Suphat. Market Organisation and Vegetable Market in Bangkok, 1960. Unpublished B.Sc. thesis, Faculty of Economics and Business Administration, Kasetsart University, Bangkok, Thailand, 1960. (In Thai.)

Thailand, Government. Annual Statistics. Fish Marketing Organisation.

_____. Annual Reports: Rice Department.

_____. Thailand Yearbook, 1968.

_____. Economic Survey of the Indian Urban Dairy Farming in Bangkok. Ministry of Agriculture, Division of Agricultural Economics, 1962.

_____. Preliminary Report of the 1970 Population and Housing Census of Thailand. National Statistical Office, 1970.

_____. Some Important Statistics of Thailand, 1968-1969. National Statistical Office, n.d.

_____. Household Expenditure Survey B.E. 2505, Advance Report: Bangkok-Thonburi Municipal Area. National Statistical Office, n.d. (In Thai.)

_____. Supplementary Report for the Consideration of Rice Trade Policy, B.E. 2513. National Statistical Office, 1969.

The Thaiway System: A Feasibility Study of a High Speed Ground Transportation System for the Greater Bangkok Metropolitan Area. Bangkok: Asian Institute of Technology, 1970.

Thananiwet, Chinaphan. Chonburi Sugar Cooperative, 1960-1965. Bangkok: Kasetsart University, 1966.

Thomas, Richard S. Broiler Production Plan for Thailand. Bangkok: USOM, 1966.

Transportation Consultants, Inc. Urban Transportation Facilities in Bangkok Metropolitan Area: A Report to His Excellency the Minister of Communications, Government of Thailand. Washington, 1959.

_____. A Comprehensive Evaluation of Thailand's Transport System Requirements. Washington, 1959.

Underwood, Frances W. The Marketing System in Peasant Haiti. Yale University Publications in Anthropology No. 60. New Haven: Yale University Press, 1960.

Vance, James E. The Merchant's World: The Geography of Wholesaling. Englewood Cliffs: Prentice Hall, 1970.

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Vilekhakarn, Charassri Suphakij. The Beef Trade in Thailand 1959. Unpublished B.Sc. thesis, Kasetsart University, Bangkok, Thailand, 1959. (In Thai.)

Wahlberg, Harold, et al. Citrus Growing in Thailand. Bangkok: Niyomkij Press, 1957.

Wajanawarirat, Wiramit. Characteristics of Sugar Demand of Consumers in Amphur Pom Prab Sattrupai, 1965-1967. Bangkok: Kasetsart University, Faculty of Agricultural Economics and Cooperatives, 1967.

Wallace, W. M. Transportation Sectoral Goals and Strategy: A Reappraisal. Bangkok: USOM, 1969.

Wann, John L. Thailand Produce Markets. Bangkok: USOM, 1963.

Ward, Richard J. The Challenge of Development: Theory and Practice. Chicago: Aldine, 1967.

Wichai-Angkhanarah, Thanit. Production and Trade in Coconut Sugar, Tambon Plai Phong Phang, Amphawa, Samut Songkhram. Bangkok: Kasetsart University, Faculty of Agricultural Economics, 1966.

Wilbanks, Thomas John. Accessibility and Agricultural Development: A System Approach to an Aspect of the Economic Development Process. Unpublished Ph.D. dissertation, Department of Geography, Syracuse University, 1969.

Articles

Abu-Lughod, Janet L. "Urbanisation in Egypt: Present State and Future Prospects." Economic Development and Cultural Change, XIII (April, 1965), 313-344.

Agarwal, P. C. "Weekly Market Size and Service Area in Sastar District, Madhya Pradesh." Indian Geographical Journal, XLIII (January-December, 1968), 29-33.

Angelli, J. P. "The Food Problems of Brazilian Cities." Geographical Review, L (July, 1960), 432-434.

Ayal, Eliezer B. "Some Crucial Issues in Thailand's Economic Development." Pacific Affairs, XXXIV (Summer, 1961), 157-164.

_____. "Value Systems and Economic Development in Japan and Thailand." Journal of Social Issues, XIX (January, 1963), 35-51.

Barton, Thomas Frank. "Rainfall and Rice in Thailand." Journal of Geography, LXII (December, 1963), 414-418.

Barton, Thomas Frank. "Railroads of Southeast Asia." Journal of Geography, LIX (January, 1960), 21-34.

Bellett, J. "Singapore's Central Area Retail Pattern in Transition." Journal of Tropical Geography, XXVIII (June, 1969), 1-16.

Berry, Brian. "City Size Distribution and Economic Development." Economic Development and Cultural Change, IX (July, 1961), 573-588.

Boventer, Edwin. "Spatial Organisation Theory as a Basis for Regional Planning." Journal of the American Institute of Planners, XXX (May, 1964), 90-100.

Chatterajee, Amiya Bhusan. "Hinterland of a Symbiotic City, a Case Study (Howrah)." Geographical Review of India, XXVII (June, 1965), 55-71.

Chayabutra, Chuwongse. "Metropolitan Bangkok and Its Developments." Journal of Social Sciences, Bangkok (May, 1965), p. 9.

Coughlin, R. J. "The Status of the Chinese Minority in Thailand." Pacific Affairs, XXV (December, 1952), 378-389.

_____. "Chinese in Bangkok: A Commercial Oriented Minority." American Sociological Review, XX (June, 1955), 311-316.

Cowgate, D. O. "Social Distance in Thailand." Social and Sociological Research, LII (July, 1968), 363-376.

Duddy, Edward A., and Revzan, David A. "The Physical Distribution of Fresh Fruits and Vegetables." Journal of Business (University of Chicago), X (January, 1937), 1-95.

Duddy, Edward A. "The Use of Transportation Facilities in the Chicago Fruit and Vegetable Market." Journal of Business (University of Chicago), XIII (July, 1940), 1-86.

Dutt, Ashok K. "Daily Shopping in Calcutta." Town Planning Review, XXXVII (October, 1966), 207-216.

_____. "Daily Shopping in Howrah City: A Study in Social Geography and Town Planning." National Geographical Journal of India, XII (September, 1966), 163-177.

_____. "Intra-city Hierarchy of Central Places: Calcutta as a Case Study." Professional Geographer, XXI (January, 1969), 18-22.

Embree, John F. "Thailand--A Loosely Structured Social System." American Anthropologist, LII, No. 2 (1950), 181-193.

Epstein, Bart J. "External Relations of Cities." Journal of Geography, LXVIII (March, 1969), 134-147.

Eyre, J. D. "Sources of Tokyo's Fresh Food Supply." Geographical Review, XLIX (October, 1959), 455-474.

Fryer, D. W. "The Million City in Southeast Asia." Geographical Review, XLIII (October, 1953), 474-494.

Geertz, Clifford. "The Development of the Javanese Economy. The Rotating Credit Association: A Middle Ring in Development." Economic Development and Cultural Change, X (April, 1962), 241-263.

Goldstein, Sidney. "Urbanisation in Thailand 1947-1967." Demography, VIII (May, 1971),

Ginsburg, Norton S. "The Great City of Southeast Asia." American Journal of Sociology, LX (March, 1955), 455-462.

Hamill, Louis. "Are Formal Theories Needed in Marketing Geography?" Professional Geographer, XVII (March, 1965), 11-13.

Hanks, L. M. "Merit and Power in the Thai Social Order." American Anthropology, LXIV (December, 1962), 1247-1261.

Hodder, Brian W. "Distribution of Markets in Yorubaland." Scottish Geographical Magazine, LXXXI (April, 1965), 48-58.

Isard, Walter. "Location Theory and Trade Theory." The Quarterly Journal of Economics, LXVIII (May, 1954), 305-324.

Johnston, Bruce F. "Agriculture and Structural Transformation in Developing Countries: A Survey of Research." Journal of Economic Literature, VIII (June, 1970), 369-404.

Katzin, M. "The Business of Higgling in Jamaica." Social and Economic Studies, IX (September, 1960), 297-331.

Keyfitz, Nathan. "The Ecology of Indonesian Cities." American Journal of Sociology, LXVI (January, 1961), 348-354.

Khan, Fazle Karim, and Makbubut, Haq. "Market Gardening In and Around Dacca City." Oriental Geographer, V (January, 1961), 1-20.

Khan, Fazle Karim, and Khain, Mohammad Hossain. "Delimination of the Umland of Greater Dacca." Oriental Geographer, V (July, 1961), 95-102.

Khan, Fazle Karim. "Food Markets in Dacca City." Oriental Geographer, VII (July, 1963), 125-139.

Krishnan, Gopal. "Spatial Analysis of Vegetable Supply of a Planned City--Chandigarh." Indian Geographical Journal, XXXVIII (January-March, 1963), 1-15.

Mayer, Harold. "Urban Geography and Urban Transport Planning." Traffic Quarterly, XVII (October, 1963), 610-31.

McIntyre, Wallace E. "The Retail Pattern of Manila." Geographical Review, XLV (January, 1955), 66-80.

Mehta, Surinder K. "Some Demographic and Economic Correlates of Primate Cities: A Case for Reevaluation." Demography, I (1964), 136-147.

Mikesell, Marvin. "Market Centers of Northeastern Spain." Geographical Review, L (April, 1960), 246-251.

_____. "The Role of Tribal Markets in Morocco." Geographical Review, XLVIII (October, 1958), 494-511.

Mintz, Sidney. "Role of the Middleman in the Internal Distribution System of a Carribean Peasant Economy." Human Organisation, XV (Summer, 1956), 18-23.

Mukhopadhyaya, Tarasish. "Ecology and Markets in Eastern Midnapur." Man in India, XLVII (January-March, 1967), 61-73.

Mukerji, A. B. "The Umland of Modinagar." National Geographical Journal of India, VIII (September-December, 1962), 250-269.

Murdie, Robert A. "Cultural Differences in Commercial Travel." Economic Geography, XLI (July, 1965), 211-233.

Mury, Frances. "Bangkok." Revue de Geographie, LII (January, 1903), 39-58.

Neale, Walter C. "Kurali Market: A Report on the Economic Geography of Marketing in Northern Punjab." Economic Development and Cultural Change, XIII (January, 1965), 129-168.

Neville, R. J. W. "The Pineapple Canning Industry of Malaya." Oriental Geographer, VII (January, 1963), 59-82.

Oshima, Harry T. "Food Consumption, Nutrition and Economic Development in Asian Countries." Economic Development and Cultural Change, XV (July, 1967), 385-397.

Patel, Ahmed M. "The Rural Markets of Rajahahi District." Oriental Geographer, VII (July, 1963), 140-151.

"Profile of Bangkook Boom." Asian Industry (May, 1968), 5 pp.

Purcell, J. C., and Rauniker, Robert. "Quantity-Income Elasticities for Food by Level of Income." Journal of Farm Economics, XLIX (December, 1967), 1410-1414.

Pyle, Jane. "Farmer's Markets in the United States: Functional Anachronisms." Geographical Review, LVI (April, 1971), 167-197.

Randhawa, N. S., and Heady, Earl O. "Spatial Programming of Production for Agricultural Development in India." Indian Journal of Agricultural Economics, XXI (July-September, 1966), 14-22.

Sendut, Hamzah. "Contemporary Urbanisation in Malaya." Asian Survey, VI (September, 1966), 484-491.

Sermanti, E. "Agriculture in Areas of Urban Expansion: An Italian Study." Journal of Town Planning Institute, LIV (January, 1968), 15-17.

Siddall, William R. "Wholesale-Retail Trade Ratios as Indices of Urban Centrality." Economic Geography, XXXVII (April, 1961), 124-132.

Siegal, B. J. "Role of Perception in Urban Rural Change: Brazilian Case Study." Economic Development and Cultural Change, III (April, 1957), 244-256.

Skinner, G. William. "Marketing and Social Structure in Rural China." Parts I, II and III, Journal of Asian Studies, XXIV (November, 1964; February, 1965; May, 1965), 3-44; 195-228;

_____. "The Thailand Chinese: Assimilation in a Changing Society." Asia (Autumn, 1964), 80-92.

_____. "Chinese Assimilation and Thai Politics." Journal of Asian Studies, XVI (February, 1957), 237-250.

Spencer, J. E. "Seasonality in the Tropics: The Supply of Fruit to Singapore." Geographical Review, XLIX (October, 1959), 475-484.

Sternstein, Larry. "Contemplating a Hierarchy of Centres in Thailand." Pacific Viewpoint, VII (September, 1966), 229-235.

_____. "A Critique of Thai Population Data." Pacific Viewpoint, VI (May, 1965), 15-35.

Strohkarck, Frank, and Phelps, Katherine. "The Mechanics of Constructing a Market Area Model." Journal of Marketing, XII (April, 1948), 493-496.

Sukrke, Astri. "The Thai Muslims: Some Aspects of Minority Integration." Pacific Affairs, XLIII (Winter, 1970-1971), 531-547.

"Supermarketing for Homesick Housewives." The Investor (Bangkok) (February, 1969), 2 pp.

Taffe, Edward, Morrill, R. J., and Gould, P. R. "Transport Expansion in Underdeveloped Countries (Ghana and Nigeria): A Comparative Analysis." Geographical Review, LIII (October, 1963), 503-529.

Tamaskar, B. G. "The Weekly Markets of the Sagar-Damoh Plateau." National Geographical Journal of India, XII (March, 1966), 38-50.

Wake, William W. "The Causal Role of Transportation Improvements in Agricultural Change in Madhya Pradesh, India, 1854-1954: A Type Study." Indian Geographical Journal, XXXVII (October-December, 1962), 133-152.

Ward, Marion. "Port Swettenham and Its Hinterland, 1900-1960." Journal of Tropical Geography, XIX (December, 1964), 69-78.

Ullman, Edward. "Trade Centers and Tributary Areas of the Philippines." Geographical Review, L (April, 1960), 203-218.

Utaya, Preecha. "A Study on the Production and Marketing of Watermelon in the Northeast of Thailand in 1964." Agricultural Economics Research Journal (December, 1964), 18 pp.

White, H. P. "Internal Exchange of Staple Foods in the Gold Coast." Economic Geography, XXXII (April, 1956), 115-125.

ABSTRACT

As part of a larger problem of food supply and distribution to urban areas, this study describes from an urban perspective the supply linkages between fresh food markets in Bangkok and Thonburi, Thailand, and the sources of the foods which are sold in them. By establishing the primary and secondary urban foci for seven commodity groups commonly found in markets, the locational focussing of the multi-braided supply and distribution channels is specified. Commodity linkages are also traced outside the cities to source areas in order to understand the operation and functioning of the informational, transportation and organizational linkages by which food is moved to city markets. From this information, changes in both sources of supply and the transport system used are identified, and the impact of such changes on the continued smooth functioning of the supply and particularly the distribution network in the two cities is discussed.

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