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POPULATION OF THAILAND**



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POPULATION OF THAILAND

**ECONOMIC AND SOCIAL COMMISSION
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PREFACE

As part of the work programme of the Economic and Social Commission for Asia and the Pacific (ESCAP), the secretariat's Population Division has undertaken the preparation and publication of a series of country monographs on the population situation of each interested country in the region. Each monograph is being prepared in close co-operation with country experts and with the financial support of the United Nations Fund for Population Activities (UNFPA). The present monograph on Thailand is the third in the series. The first on Hong Kong and the second on the Republic of Korea have been published. Work is in progress on similar studies for Sri Lanka, Philippines, Japan and Nepal. In addition, monographs on other countries will be prepared as the resources of the secretariat permit.

The purpose of the monographs is to provide a comprehensive picture of past, current and prospective population trends in the countries, as well as a basis for measuring such human needs as health services, housing, education, employment and family planning in terms of the size, growth and basic composition of the population. Changes and trends in these characteristics over a period of time are measured in terms of geographic distribution of the population to enable planners to determine regional needs within each country.

The present monograph was prepared in close co-operation with the National Statistical Office, Office of the Prime Minister; the National Economic and Social Development Board; the Ministry of Education; the Ministry of Public Health; National Institute of Development Administration; National Housing Authority, the Institute for Population and Social Research, Mahidol University and the Institute of Population Studies, Chulalongkorn University. The timely production and availability of the tabulations of the 1970 Population and Housing Census data greatly facilitated the preparation of this monograph. The country experts collaborating in the study were:-

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Mrs. Anuri Wanglee also reviewed the final drafts of the constituent chapters of the monograph. Dr. Visid Prachuabmoh, Dean, the Graduate School, Chulalongkorn University gave helpful comments on the earlier drafts of the chapters on Internal Migration and Sources of Data.

The assistance of the Government of France in providing ESCAP with the expert services of Mr. Jean-Pierre Bourlier on a non-reimbursable loan basis is gratefully acknowledged.

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Abbreviations

- DSCS** - The Development Support Communication Services
- FP** - Family Planning
- IEC** - Information, Education and Communication
- IPS** - Institute of Population Studies, Chulalongkorn University
- IUD** - Intra-uterine Device
- MCH** - Maternity and Child Health
- MOPH** - Ministry of Public Health
- NESDB** - National Economic and Social Development Board
- NFPP** - National Family Planning Project
- NHA** - National Housing Authorities
- NSO** - National Statistical Office
- PL** - Public Law
- PPAT** - The Planned Parenthood Association of Thailand
- SPC** - The Survey of Population Change
- REDPHE** - Regional Education Development Plan Including Higher Education
- UNFPA** - United Nations Funds for Population Activities
- UNICEF** - United Nations Children's Fund
- USAID** - United States Agency for International Development

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INTRODUCTION

A. GEOGRAPHICAL FEATURES

Thailand^{1/} is a tropical country in the Indo-Chinese Peninsula of Southeast Asia and is situated between 5° and 21° north latitude, and 97° and 106° east longitude. It is bordered by the Lao People's Democratic Republic and Democratic Kampuchea on the north and east, Malaysia and the Gulf of Thailand on the south and Burma on the west. There are three natural inland boundaries: (a) the Mekong which flows between Thailand and the Lao People's Democratic Republic for about 50 miles on the north and more than 450 miles on the east; (b) the watershed of the Bilaukaung Range, which lies between Thailand and southern Burma; (c) the Salween River which flows between northwestern Thailand and Burma for a short distance. Thailand's coastline is roughly 1,875 kilometres on the Gulf of Thailand and about 740 kilometres on the Indian Ocean.

The Kingdom of Thailand covers about 200,000 square miles or 514,000 km², an area slightly smaller than France. The country's greatest distance from north to south is about 1,000 miles or 1,650 kilometres and from east to west is 500 miles or about 800 kilometres. It consists of two distinct parts: one is the valley of the Chao Phraya River (sometimes spelled Chao Phya) and the Korat Plateau which forms a compact area; the other is the extension more than 1,000 kilometres long as far as the Malaysian frontier. On the map, Thailand looks somewhat like a tree with a long trunk topped by a mass of leaves, or an ancient axe, or the head of an elephant, symbolic to the Thai people of good fortune.

The pattern of rivers and mountains divide the country into four natural regions: (a) the Northern Region; (b) the Northeast Region (principally the Korat Plateau); (c) the Central Region or the Chao Phraya basin; and (d) the Southern Region or the Peninsula. "These terrain regions have little significance in civil or military administration, but their descriptive names are frequently used in presenting various types of information and in defining locations".^{2/}

The relief of the Northern Region, which has an area of about 170,006 km² forms part of the edge of

the Himalayan chain. With a north-south alignment, the mountains have an average height of 1,000-2,000 metres and the country's highest mountain, Doi Intharnon rises to a height of about 8,500 feet or 2,576 metres above sea level. The western-most ridges continue southward to form the backbone of the Malay Peninsula. The region is drained by numerous streams, those in the extreme north joining the Mekong; those of the west join the Salween river, but a large number (Ping, Wang, Yom, Nan and Pa Sak) flow south to form the Chao Phraya River. The teak forested uplands of the north are relatively sparsely settled and transportation is often difficult, although there are fertile crowded valleys where the majority of the population cultivate rice on small, well irrigated holdings.

Northeast Thailand which is about 170,226 km² in area, is a flat limestone plateau with poor soil and insufficient irrigation. "The rivers which cut across it are tributaries of the Mekong and rise in the mountains of Phetchabun. These form the western flanks of the Mekong basin, and separate it from the Menam Chao Phya basin. To the south, the Dangrek chain forms the frontier between Thailand and Cambodia".^{3/}

The Northeast is a dry, often rather salty area, with population fairly dense in the river valleys, but spreading out into more arid areas over the years with the growth of population. Natural vegetation is limited to scrub forests, weeds and grasses. The soil is not everywhere infertile and some parts give a good harvest when the monsoon rains are sufficient. Until recently, glutinous rice was chiefly cultivated in this area, but other crops, notably corn, kenaf and tapioca, are also being grown in large quantities.

The Central Region or the Chao Phraya basin, with an area of about 103,579 km² forms the political and economic heart of Thailand. This flat alluvial plain stretches from the foothills of the northern mountains at Uttaradit to the Gulf of Thailand. The general flatness of the alluvial basin is interrupted occasionally by small but abruptly rising hills. Jutting into the southeastern part of the region is an extension of the Cardamom mountains of the Southwestern area of Democratic Kampuchea. The low

^{1/} Thailand is the name for the country earlier known to outsiders as Siam.

^{2/} John W. Henderson and others, *Area Handbook for Thailand* (Washington D.C., United States Government Printing Office, 1971), p. 8.

^{3/} Achille Clarac and Michael Smithies, *Discovering Thailand, A Guide Book* (Bangkok, Siam Communications, 1972), p. 15.

gradient of the river valley enables it to be flooded annually by the monsoon rains making it one of the most fertile areas for rice cultivation. Indeed this has made Thailand the world's most important rice exporter. The special needs of rice cultivation make the inhabitants of the lower part of the valley of the Chao Phraya a waterborne population. In the well-watered coastal plains of the southeast, tapioca, rubber, pepper and tropical fruits are the principal products.

The Southern Region or Peninsular Thailand has an area of about 70,189 km² and was acquired in the expansion of the Thai Kingdom down the Malay Peninsula between the fifteenth and nineteenth centuries. "The mountains of southern Thailand are of alternately limestone and crystalline rocks reaching a height of 1,500 metres. They are easy to cross and form no serious obstacle to transport. The Indian Ocean side, which is better watered, lends itself to production of rubber and oil palms while the Gulf side produces rice. The production of tin, which exists in quantity in the valleys and in the under water deposits near the coast, is the principal wealth of the area."^{4/}

B. CLIMATE

Since Thailand is situated very close to the equator, and the altitude of most of the country is close to sea level, high temperatures and high humidity prevail generally. The average temperature is about 82°F. However, given the extension of the country from north to south, the climate varies considerably according to latitude. In the Central Region, the average temperature has ranged between 80°F and 100°F during the wet monsoon period. In the dry season the average temperature has varied between 57° and 90°. In the north and northwest, the variation is much greater. For instance, Chiang Mai has a mean annual temperature of 77.8° and mean range of 14°. The most constant temperature is in the Southern Region where the daily range is rarely more than 14° and the annual maximum and minimum temperatures are 68° and 95° respectively.

Climatic variations are most important in terms of rainfall particularly in areas which are not affected by the annual flooding of the Chao Phraya river. Thailand has three seasons: hot and relatively dry from March to May, rainy from June to October and cool from November to February. The dry season is very short in the south and southeast where the annual rainfall can in some parts exceed 6,000

mm. In central Thailand 125 days of rain bring 2,000 mm per year while in the north, with 100 days of rain, there are only just over 1,000 mm rainfall a year. A summary of 1961 and 1971 meteorological data for 12 selected stations is given in table 1.

Although the dominant rainfall distribution pattern is based upon the monsoon winds and the location of the mountains, there are cyclonic variations. Thailand is influenced by side eddies from the southern Asiatic winter cyclonic storm belt which extends from northeastern India to southwestern China. Afternoon and early evening thunderstorms are common in the northern areas between May and October and in the south between March and November. Typhoons of considerable violence sweep across the Indo-Chinese Peninsula from the South China Sea into Thailand both towards the end of the dry season and at the end of the rainy season.

C. HISTORY

The history of Thailand is, at least in the earliest periods, very uncertain. When the Burmese took Ayutthaya for the second time in 1767, many of the official records and annals were destroyed. Though several efforts were subsequently made to reconstitute these records, their sources are weak and their chronology is sometimes debatable. Thus, the Thai historical record for the most part, has been based on orally repeated legends rather than on factual investigation. Accurate and fairly complete records date only from 1767.

The people of Thailand appear to have originated in China and like the Chinese, the Thais are of Mongolian stock. They migrated southward along the Yangtse valley and settled in the area now known as Thailand. "In historic times, the influence of Indian civilizations was the first which was felt in what we know today as Thailand and which was then occupied by Mons. These people, about whom relatively little is known, were a vehicle of Indianisation in the region. They borrowed from the neighbouring sub-continent the civilization which was then superior in its religion, writing, political structure and technical progress. Chinese sources first mention the existence of a Buddhist Davaravati kingdom in the 7th century in the Menam Chao Phya valley. This state and those which preceded it were under the fairly lax suzerainty of Funan, the site and extent of which are still the subject of debate, but which probably covered contemporary Cambodia and the centre of modern Thailand."^{5/}

^{4/} *Ibid.*, p. 16.

^{5/} *Ibid.*, p. 17.

Table 1. Temperature and rainfall at selected stations, 1961 and 1971

Station and year		Temperature (° C)			Rainfall		Mean relative humidity (percentage)
		Mean maximum	Mean	Mean minimum	Amount (mm)	Number of days	
Central Region							
Phra Nakhon	1961	32.1	27.9	23.6	1,458.1	135	74.3
	1971	32.1	27.7	23.3	1,483.9	132	79.4
Sattahip	1961	33.1	28.9	24.7	914.4	115	71.7
	1971	32.2	28.1	24.0	1,915.1	98	77.5
Chanthaburi	1961	31.5	27.1	22.7	2,910.2	189	78.4
	1971	30.7	26.6	22.5	2,289.3	167	80.5
Aranyaprathet	1961	32.9	27.6	22.2	1,533.9	135	72.6
	1971	32.1	26.9	21.6	1,483.9	137	76.1
Northern Region							
Nakhon Sawan	1961	33.4	28.1	22.7	1,035.9	102	67.7
	1971	33.0	27.5	22.0	994.8	104	70.7
Uttaradit	1961	33.5	27.1	20.6	1,797.6	143	72.5
	1971	32.5	26.6	20.6	1,740.4	132	74.6
Chiang Mai	1961	31.0	25.5	20.0	1,575.8	138	70.7
	1971	31.0	25.0	19.0	1 453.0	127	74.2
Northeast Region							
Udon Thani	1961	32.8	27.1	21.3	1,554.8	132	69.7
	1971	30.7	26.0	21.3	1,494.8	119	70.6
Nakhon Ratchasima	1961	32.6	27.0	21.4	949.6	116	67.9
	1971	32.2	26.6	20.9	1,020.8	109	72.3
Southern Region							
Bandon	1961	31.7	26.9	22.0	1,403.3	177	76.7
	1971	31.3	26.7	22.0	2,002.5	147	81.1
Phuket	1961	31.3	27.7	24.0	1,826.8	168	75.7
	1971	31.1	27.4	23.7	3,286.5	...	75.0
Songkhla	1961	31.5	27.7	23.8	2,114.1	176	76.1
	1971	31.4	27.5	23.6	2,416.2	148	78.5

Source: Government of Thailand, *Statistical Yearbook- Thailand No. 30:1972-1973* (Bangkok, National Statistical Office, 1975), table 6.

According to legends, the earliest known Thai kingdom of Nanchao was established in the mid-seventh century A.D. in the present day Chinese province of Yunan. This kingdom which lasted until the mid-thirteenth century is said to have successfully resisted Chinese efforts at reconquest in 751 and 754. During this period, the kingdom successfully retained its Thai characteristics in spite of slowly penetrating Chinese influence. However, in 1253, the Thais were driven out of Nanchao by Mongol-Chinese armies under Kublai Khan. A mass migration took place southward into the area now known as Thailand.

The migrants settled in the fertile Chao Phraya River valley where in 1238, after defeating the Khmers, who at that time ruled the valley, and freeing the Thai principalities from the Cambodian yoke, the Thais founded Sukhothai, capital of the first integrated Thai kingdom.

The most important ruler during the Sukhothai period (1238-1350) was King Ramkhamhaeng who was the first Thai king to be accorded the title of the Great. During his reign, Sukhothai was an extensive kingdom, bordering to the north on Lannathai and in the east on Vientiane, covering in the south the Malay peninsula and including in the west, Tennesserim, Tavoy, Martaban and Pegu. Besides being a valiant warrior, a wise statesman and a brilliant diplomat, King Ramkhamhaeng was also a far-sighted scholar. Realizing the importance of a national language as a unifying force of his people as well as a symbol of their independence, he created in 1283, the first Thai alphabet, using as a basis, the Mon and Khmer scripts which had in turn been derived from a south Indian script. It was also during his reign that Buddhism was imported from Sri Lanka.

After the death of King Ramkhamhaeng, Sukhothai began to decline and finally came under the sovereignty, towards 1350, of the Prince of U Thong who had in the meantime established his capital at Ayutthaya. The Thais thus made a further step to the south. Under the Prince of U Thong, who was proclaimed King Rama Thibodi I, Ayutthaya grew in wealth and strength. It seized the Khmer possession of Lop Buri to the north and Chanthaburi to the southeast and eventually asserted authority over the Cambodian vassal States. It was during the Ayutthaya period (1350-1767) that Thailand entered into foreign trade with the Dutch, English, Japanese and French.

In 1767, Ayutthaya fell to the Burmese and was almost totally destroyed. However, a general, Phya Taksin, escaped with 500 followers. He was soon able to raise a force strong enough to drive the Bur-

mese invaders out of the city. He established his capital at Thon Buri, today part of the capital city of Bangkok, where he was crowned king. King Taksin was succeeded by one of his generals, Phya Chakri who established his capital at Bangkok in 1782. Phya Chakri who was crowned with the name of Pra Buddha Yodfah (1782-1809) founded the Chakri dynasty which reigns in Thailand today and which uses the name of Rama, the legendary hero of the Thai literary epic.

Until 1932, the form of government in Thailand was an absolute monarchy. Thailand became a constitutional monarchy on 24 June 1932 during the reign of Rama VII, after a revolution. After the abdication of Rama VII on 2 March 1935, he was succeeded by his nephew, Ananda Mahidol, who reigned from 1935 to 1946. His brother, the present monarch, H.M. King Bhumipol Adulyadej, is the ninth king of the Chakri dynasty.

It is of interest to note that the Thais have preferred to call their country by the official name of the current capital. Thus, during the Sukhothai period (1238-1378), it was known as the Kingdom of Sukhothai. When Ayutthaya became the capital, (1350-1767), it was the Kingdom of Ayutthaya. Siam became the official name of the country only during the reign of the fourth king of the Chakri dynasty. Muang Thai has been the popular name of the country from ancient times. "Muang" corresponds to "land" and "Thai" to "free", that is, "Land of the Free," and aptly so, since Thailand has always been independent and is the only nation in Southeast Asia that has never been a Western colony. In 1938, the name Siam was changed to Thailand and except for a brief period, 1946-1948, Thailand has been the official name of the country ever since.

D. PEOPLE

The population of Thailand, which was about 17.6 million immediately after the Second World War, numbers over 42 million. This rapid increase has largely been due to advances in personal hygiene and medical services which caused a fall in the number of deaths, particularly among children. The rural population forms some 85 per cent of the people, the highest rural density of the population, 46 persons per km², being found in the rice growing area of the Chao Phraya river basin and the fertile valleys of the north, mostly near Chiang Mai.

Although local and regional differences existed, language, culture and physical type made the majority of Thailand's population unmistakably one people. The ethnic Thais form nearly 82 per cent of the po-

pulation and speak different dialects, Thai Yuan in the north and Thai Lao in the northeast but the official language used in Bangkok is naturally widespread. The majority of the Thais are Buddhists. The Chinese estimated at 3 million are the largest ethnic minority in the country and stem from a culture distinctively different from that of the Thai. Most of them, in the process of assimilation, have acquired Thai nationality. "The mingling of races encounters no religious barrier and leads to the development of a Sino-Thai society, with the result that the happy fusion of these two elements has become one of the characteristics of the Thai nation"^{6/}.

The ethnic Malays, numbering more than a million, are concentrated in the Southern Region and constitute the majority of Thailand's Muslim population. "The Malays in Thailand represent a fairly homogeneous minority that has been highly resistant to assimilation into the national culture. Except at the official level, they have little contact with their Thai neighbours. Brigandage and ethnic isolationism, which are complicated by Communist terrorism along the Thai-Malaysian border..., add to the gap between ethnic Malay and Thai that already exists because of language and religion."^{7/}

The other non-Thai groups are the Indians and Pakistanis who are engaged in trade, the Cambodians left over from the ancient Khmer Empire and the Vietnamese in the northeast. These minority groups are too small or too isolated to enter importantly into the dominant Thai pattern of life and outlook. The principal hill-tribes who live outside the Thai stream of life are Meos, Karens, Lahus, Lissus and Khas, and collectively number about 250,000 persons.

E. ADMINISTRATIVE SYSTEM

The Cabinet is responsible for the formulation of Government policy. The day to day administration of the country, however, is carried out by the Civil Service comprising officers of various services and grades. The administrative bodies fall into two categories: ministries and quasi-autonomous agencies. The political head of each ministry is a minister of state who is responsible to the Prime Minister. The top civil service official in each ministry is the permanent under secretary of state who is entrusted with the over-all supervision and direction of the departments under the ministry. Outside the ministries, but subject to their direct control and super-

vision are a number of quasi-autonomous State enterprises such as the Port of Bangkok Authority, the Railroad Organization, the Metropolitan Electricity Authority, the Tourist Organization of Thailand, the Telephone Organization of Thailand etc.

For convenience of administration, the country is divided into a number of provinces (*changwat*) and further sub-divided into districts (*amphur*). The districts are divided into communes (*tambon*) which are further sub-divided into villages (*muban*). The head of the province is the governor who is appointed by and responsible to the Minister of the Interior. "The Governor carries out the policies of the central Government, supervises the overall administration of the province, co-ordinates the work of the various ministry representatives from Bangkok, and maintains law and order within his jurisdiction. He reviews the reports of district officers and gives final approval to the election of commune headmen. The Municipal Act of 1953 also empowers him with a supervisory responsibility over municipal government"^{8/}.

The head of the district administration is the district officer (*nai amphur*) who is appointed by the Minister of Interior and is responsible to the governor of the province. Though occupying the lowest level in the central Government hierarchy, he is nevertheless the most important link between government and people. His duties are varied and extensive. Besides being the chief magistrate, he is also the chief executive in his district and supervises the collection of taxes, issues certificates of birth, marriage, divorce and death, registers school children and aliens, arbitrates land disputes and administers local election.

The chief of each commune is the *kamnan* chosen by the headmen of the villages constituting the commune from among themselves but confirmed in office by the provincial governor. Though enjoying a quasi-official status, his prestige is considerable. "He is in charge of recording vital statistics, assists the district officer in maintaining public peace and helps him collect taxes. He supervises and co-ordinates the activities of the village headmen and convenes a monthly meeting of the headmen before his monthly meeting with the district officer; thus, the *kamnan* serves as an intermediary between the district officer and the village chiefs"^{9/}.

The administrative head of the village is the village headman (*pu yai ban*) meaning 'elder man of the

^{6/} *Ibid.*, p. 27.

^{7/} John W. Henderson and others, *op.cit.*, p. 80.

^{8/} *Ibid.*, pp. 182-183.

^{9/} *Ibid.*, p. 184.

village'). He is chosen by the villagers, and though the term of office is fixed at five years, the headman tends to remain in office until death or retirement. The village headman is not a regular governmental official but receives a small stipend for services rendered which are similar to the commune chief.

Municipal government was introduced in 1933. Its most important purpose was to familiarize the Thai people with the parliamentary system of government and to facilitate national policies with respect to local public health and welfare. There are three types of municipalities, according to the size and density of their population and the sources of tax revenue available for self-support: (a) *nakhon* or city, (b) *muang* or town, (c) *tambon* or commune municipality.

In order to obtain the status of *nakhon* or *muang* municipality, a place must have a minimum number of inhabitants and a minimum population density (a total of 50,000 or more inhabitants with a population density of not less than 3,000 inhabitants per km² for a *nakhon* municipality; and a minimum of 10,000 inhabitants with a population density of not less than 3,000 inhabitants per km² for a *muang* municipality). A *tambon* municipality is created by an official decree of the Ministry of Interior. To be so classified, a place must have urban characteristics and adequate income to provide the needed services. In 1975, the size of a *tambon* municipality ranged from 4,200 to 27,000 population.

A municipality is required to perform certain functions and provide services for its inhabitants such as lighting, piped water supply, a market, streets, sewerage, health services and educational services. The municipality is also responsible for maintaining the local population registration. However, the functions of the municipalities vary among the three types of municipalities. Each municipality has its own budget, relying mainly on local revenue and a subsidy from the central Government.

The country is now divided into 71 provinces, 642 districts and sub-districts, 5,505 communes and 49,178 villages. There are 118 municipalities, since the province of Phra Nakhon (which includes the capital city of Bangkok) and Thon Buri were combined into one entity called Bangkok Metropolis, which is the largest urban area having a population of about 4.3 million as of 1976. Of the 118 municipalities, one is a city municipality, 83 are town municipalities and the remainder are commune municipalities.

F. THE ECONOMY

The economy of Thailand has for centuries been predominantly agricultural, based on rice – the staple food of the people. Even today, Thailand remains an agricultural country despite its increasing industrialization. Agriculture (including livestock, forestry and fisheries) is the main economic activity and agricultural products constitute the largest component of the national income, though their share has been declining steadily (see table 2) from about 42 per cent in 1956 to about 30 per cent in 1971.^{10/} Thailand's foreign trade depends heavily on primary agricultural products, exports of which in 1971 formed a little over 70 per cent of the total exports. Over 79 per cent of the country's labour force is also reported to be engaged in agriculture and related activities.^{11/}

Traditionally the agricultural economy of Thailand has been dominated by one crop – rice. As noted in the preceding sections, the Chao Phraya river valley and its hinterland are admirably suited to the cultivation of rice which is the traditional basis of the rural economy. Thailand produces about 14 million metric tons of rice *per annum* of which over 1.6 million metric tons are exported. However, the production per unit of cultivated land is not high and could certainly be increased. The "green revolution" elsewhere and falling world market rice prices have in recent years considerably reduced Thailand's earnings from its rice exports.

Next to rice, rubber has for long been the second most important product, the total production in 1970 being estimated at 277,486 tons. "Because it is almost entirely exported..., the uncertainty of the international market has some effect on production. The plantations are often owner-managed and very rarely reach the highly specialized level of the large estates in Malaysia, Cambodia or Vietnam which were formed by large international financial interests. As a number of plantations have ceased to be profitable, they have been abandoned and attempts are now being made to introduce different crops such as oil palms in the south"^{12/}.

^{10/} This fall in the portion of national income attributable to agriculture has occurred despite a steady growth in output in recent years.

^{11/} It has been pointed out that "this figure definitely errs on the high side, as many people who call themselves agriculturalists earn significant proportion of their incomes outside the agricultural sector". Ammar Siamwalla, "Stability, growth and distribution in the Thai economy", in Prateep Sondysuvan (ed.) *Finance, Trade and Economic Development in Thailand* (Bangkok, Sompong Press, 1975), p. 26.

^{12/} Achille Clarac and Michael Smithies, *op.cit.*, p. 29.

Table 2. Percentage distribution of gross domestic product by industrial origin, selected years, 1951 to 1972

Industrial origin	1951	1955	1960	1965	1969	1970	1971	1972
Agriculture	50.1	42.0	39.8	34.9	31.7	28.5	28.6	28.1
Mining and quarrying	1.9	1.6	1.1	2.1	2.0	2.1	2.1	2.1
Manufacturing	10.3	11.8	12.6	14.2	15.4	16.0	16.3	16.8
Construction	2.9	4.0	4.6	5.6	6.4	6.1	5.8	5.1
Electricity and water supply	0.1	0.2	0.4	0.8	1.1	1.2	1.3	1.5
Transportation and communication	3.1	5.1	7.5	7.1	5.9	6.1	6.1	5.9
Wholesale and retail trade	18.0	19.6	15.2	16.5	17.4	18.9	18.2	18.5
Banking, insurance and real estate	0.4	1.4	1.9	2.6	3.7	4.1	4.4	4.6
Ownership of dwellings	3.7	3.0	2.8	2.5	2.0	2.0	2.0	2.0
Public administration and defence	2.8	4.8	4.6	4.3	4.3	4.5	4.6	4.5
Services	6.7	6.5	9.6	9.5	10.1	10.5	10.6	10.9
Gross domestic product	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: For 1951 to 1965, James C. Ingram, *Economic Change in Thailand, 1850-1970* (Stanford, Calif., Stanford University Press, 1971), table XX; for 1969 to 1972, Government of Thailand, *Statistical Yearbook, No. 30, 1972-1973* (Bangkok, National Statistical Office, 1975), table 212.

Since 1955 there has been a rapid and substantial growth of crops other than rice, such as maize, cassava, kenaf, cotton, sugar cane, tobacco, fruits and vegetables. This diversification in agriculture was motivated in the first instance by the necessity to avoid excessive dependence on the export of a few products on the one hand and the growing external and internal demand for the faster growing cash crops on the other. An interesting feature in Thailand's agriculture is that these crops have accounted for over 75 per cent of the expansion in cultivated area in recent years and this expansion has been accomplished by the small farmer. A considerable degree of regional specialization has developed in the cultivation of these crops. For instance, kenaf is concentrated in the Northeast, maize in the Central Region and cassava in the Southeast.^{13/} The importance of these crops is seen in the fact that while the value of rice exported in 1971 was 2.9 billion baht, (20 baht \$US 1 approximately) the combined value of the exports of maize, cassava, tobacco, sugar, jute and kenaf amounted to nearly 5 billion baht.

The most important economic activity is wholesale and retail trade, which in 1972 contributed to about 19 per cent of the gross domestic product and employed as many as 876,000 persons. Most retail trade is in local produce and consumer goods sold either by vendors or in urban markets. The bulk of wholesale trade is in imports and in commodities for export.

Industry is of minor but increasing importance in the economic life of the country. The share of "manufacturing" in total gross domestic product has steadily increased from 10.3 per cent in 1951 to 16.8 per cent in 1972. The expansion that has taken place has largely been due to the intervention of the Government which was becoming increasingly aware of the need to shift the structure of the economy and to reduce the dependence upon agriculture and a few primary products. During the past decade or so, the industrial structure of the country has also considerably changed. Rice mills, saw mills and oil factories now constitute a smaller portion of the total, the major share being occupied by those establishment manufacturing construction materials, iron and steel, electrical goods, petroleum, chemicals, plastics, vegetable oils, fruit canning and automobile assembly plants. The most rapid expansion has taken place in the production of consumer goods, first because "the demand for import substitutes was strong and easily identified and import substitution was encouraged by special promotion privileges. Secondly, the production of capital goods and basic materials generally require a broader market and a larger investment than are generally available in Thailand and these industries therefore expanded more slowly".^{14/}

Though a wide variety of minerals occur in the country, the most important mineral is tin which is located in quantity in the mud deposits caused by erosion of the mountains which separate Thailand

13/ James C. Ingram, *Economic Change in Thailand, 1850-1970* (Stanford, Calif., Stanford University Press, 1971), pp. 261-262.

14/ Government of Thailand, *The Third National Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board, 1973), p. 144.

and Burma and which continue south to the Malaysian frontier. Thailand is one of the world's major producers of tin and most of the country's output has been exported during the last 100 years. The exploitation of offshore deposits pushed tin exports to 21,873 metric tons in 1971. Sizeable deposits of tungsten occur in northwestern and southern provinces and of antimony in the northern provinces of Lampang and Phrae. These are also mined almost entirely for export. Iron deposits are found in Thailand but not in quantities large enough to serve as basis for a long scale steel industry. However, iron has been mined in many parts of the country for many centuries and smelted in simple charcoal furnaces to make the few implements needed by farmers. The other minerals of significant importance are lead, lignite and manganese. Silica sand in Thailand is of high quality and the total reserves are estimated at 46 million tons, the major deposits occurring in Songkhla, Rayong and many other parts of the Southern and Northeast Regions.

The Government has taken an active interest in the development efforts of the country. During the years following the Second World War, efforts have mainly been concentrated on the development of eco-

nomie overheads — transportation, communications, power and irrigation. The National Economic Development Board^{15/}, created in 1959, has formulated several development plans. The current plan, the Third National Economic and Social Development Plan, gives high priority to the further development and expansion of agriculture for several reasons. First, Expanded output and an improvement in the quality of agricultural products is essential to boost sales abroad and to solve the immediate problem of the balance of trade deficit. Secondly, agricultural development is essential for expansion of production based on domestic raw materials. Thirdly, agricultural development based on labour-intensive techniques will help to reduce underemployment and under-utilization of farm labour. Fourthly, the improvement of the social and economic conditions of the farmers and the quality of life in rural areas call for higher priority to be given to the development of agriculture.^{16/}

^{15/} More recently known as the National Economic and Social Development Board.

^{16/} National Economic and Social Development Board, *op.cit.*

Chapter I

GROWTH AND DISTRIBUTION OF POPULATION

A. POPULATION GROWTH IN THE PAST

No extensive census enumerations appear to have been made in ancient Thailand. It is possible that population records may have been maintained then for conscription or military purposes since the country was engaged in constant wars with its neighbours, but these records have not survived to the present. In the absence of reliable records, knowledge about the size, composition, distribution and growth of the population in the early times is very limited and uncertain. It could perhaps be safely assumed that population growth in early periods was low because high birth rates were offset by high death rates.^{1/} Nevertheless, the population of Thailand prior to the date of the first modern census held in 1911 is a matter for learned conjecture.

Several attempts have, however, been made to estimate the population of Thailand up to the nineteenth century based largely on the local registers kept by district officials, generally for purposes of military conscription, taxation or administration. These estimates are, however, subject to very serious limitations because they rely on a variety of sources and, in most cases, their reliability depends largely upon the intelligence of the person making the estimates. The reliability of the estimates also depend upon the "definition" of Thailand because the area of Thailand has been frequently changed by treaties with the British and French. "It is difficult to point to any one historical definition as 'best' for while it is true that Thailand exercised suzerainty over the areas ceded to the English and French, both the nature and the period of control varied considerably, making it virtually impossible to discredit any of a series of varying estimates for a particular period."^{2/}

The various estimates are assembled in figure 1 in which a sketched-in trend line represents an es-

^{1/} This view is supported by the fact that it took about seven centuries for the population of Thailand to reach 8 million as enumerated at the first census held in 1911 while successive additions of 8 million were made in very much shorter periods.

^{2/} Larry Sternstein, "A critique of Thai population data" as reproduced in *Perspective on Thai Population*, Research Report No. 11 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1974), p. 81.

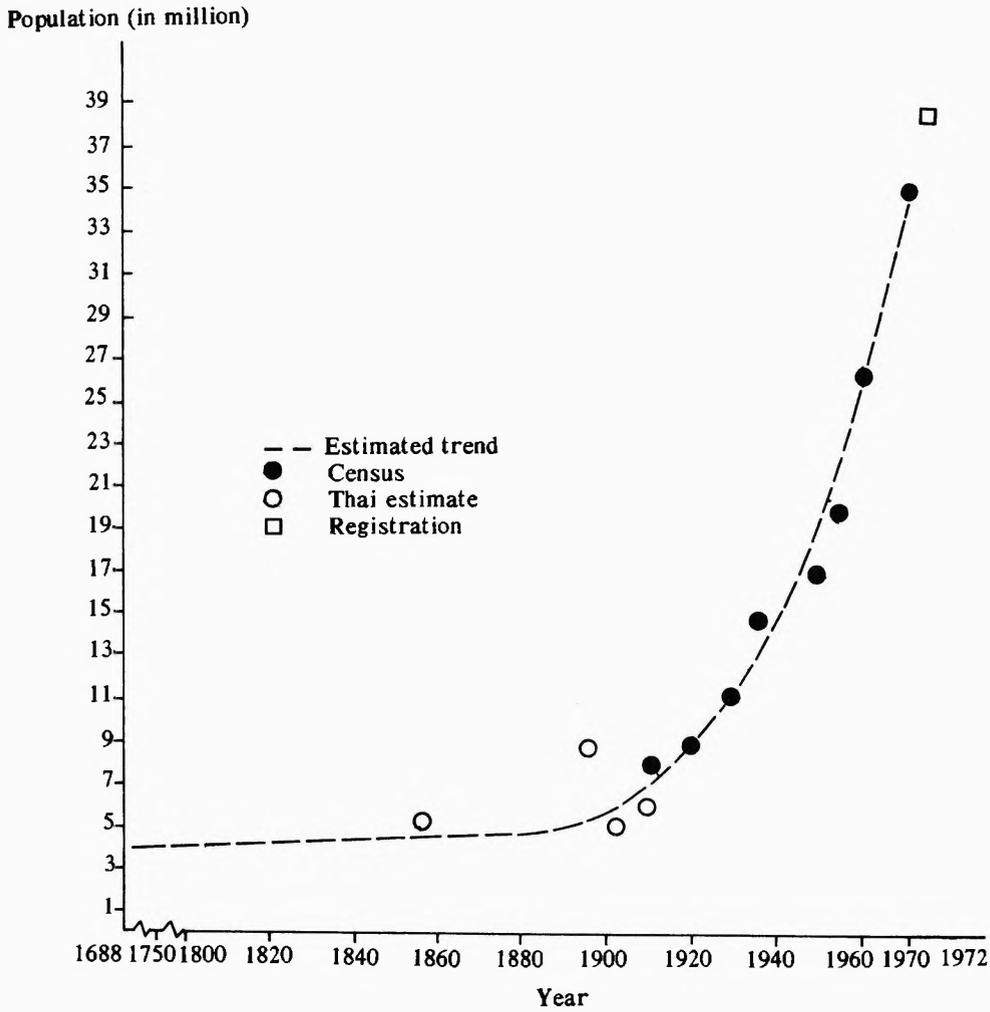
timated consensus of these estimates. This trend line "is necessitated by the non-rigorous nature of the data and is based on several assumptions: first, that late in the seventeenth century, the total population of Thailand was about 4 million; second, that the population was close to 5 million in the mid-nineteenth century; third, that the latter level was, more or less, maintained until the beginning of this century. Obviously such a curve is not an objective analytical assessment that can be subjected to further, more sophisticated analysis, but simply a descriptive device."^{3/}

The trend indicated by the graph also suggests that there has been an acceleration in the rate of growth of the population sometime between 1850 and 1875. This picture is also confirmed by the facts of history. The period was significant in the history of Southeast Asia as it marked the spread of colonial rule, the expansion of world trade and the opening of new markets. Thailand became a partner in world trade because of the expanding demand for its quality rice.^{4/} Rural Thailand proved to be very responsive to the new demand and surpluses were produced for each sale abroad. The increase in rice production was made possible by the extension of paddy land and intensification of labour in the central plain north of Bangkok. The economic changes brought about by Thailand's entry into the world market encouraged substantial Chinese immigration. Indeed it was the Chinese immigrants who provided the entrepreneurial services for the rice trade. "These changes were accompanied by an increase in population, slow at first and then quite rapid. The increase in population occurred in all regions, and did not vary with the degree of commercialization."^{5/} It is estimated that two-fifths of this in-

^{3/} *Ibid.*, p. 82.

^{4/} Several reasons have been attributed to the expanding foreign demand for Thai rice. It has been suggested that the development of steam transportation and the opening of Suez Canal (1869) made possible the mass export of bulky commodities such as rice from Southeast Asia. The Suez Canal may have had an important indirect influence on the market for Thai rice in that Burmese rice exports may have been diverted from Asian to European markets thus increasing the demand in Asia for Thai rice. See, James C. Ingram, *Economic Change in Thailand 1850-1970* (Stanford, Calif., Stanford University Press, 1973), pp. 41-42.

^{5/} *Ibid.*, p. 37.



Source: Redrawn from Larry Sternstein, "A critique of Thai population data", as reproduced in *Perspective on Thai Population*, Research Report No. 11 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1974), figure I-1.

Figure 1. Growth of the Thai population, 1688-1960

crease consisted of the immigration of Chinese, the other three-fifths being the excess of births over deaths. The rate of natural increase was also increasing due to declining mortality combined with a possible rise in fertility. Whatever the cause, the Thai population was definitely expanding during the late nineteenth and early twentieth centuries and the influx of the Chinese played a significant role.

B. POPULATION GROWTH IN THE TWENTIETH CENTURY

1. Trends in growth

A systematic and scientific basis for the enumeration of the population was laid in 1911 when the first official census of Thailand was taken.^{6/} Since then six more censuses have been carried out in the country in 1919, 1929, 1937, 1947, 1960 and 1970. The total enumerated population, the intercensal growth and the average annual intercensal growth rates are shown in table 3.

of 59 years. It will also be discerned that the population grew rather slowly in the early years, the rate of growth gradually increasing to 3.0 per cent *per annum* during the 1929-1937 intercensal period. During the subsequent period there was a sudden decline in the rate of growth to 1.9 per cent, thereafter rising to 3.4 per cent between 1947 and 1960. The average annual growth rate during the last intercensal period, 1960-1970, was 2.8 per cent. The significance of these rates of growth is seen from the fact that, while it took centuries for the population of Thailand to reach 8 million in 1911, the subsequent additions of 8 million were increasingly rapid. It took only 32 years for the population to increase to 16 million; another 15 years to reach the 24 million mark while 32 million was attained in a matter of another nine years.

The 1960-1970 intercensal growth rate is somewhat lower than the rate for the previous period. However, the total 1970 population after adjustment for underenumeration is estimated to be about 36 million instead of the 34 million enumerated at the census.^{7/} Based on these estimates, the popula-

Table 3. Enumerated population, intercensal increase and average annual intercensal growth rate, Thailand, census years, 1911-1970

Date of census	Enumerated population	Intercensal increase	Intercensal interval (years)	Average annual intercensal growth rate (percentage)
1 April 1911	8,266,408	—	—	—
1 April 1919	9,207,355	940,947	8.0	1.36
15 July 1929	11,506,207	2,298,852	10.3	2.19
23 May 1937	14,464,105	2,957,898	7.8	2.96
23 May 1947	17,442,689	2,978,584	10.0	1.89
25 April 1960	26,257,916	8,815,227	12.9	3.22
1 April 1970	34,397,374	8,139,458	9.9	2.76

Sources: Government of Thailand, *Statistical Yearbook of Thailand, 1938, 1939, 1945, 1955*; *ibid.*, 1960 *Thailand Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962); *ibid.*, 1970 *Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).

It will be seen that the population of Thailand increased from about 8.3 million in 1911 to 34.4 million in 1970 or by about 316 per cent during a period

tion growth rate during the 1960-1970 intercensal period is estimated at 3.0 per cent *per annum*. Given this rate of the growth, the population of Thailand will double in about 23 years. However, data for recent years indicate that there has been a slowing down in the rate of growth of the population due to declines in fertility rates. The annual rate of growth as of 1976 is estimated at about 2.5 per cent.

^{6/} It has been noted by Graham that this census "began a leisurely enumeration [in 1909], which by dint of repeated checking and revision, was at length brought within measurable distance of a fairly accurate representation of the number of the people. This was followed by an annual revision of the registers, and it is claimed by the authorities now given as substantially correct". Graham has also observed that there is evidence to indicate that the census enumeration, particularly in the outlying provinces, was subject to errors. See, A.W. Graham, *Siam* (London, 1924), p. 113.

^{7/} Fred Arnold and Mathana Phananimai, *Revised Estimates of the 1970 Population of Thailand*, Research Paper No. 1 (Bangkok, National Statistical Office, 1975).

2. Components of growth

The remarkably rapid rate of population growth during this century has been due to two factors: (a) natural increase or excess of births over deaths and (b) migration balance or excess of immigrants over emigrants. While in the past, migration played a major role, the growth of the population during the last six decades was occasioned more by natural increase. In fact, since 1911, every intercensal period was characterized by a natural increase that was several times the net migration, and in all three intercensal periods since 1937, the ratio of natural increase to net migration has been greater than 10:1.

The decennial average birth rates, death rates and the rates of natural increase are shown in table 4. It will be seen from this table that the natural increase in the Thai population is due to a decline in mortality that was faster than that of fertility. While birth rates declined from an average of about 49 per thousand during the 1920-1929 decennium to about 41 during 1961-1970, the fall in the average death rate from about 28 to 10 was much faster during the same period.^{8/} Consequently, there has been an increase in the rate of natural increase from about 21 per thousand of the population during 1920-1929 to about 31 per thousand during 1961-1970.

Table 4. Decennial average birth rates, death rates and rates of natural increase, 1920-1969

Decennium	Average birth rate	Average death rate	Average rate of natural increase
1920-1929	49.4	28.3	21.1
1930-1939	47.6	25.1	22.5
1940-1949	40.6	20.7	19.9
1950-1959	44.9	13.8	31.1
1960-1969	41.4	10.7	30.7

Source: Based on data relating to estimated birth rates and death rates, in tables 50 and 62.

migration has been reduced considerably. According to estimates based on census data, net migration accounted for only a sixth of the population increase during the 1920s; less than one-twentieth during the 1930s and about one-sixteenth between 1947 and 1960. The considerable reduction in immigration, particularly during the period after the Second World War has largely to be explained in terms of the Immigration Act of 1949 which limited the immigrants from each country to a maximum of 200 per year. In the 1960s immigration has averaged only about 2,000 persons *per annum*, the important countries of origin being China, India, the United States of America, Japan, the United Kingdom and the Philippines.

Table 5. Population by major region: Thailand, 1960 and 1970

Region	1960		1970	
	Number	Percentage	Number	Percentage
Whole Kingdom	26,257,916	100.0	34,397,374	100.0
Central	8,271,302	31.5	10,611,877	30.8
Northern	5,723,106	21.8	7,488,683	21.8
Northeast	8,991,543	34.2	12,025,140	35.0
Southern	3,271,965	12.5	4,271,674	12.4

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962); *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).

As noted earlier, migration played a major role in the growth of Thailand's population during the nineteenth century; estimates indicate that nearly 50 per cent of the increase in population during the second half of that century was due to net migration. However during the present century the importance of

Census data also support the contention that there have been very few immigrants into the country in recent years. For instance, according to the 1960 census data, only about 11,600 persons resident in the country reported that they had immigrated during the previous five years. Of these 2,900 had come from China while the rest were from all other countries. According to the 1970 census, about 29,000 persons had migrated into Thailand between 1965 and 1970. "Although these totals are probably under-reported,

^{8/} For a discussion of the trends in fertility and mortality, see chapters VII and VIII.

they indicate that few persons moved into Thailand during the five-year periods preceding the last two censuses. Place of birth data also support a similar conclusion: according to the 1960 census, 98.1 per cent of the population had been born in Thailand; of the remaining 1.9 per cent, 1.5 per cent had been born in China. In 1970, 98.8 per cent of the population reported that they were born in Thailand, and of the 1.2 per cent foreign born, about 1 per cent reported that they had been born in China."^{9/}

C. DISTRIBUTION OF THE POPULATION

1. Regional distribution

As noted in the Introduction, Thailand is divided into four major regions: Central, Northern, Northeast and South. The distribution of the population by these four major regions is shown in table 5. It will be seen that the proportion of persons residing in these four regions has remained more or less constant between 1960 and 1970. The largest proportion, about 35 per cent, lives in the Northeast Region which also contains 33.1 per cent of the total land area while the smallest proportion lives in the Southern Region.

2. Rural-urban distribution

The distribution of the population by rural-urban residence in 1960 and 1970 is shown in table 6. It will be seen that Thailand remains largely a rural

12.5 per cent in 1960 and to 13.2 per cent in 1970. According to the civil registration data as at the end of 1972, the urban population accounted for about 16 per cent of the country's population. During the 1960s, the growth rate of the urban population was approximately 6.5 per cent *per annum*. Investments in economic development, including the rapid expansion of the country's infrastructure and to a certain extent, military investment, helped to accelerate the growth of a number of urban centres, particularly in the Northeast.

Most of the urban population is concentrated in a single metropolitan centre. The city of Bangkok-Thon Buri^{10/} had a population of 2.9 million in 1970, which was more than half the nation's total population classified as residing in municipal areas and almost three-fourths of the population living in places of 20,000 persons or more. Further the 1974 estimated population of the Bangkok Metropolis amounting to about 4 million was nearly 40 times the population (98,300) of the second largest city, Chiang-Mai. The hierarchy of urban places in Thailand provides a good example of the "primate city" phenomenon.

The rural-urban distribution of the population by major geographical regions is shown in table 7. It will be observed that nearly 71 per cent of the country's urban population is concentrated in the Central Region while other regions share almost equally the balance of 29 per cent. The intraregional com-

Table 6. Rural and urban population, 1960 and 1970

Area	1960		1970	
	Number	Percentage	Number	Percentage
Rural	22,984,051	87.5	29,844,274	86.8
Urban	3,273,865	12.5	4,553,100	13.2
Whole Kingdom	26,257,916	100.0	34,397,374	100.0

Source: Same as table 5.

country with nearly 87 per cent of its population being rural residents. Consequently only about 13 per cent of the country's population live in areas defined as urban.

The level of urbanization, that is the percentage of population residing in municipal areas to total population increased from about 10 per cent in 1947 to

parison of rural-urban distribution reveals that the Central Region was the most urbanized with about 30 per cent of its population living in municipal areas. Bangkok Metropolis is located in this region. The second most urbanized region was the Southern Region where the proportion of urban to total population was nearly 11 per cent and the least urbanized region was the semi-arid Northeast.

^{9/} CICRED, *The Population of Thailand* (Bangkok, NESDB, 1974), p. 8.

^{10/} Now officially combined as one city and called Bangkok Metropolis.

Table 7. Rural-urban distribution of the population by major region: Thailand, 1970

Region	Total population		Rural population		Urban population	
	Number	Percentage	Number	Percentage	Number	Percentage
Whole Kingdom	34,397,374	100.0	29,844,274	86.8	4,553,100	13.2
Central	10,611,877	100.0	7,398,896	69.7	3,212,981	30.3
Northern	7,488,683	100.0	7,048,829	94.1	439,854	5.9
Northeast	12,025,140	100.0	11,579,867	96.3	445,273	3.7
Southern	4,271,674	100.0	3,816,682	89.3	454,992	10.7

Source: Government of Thailand, *1970 Census of Population and Housing, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 1A.

3. Population density

As noted earlier, the area of Thailand is reckoned at 514,000 km². With an enumerated population of approximately 34.4 million in 1970, the overall density in that year was 67 persons per km². The density has increased over the years with increasing population as is evident from table 8.

Table 8. Population density in Thailand, 1911-1970

Census year	Persons per km ²
1911	16
1919	18
1929	22
1937	28
1947	34
1960	51
1970	67

The density, however, varies from one region to another. The Central Region which consists of 20 per cent of the total land area and 31 per cent of the country's population is the most densely populated region. Its density in 1970 was 102.5 persons per km², although in the Bangkok Metropolis the density was about 7,800 persons per km². The semi-arid plateau region of the Northeast occupying 33.1 per cent of the land surface and containing about 35 per cent of the country's total population is the second most densely populated area with a density of 70.6 persons per km². The density of Northern Region (44.0 persons per km²) and Southern Region (60.9 persons per km²) is below the national average (see table 9).

Table 9. Population density by region, 1970

Region	Percentage of land area	Percentage of population	Density
Central	20.2	30.8	102.5
Northeast	33.1	35.0	70.6
Northern	33.0	21.8	44.0
Southern	13.7	12.4	60.9

Source: Compiled from 1970 census data.

Table 10 gives the density of a few selected countries in the ESCAP region. It will be observed that in 1973 Thailand had a density which was nearly double that of Malaysia, Burma and Democratic Kampuchea but much lower than the density of countries like Philippines, Bangladesh, Sri Lanka and the Republic of Korea.

Table 10. Population densities of selected ESCAP countries based on estimated 1973 population

Country	Persons per km ²
Bangladesh	502
Burma	44
Democratic Kampuchea	42
Indonesia	84
Lao People Democratic Republic	13
Malaysia	35
Philippines	134
Republic of Korea	334
Sri Lanka	202
Thailand	77

Source: United Nations, *Demographic Yearbook 1973* (Sales No.E/F.74.XIII.1), table 2.

Chapter II

INTERNAL MIGRATION

A. INTRODUCTION

Information on internal migration was first collected at the 1960 census of population. The two questions which provided information for a direct measure of migration concerned (i) *changwat* of birth and (ii) *changwat* of residence five years prior to the census date.^{1/} The information on place of birth by place of residence, and place of current residence by place of residence five years earlier was cross-classified by age and sex. In 1970, slightly more detailed information on migration was collected. In addition to the two questions in the 1960 census, those who were reported as migrants were also classified in 1970 as municipal or non-municipal residents. However, the data based on the 1970 census relating to lifetime, intra-and inter-*changwat* migration by five-year age groups and by sex do not provide adequate information for measuring rural-urban migration or studying detailed differential migrations.

However, the census data for 1960 and 1970 are used to determine patterns of internal migration in Thailand. For the purpose of the present analysis, Thailand is divided into five regions: Bangkok-Thon Buri, Central, Northern, Northeast and Southern. This division varies from the official division for administrative purposes in that Bangkok-Thon Buri is treated as a separate region instead of being included in the Central Region. The justification is that these two *changwat* together constitute what may be labeled a "metropolitan area" in the modern sense of the term and receive the bulk of the migrants from other regions.

B. MIGRATION BY REGION

As stated earlier, the censuses provide only two types of migration data: place of birth and place of residence five years earlier. The two types of migrants defined, on the basis of these data are lifetime migrants and five-year migrants respectively. A lifetime migrant is defined as a person whose *changwat* of residence at the census date differs from the *changwat* of birth, and a five-year migrants is a person who has changed his usual place of residence from one *changwat* to another during the migration interval.

^{1/} *Changwat* is the Thai word for a province. For administrative purposes, the country is divided into 71 *Changwat* (It should be noted that there is no plural form of nouns in Thai).

1. Volume and streams

a. Volume and streams of lifetime migrants: 1960 and 1970

Table 11 shows the number and percentage of persons who were born in the *changwat* of present residence as well as the number and percentage of persons who were born in one *changwat* but were living in another on the census date. According to this table, in 1960, approximately one in every 10 persons in Thailand was a lifetime migrant while in 1970, it was one in seven. The highest percentage of lifetime migrants in both censuses, 23 per cent in 1960 and 27 per cent in 1970, were recorded in Bangkok-Thon Buri. Among the other four regions, the Northeast had the highest percentage of lifetime migrants in 1960, a position taken by the Central Region in 1970. The Southern Region had the lowest percentage of lifetime migrants in both 1960 and 1970. For the country as a whole the percentage of lifetime migrants increased 2.3 percentage points in the decade, from 10.8 in 1960 to 13.1 in 1970.

Tables 12 and 13 show net gain and loss of lifetime migrants by region. The pattern appears to be similar in both years; Bangkok-Thon Buri gained from every region and the Northeast lost to all. The total gain for Bangkok-Thon Buri was 342,000 in 1960 and 601,000 in 1970. The Northeast had lost almost 198,000 persons to other regions by 1960 and 309,000 by 1970. As for the other three regions, in 1970 the Central Region gained only from the Northeast, the Northern Region gained from the Central and the Northeast, while the Southern Region gained from all except Bangkok-Thon Buri.

Data from tables 12 and 13 also provide another measure, developed by Lee and others^{2/}, namely the intercensal change in the birth-residence index. This measure is comparable to the net migration obtained by the forward census survival method. The main difference is that the birth-residence index represents persons of all ages, while the census survival method yields estimate of persons aged 10 years and over. Hence for purposes of comparison, the migration of persons born during the intercensal period

^{2/} Everett S. Lee and others, *Population Redistribution and Economic Growth, United States: 1870-1950*, Vol. I. Methodological Considerations and Reference Tables (Philadelphia, The American Philosophical Society, 1957).

Table 11. Number and percentage of persons living in *changwat* of birth, by region, 1960 and 1970

	Number of persons, 1960 and 1970							
	Total		Changwat of birth		Other <i>changwat</i>		Foreign born	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
	1970							
Whole Kingdom	34,397,374	100.0	29,556,763	85.9	4,491,047	13.1	349,564	1.0
Bangkok-Thon Buri	3,077,361	100.0	2,074,565	67.4	837,761	27.2	165,035	5.4
Northern	7,488,683	100.0	6,507,884	86.9	943,975	12.6	36,824	0.5
Central	7,534,516	100.0	6,375,278	84.6	1,085,724	14.4	73,514	1.0
Northeast	12,025,140	100.0	10,790,016	89.7	1,198,858	10.0	36,266	0.3
Southern	4,271,674	100.0	3,809,020	89.2	424,729	9.9	37,925	0.9
	1960							
Whole Kingdom	26,257,916	100.0	23,009,208	87.3	2,760,895	10.8	487,813	1.9
Bangkok-Thon Buri	2,136,435	100.0	1,425,494	66.7	486,490	22.8	224,451	10.5
Northern	5,723,106	100.0	5,054,178	90.9	624,559	8.5	44,369	0.6
Central	6,134,867	100.0	5,395,541	88.0	633,560	10.3	105,766	1.7
Northeast	8,991,543	100.0	8,169,473	88.3	765,423	10.9	56,647	0.8
Southern	3,271,965	100.0	2,964,522	90.6	250,863	7.7	56,580	1.7

Source: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 5; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 8A.

must be estimated. This is not being attempted in the present analysis for lack of appropriate data. However, estimates of intercensal migration calculated by the place of birth method are shown below for 1960-1970 for the five regions.

Region	Intercensal changes by place of birth method
Northern	-1,120
Central	-121,816
Bangkok-Thon Buri	+259,145
Northeast	-111,101
Southern	-25,108

According to the birth-residence index, the intercensal change was dominated by Bangkok-Thon Buri. During the 1960-1970 period, Bangkok-Thon Buri had a net gain of 260,000 in-migrants while the other four regions experienced net losses.

b. Volume and streams of 5-year migrants

Between 1955 and 1960, approximately 830,000 persons changed their *changwat* of residence. Of these migrants the proportions residing in the various regions in 1960 were 19 in the Northern, 26

in the Central, 20 in Bangkok-Thon Buri, 25 in the Northeast and 10 in the Southern. Table 14 shows the distribution of migrants by region of present and previous residence, and the net gain and loss for each region. The data indicate high proportions of intra-regional migrants in every region except Bangkok-Thon Buri.

It is also evident from table 14, that Bangkok-Thon Buri gained from every other region while the Central lost to all regions. The second largest loser was the Northeast, which gained 4,000 persons from the Central Region but lost almost 45,000 persons to the other regions. The Northern region had a substantial gain from the Central and the Northeast Regions, but lost to Bangkok-Thon Buri and the Southern Region. Finally, the Southern Region gained approximately 12,000 persons from the Northern, Central and Northeast Regions while losing almost 3,000 persons to Bangkok-Thon Buri.

The distribution of migrants by region of present and previous residence during the 1965-1970 period is shown in table 15. During this period, the number of migrants within the entire country was more than double that during 1955-1960. However, the proportions of migrants in each region were more or less

Table 12. Region of birth by region of residence, 1960

Region of birth	Region of residence, 1960					Total
	Bangkok-Thon Buri	Northern	Central	Northeast	Southern	
Bangkok-Thon Buri	1,425,494	20,269	93,003	14,356	16,933	1,570,055
Northern	45,426	5,364,838	25,161	10,807	1,145	5,447,377
Central	343,256	183,581	5,808,890	25,531	39,123	6,400,381
Northeast	71,598	88,305	72,693	8,872,818	16,294	9,121,708
Southern	26,210	1,643	5,509	257	3,130,516	3,164,135
Total	1,911,984	5,658,636	6,005,256	8,923,769	3,204,011	25,703,656
Net gain and loss						
Bangkok-Thon Buri	-	-25,157	-250,253	-57,242	-9,277	-341,929
Northern	+25,157	-	-158,420	-77,498	-498	-211,259
Central	+250,253	+158,420	-	-47,162	+33,614	+395,125
Northeast	+57,242	+77,498	+47,162	-	+16,037	+197,939
Southern	+9,277	+498	-33,614	-16,037	-	-39,876
Total	+341,929	+211,259	-395,125	-197,939	+39,876	-

Source: Government of Thailand, *Census of Population: 1960, Changwat Series* (Bangkok, Central Statistical Office, 1962), table 5.

Table 13. Region of birth by region of residence^{a/}, 1970

Region of birth	Region of residence, 1970					Total
	Bangkok-Thon Buri	Northern	Central	Northeast	Southern	
Bangkok-Thon Buri	2,074,565	26,176	140,186	33,945	18,982	2,293,854
Northern	92,190	6,981,882	83,048	38,996	10,968	7,207,084
Central	515,608	235,613	7,023,593	98,478	60,644	7,933,936
Northeast	148,111	164,871	142,929	11,764,861	32,751	12,253,523
Southern	64,454	8,681	27,239	8,203	4,092,319	4,200,896
Total	2,894,928	7,417,223	7,416,995	11,944,483	4,215,664	33,889,293
Net gain and loss						
Bangkok-Thon Buri	-	-66,014	-375,422	-114,166	-45,472	-601,074
Northern	+66,014	-	-152,565	-125,875	+2,287	-210,139
Central	+375,422	+152,565	-	-44,451	+33,405	+516,941
Northeast	+114,166	+125,875	+44,451	-	+24,548	+309,040
Southern	+45,472	-2,287	-33,405	-24,548	-	-14,768
Total	+601,074	+210,139	-516,941	-309,040	+14,768	-

Source: Government of Thailand, *Census of Population and Housing 1970, Changwat Series*, print-out tables available at the National Statistical Office, Bangkok.

Note: a/ Excludes *changwat* of birth unknown.

Table 14. Number of migrants by region of previous residence and region of present residence, 1955-1960

Region of residence	Region of previous residence					Total
	Northern	Central	Bangkok-Thon Buri	Northeast	Southern	
Northern	90,702	30,270	8,900	26,002	847	156,721
Central	15,560	123,762	40,006	25,860	5,023	210,211
Bangkok-Thon Buri	13,947	81,214	36,432	26,745	9,464	167,802
Northeast	4,896	10,758	8,890	180,353	1,252	206,149
Southern	1,482	10,850	6,529	6,998	58,696	84,555
Total	126,587	256,854	100,757	265,958	75,282	825,438
Net gain and loss						
Northern	-	+14,710	-5,047	+21,106	-635	+30,134
Central	-14,710	-	-43,341	+15,102	-5,827	-48,776
Bangkok-Thon Buri	+5,047	+43,341	-	+17,855	+2,935	+69,178
Northeast	-21,106	-15,102	-17,855	-	-5,746	-59,809
Southern	+635	+5,827	-2,935	+5,746	-	+9,273
Total	-30,134	+48,776	-69,178	+59,809	-9,273	-

Source: Government of Thailand, 1960 *Census of Population, Changwat* series, print-out tables. (Available at the National Statistical Office).

Table 15. Number of migrants by region of previous residence and region of present residence, 1965-1970

Region of residence	Region of previous residence					Total
	Northern	Central	Bangkok-Thon Buri	Northeast	Southern	
Northern	195,703	58,035	14,646	43,920	3,430	315,734
Central	47,231	248,103	82,823	62,936	14,988	456,081
Bangkok-Thon Buri	36,555	166,181	95,504	66,813	29,242	394,295
Northeast	26,130	45,646	23,592	330,486	4,814	430,668
Southern	3,775	18,486	8,867	11,519	131,083	173,730
Total	309,394	536,451	225,432	515,674	183,557	1,770,508
Net gain and loss						
Northern	-	+10,804	-21,909	+17,790	-345	+6,340
Central	-10,804	-	-83,358	+17,290	-3,498	-80,370
Bangkok-Thon Buri	+21,909	+83,358	-	+43,221	+20,375	+168,863
Northeast	-17,790	-17,290	-43,221	-	-6,705	-85,006
Southern	+345	+3,498	-20,375	+6,705	-	-9,827
Total	-6,340	+80,370	-168,863	+85,006	+9,827	-

Source: Same as table 13.

similar to those obtaining in the earlier period: Northern (18 per cent), Central (26 per cent), Bangkok-Thon Buri (22 per cent) Northeast (24 per cent) and the Southern (10 per cent). In fact, the proportions for the Northern and the Southern Regions have been identical in both periods, while for other regions, there were only slight changes in the proportions.

In terms of net migration, Bangkok-Thon Buri gained almost 170,000 migrants, some from every region, while the Northeast lost to all other regions, about 85,000 in all. The Central Region also lost migrants to every other region, except for a slight gain from the Northeast. The Southern Region, which had a net gain of almost 10,000 persons during 1955-1960, lost an almost equal number during 1965-1970. As for the Northern Region, the net gain was only a quarter of that between 1955 and 1960.

2. Age and sex differentials

Table 16 shows the number of migrants aged 5 years and over and the migration rates by age and sex in respect of the whole Kingdom for the 1955-1960 and 1965-1970 periods. Between 1955 and 1960, approximately one in 25 persons in Thailand migrated from one *changwat* to another. The age pattern of migration is the same for both males and females, the migration rates increasing with age reaching a peak at ages 20-29 and thereafter declining gradually. The highest migration rates are found in the 10-39 age range for both males and females. In terms of sex differential, males were more migratory than females in all ages. The sex difference in migration was greatest at ages 20-29, when the rate was 72 per 1,000 males and only 44 per 1,000 females.

By 1965-1970, the migration rate for the total population had increased to 61.5 per 1,000 population aged 5 years and over. An increase in the rates had taken place for both males and females at all ages. The patterns of migration in terms of age and sex are quite similar for the two periods, migration rates reaching a peak at age group 20-29 for both sexes. Sex differences are also almost the same. Males are more migratory than females at all ages except 10-19, where the rate for females is 62.5 as against 59.5 for males. The sex differential for ages 20-29 was as large in 1965-1970 as in 1955-1960. In short, at all ages over 20 males are more migratory than females.

At ages 5-9, of course, there is hardly any difference in male and female migration rates because most of these children migrate with their parents whose decision to migrate is seldom based on the sex

Table 16. Number of migrants^{a/} 5 years and over and rates of migration per 1,000 population by age and sex, Thailand: 1955-60 and 1965-70

Age and sex	Number		Rate	
	1955-1960	1965-1970	1955-1960	1965-1970
Both sexes				
Total	785,357	1,765,680	35.8	61.5
5- 9 years	110,498	241,982	27.7	45.8
10-19 years	182,970	505,204	32.7	61.0
20-29 years	259,226	512,785	57.8	104.1
30-39 years	119,842	267,365	38.3	66.3
40-49 years	59,325	127,150	28.1	46.4
50-59 years	32,079	63,556	21.9	36.3
60 + years	21,417	47,638	17.7	28.3
Males				
Total	446,358	944,284	40.6	66.3
5- 9 years	56,418	122,775	28.0	45.8
10-19 years	95,110	246,576	33.7	59.5
20-29 years	160,750	292,253	71.9	120.8
30-39 years	70,234	152,804	44.6	76.4
40-49 years	34,617	72,618	32.6	52.9
50-59 years	18,216	34,341	25.2	39.9
60 + years	11,013	22,917	19.8	30.0
Females				
Total	338,999	821,396	30.9	56.9
5- 9 years	54,080	119,207	27.3	45.7
10-19 years	87,860	258,628	31.8	62.5
20-29 years	98,476	220,532	43.8	82.9
30-39 years	49,608	114,561	32.0	52.5
40-49 years	24,708	54,532	23.6	37.4
50-59 years	13,863	29,215	18.7	30.0
60 + years	10,404	24,721	15.9	24.6

Sources: Government of Thailand, *1960 Census of Population, Changwat* series, table 6; *ibid.*, *1970 Census of Population and Housing, Changwat* series, table 9.

Note: ^{a/} Migrant of unknown age and unknown place of last residence are excluded.

of young children. At ages 10-19, the higher rate of migration of females doubtless reflects the presence in the migration streams of wives accompanying their husbands, who are usually older than they, and the demand in the cities for domestics and for other kinds of female labour.

The ratio of male to female migrants is shown in table 17. It is clear that there has been a decline in the ratios for all age groups between the two periods, the decline being sharp at ages 20-29. In other words, females have become increasingly mobile and in two age groups, 10-19 and 60 and over, female migrants

outnumber males. For all ages taken together the sex ratio decreased from 131.7 to 115.0 males for 100 females.

Table 17. Sex ratio of migrants by age, Thailand: 1955-1960 and 1965-1970

Age	1955-1960	1965-1970
Total	131.7	145.0
5-9 years	104.3	103.0
10-19 years	108.2	95.3
20-29 years	163.2	132.5
30-39 years	141.6	133.4
40-49 years	140.1	133.2
50-59 years	131.4	117.5
60 years & over	105.8	92.7

Source: Derived from table 16.

As for age and sex selection by region, between 1955 and 1960, the number of male migrants exceeded the number of female migrants in every region. For

1970 period, male migrants still outnumbered female migrants except in Bangkok-Thon Buri. But the difference between the sexes had narrowed as is evident from table 18. The percentages of male migrants were 54, 55, 49, 54 and 56 for the Northern, the Central, Bangkok-Thon Buri, the Northeast and the Southern Regions respectively^{4/}. In Bangkok-Thon Buri female migrants outnumbered male migrants and the trend everywhere was toward increasing female migration.

In terms of sex differentials, migration rates were always higher for males than for females during the 1955-1960 period except for migrants aged 10-19 and 60 and over in Bangkok-Thon Buri^{5/}. But by 1965-1970, a striking change had occurred. Table 17 shows that while male migrants were still predominant in many age groups, female migration rates exceeded those for males in several age groups especially in Bangkok-Thon Buri. At ages 10-19, migration rates in the Northern, Bangkok-Thon Buri and the Southern Regions were higher for females than for males. How-

Table 18. Migration rates per thousand by age, sex and region, 1965-1970

Age and sex	Region					
	Total	Northern	Central	Bangkok-Thon Buri	Northeast	Southern
Male						
Total	66.3	53.3	80.4	109.7	48.5	54.0
5-9 years	45.8	44.1	54.6	49.8	36.9	35.9
10-19 years	59.5	46.3	67.6	125.3	40.7	46.1
20-29 years	120.8	91.2	163.6	203.2	79.8	100.8
30-39 years	76.4	61.4	95.2	92.1	58.8	69.8
40-49 years	52.9	45.2	65.4	54.2	43.4	47.1
50-59 years	39.9	37.6	46.8	39.6	31.2	33.2
60+ years	30.0	25.4	32.9	42.7	25.6	20.0
Female						
Total	56.9	46.0	63.1	111.8	39.6	43.2
5-9 years	45.7	43.8	53.5	52.1	37.3	24.2
10-19 years	62.5	47.7	66.6	152.1	40.5	46.4
20-29 years	82.9	66.8	103.2	178.3	53.8	71.2
30-39 years	52.5	47.6	66.5	77.6	42.2	44.8
40-49 years	37.4	36.1	45.3	52.8	31.1	31.1
50-59 years	30.0	29.6	34.9	52.9	22.8	22.7
60+ years	24.6	22.3	27.9	50.4	19.9	15.1

Source: Government of Thailand, *1970 Census of Population and Housing, Changwat Series* (Bangkok, National Statistical Office 1973), table 9.

example, the percentages of male migrants were 56, 59, 53, 56 and 59 per cent for the Northern, the Central, Bangkok-Thon Buri, the Northeast and the Southern Regions respectively^{3/}. During the 1965-

^{3/} Government of Thailand, *1960 Census of Population, Changwat Series* (Bangkok, Central Statistical Office, 1962) table 6.

ever, the peak ages and the age groups in which migration was concentrated are identical in both periods

^{4/} *Ibid.*, *1970 Census of Population and Housing, Changwat Series* (Bangkok, National Statistical Office, 1973), table 9.

^{5/} *Ibid.*, *1960 Census of Population, Changwat Series* (Bangkok, Central Statistical Office, 1962), table 6.

and for each region. Thus, despite the higher level of migration in the later period, age-sex selection in each region remained nearly the same, i.e. the sex difference in migration rates tended to be most marked in the peak age group 20-29 and least so at ages 5-9.

C. MIGRATION BY CHANGWAT

1. Volume and streams of five-year migrants

The volume and rate of internal migration in Thailand substantially increased from 1955-1960 to 1965-1970. In 1955-1960, approximately 830,000 persons, or 3.8 per cent of the population aged 5 and over, changed their *changwat* of residence. During 1965-1970, the corresponding number was 1,800,000, or 6.3 per cent of the population aged 5 years and over.

Ng's study^{6/} in 1969 reported the net balance of migration for each *changwat* for 1955-1960. Among the 71 *Changwat*, the 10 which gained and the 10 which lost the largest number of five-year migrants were as follows:

Gains		Losses	
1. Bangkok-Thon Buri	69,179	1. Roi Et (NE)	22,689
2. Udon Thani (NE)	33,367	2. Maha Sarakarm (NE)	18,606
3. Phetchabun (N)	17,327	3. Ayutthaya (C)	16,918
4. Lop Buri (C)	15,440	4. Nakon Ratchasima (NE)	14,972
5. Kamphaeng Phet (NE)	15,348	5. Ubon Ratchathani (NE)	14,759
6. Nong Khai (NE)	13,802	6. Khon Kaen (NE)	12,720
7. Chiang Rai (N)	13,151	7. Surin (NE)	11,396
8. Chaiyaphum (NE)	12,159	8. Srisaket (NE)	10,434
9. Yala (S)	8,737	9. Suphan Buri (C)	10,301
10. Prachuab Khiri Khan (C)	7,936	10. Chachoengsao (C)	9,040

Bangkok-Thon Buri had the largest gain - nearly 70,000 persons the resultant of 130,000 in-migrants and 60,000 out-migrants. However, its net migration rate of 35 per 1,000 population was not the highest. It was Kamphaeng Phet that experienced the highest relative gain, 112 per 1,000 population, followed by a rate of 82 per 1,000 population for Phetchabun. Among the net losers, the highest rate was for Maha Sarakarm, 45 per 1,000 population, while Roi Et ranked second with a rate of 43 per 1,000 population.^{7/} The in-and out-migrant rates in respect of each *changwat* for 1965-1970 are shown in table 19.

The extraordinary high in-migration rate of Kamphaeng Phet should be considered at this point. In

^{6/} Ng, Ronald C.Y., "Recent internal population movement in Thailand", *Annals of the Association of American Geographers*, vol. 59, No. 4, 1969, pp. 710-730.

^{7/} Wiwit Siripak, "Patterns and correlates of internal migration in Thailand," unpublished paper for M.A. degree, University of Chicago, 1965.

1960, the total population of this *changwat* was 173,346 and there were 19,445 in-migrants age 5 years and over. Obviously, this number of in-migrants was not the largest in the country but the rate of 135 per 1,000 population was by far the highest. By 1970, its population had grown to 339,862 inhabitants, approximately a 96 per cent increase. The in-migration rate also jumped to 198 per 1,000, the highest in the country. This extraordinary growth was due to the migration of many people from the Northern, Northeast, and Central Regions who migrated to the Self-Help Settlement of Thung Pho Thaley, one of the welfare settlements undertaken by the Government and the areas nearby. According to a study by Bhavichitra, the heavy influx of migrants began in 1957^{8/}. The majority came from Nakornsawan in the Northern Region and Ubon Ratchathani and Buriram in the Northeast. By 1967, the district in which the settlement is located had increased its inhabitants from the original 100 to approximately a quarter of the total population of the *changwat*. Further, the study indicates that almost 70 per cent of the migrants were attracted there by friends and relatives who migrated earlier.

In Bangkok-Thon Buri, the volume of in-migrants was, as always, the highest. The obvious reason for this high volume has been recognized in every study of internal migration in Thailand. Bangkok is the prime city, the only large political, commercial and industrial centre in the country. Each year this metropolitan area absorbs a substantial number of migrants. Between 1965 and 1970, approximately 300,000 persons from various *changwat* migrated to Bangkok-Thon Buri. Of these migrants, the proportions coming from the Central, the Northeast, Northern, and Southern Regions were 56, 22, 12 and 10 respectively. In terms of net migration, the area gained 170,000 in-migrants at a rate of 63 per 1,000 population.

Figure 2 shows the streams from the five *changwat* in each region which sent the largest number of migrants to Bangkok-Thon Buri. These 20 *changwat* accounted for 53 per cent of the total in-migrants. Distance played an important role. About 70,000 of the 82,000 migrants from the Central Region migrated from nearby areas, while fewer than a third came from the more distant Northern and Southern Regions. The small number from the Northern Region is partly due to heavy movement to Kamphaeng Phet from this region, as shown in figure 3. Lastly, of the 67,000 in-migrants from the Northeast, more than half mi-

^{8/} Chamreang Bhavichitra, "Study on migration in Thung Pho Thaley Resettlement area in the province of Kamphaeng Phet," *The Commemorative Monograph for the Second Sociological and Anthropological Exhibition at Thammasat University* (Bangkok, 1972).

Table 19. Rates of internal migration by *changwat*, 1965-1970
(rate per 1,000 population)

<i>Changwat</i>	In	Out	Net
Bangkok-Thon Buri	110.8	48.2	62.6
Northern Region			
Kamphaeng Phet	197.8	55.4	142.4
Chiang Rai	36.5	18.1	18.4
Chaign Mai	27.4	20.3	7.1
Tak	44.2	48.6	-4.4
Nakhon Sawan	62.0	100.7	-38.7
Nan	16.3	28.3	-12.0
Phichit	34.0	115.7	-81.7
Phitsanulok	66.8	52.6	14.2
Phetchabun	124.7	56.9	67.8
Phrae	17.2	36.6	-19.4
Mae Hong Son	34.6	16.3	18.3
Lampang	20.7	44.6	-23.9
Lamphun	18.3	46.1	-27.8
Sukhothai	32.2	49.8	-17.6
Uttaradit	40.0	46.7	-6.7
Uthai Thani	66.7	77.0	-10.3
Central Region			
Kanchanaburi	80.5	59.2	21.3
Chanthaburi	94.9	48.3	46.6
Chachoengsao	30.9	108.6	-77.7
Chon Buri	123.8	62.6	61.2
Chainat	37.2	120.9	-83.7
Trat	124.1	36.6	87.5
Nakhon Nayok	29.8	113.4	-83.6
Nakhon Pathom	51.1	108.7	-57.6
Nonthaburi	132.0	73.1	58.9
Pathum Thani	75.8	90.5	-14.7
Prachuab Khiri Khan	141.7	68.0	73.7
Prachin Buri	63.1	65.3	-2.2
Ayutthaya	36.4	109.1	-72.7
Phet Buri	43.2	72.6	-29.4
Rayong	153.5	51.2	102.3
Rat Buri	53.2	77.9	-24.7
Lop Buri	100.3	95.5	4.8
Samut Prakan	149.7	67.7	82.0
Samut Songkhram	21.7	100.3	-78.6
Samut Sakhon	40.4	78.0	-37.6
Sara Buri	77.4	113.3	-35.9
Sing Buri	40.2	95.0	-54.8
Suphan Buri	22.1	83.4	-61.3
Ang Thong	31.5	94.8	-63.3
Northeast Region			
Kalasin	24.1	56.8	-32.7
Khon Kaen	36.9	81.7	-44.8
Chaiyaphum	49.6	55.3	-5.7
Nakhon Phanom	31.9	27.4	4.5

Nakhon Ratchasima	57.4	62.1	-4.7
Buriram	52.4	47.0	5.4
Maha Sarakham	20.3	77.8	-57.5
Roi Et	15.3	72.9	-57.6
Loei	85.8	32.5	53.3
Sisaket	24.1	41.0	-16.9
Sakon Nakhon	51.1	33.5	17.6
Surin	21.7	48.8	-27.1
Nong Khai	142.6	32.4	110.2
Udon Thani	77.6	50.3	27.3
Ubon Ratchathani	21.9	40.5	-18.6
Southern Region			
Krabi	84.6	45.9	38.7
Chumphon	78.2	52.6	25.6
Trang	36.6	43.3	-6.7
Nakhon Si Thammarat	19.7	56.9	-37.2
Naratiwat	32.7	27.7	5.0
Pattani	30.3	59.7	-29.4
Phangnga	99.4	37.8	61.6
Phatthalung	31.2	58.5	-27.3
Phuket	79.6	65.3	14.3
Yala	103.4	60.2	43.2
Ranong	149.3	75.7	73.6
Songkhla	40.2	57.5	-17.3
Satun	150.3	28.4	121.9
Surat Thani	52.0	46.1	5.9

Source: Same as table 18.

grated from the three *changwat* of Nakhorn Ratchasima, Ubon Ratchathani and Roi Et.

For the Central Region, high in-migration to Nonthaburi and Samut Prakan was due to proximity to the Bangkok-Thon Buri metropolitan area. The two *changwat* are the nearest and most convenient for communication and transportation. Furthermore, Samut Prakan is the major port of the country and in fact, the major port for Bangkok, which is situated about 20 miles up river.

High in-migration rates in the *changwat* along the east coast - Chon Buri, Rayong, Trat and Chanthaburi resulted from various factors, the most important being the rapid expansion of farm land and development of agro-industries. The establishment of a United States military base, the Self-Help Settlement, the sapphire rush and the development of resort areas were also major pull factors for these *changwat*. The growth during the decade was 70 per cent for Rayong and it was almost 40 per cent for others.

For Prachuab Kiri Khan, the migration rate was high and regular. In 1960, its in-migration rate rank-



Figure 2. Major streams of migration to Bangkok-Thon Buri, 1965-1970



Figure 3. Major destination of migrants, 1965-1970

ed fourth in the country at approximately 100 per 1,000. In 1970, it ranked seventh at 140 per 1,000 population. This *changwat* is a transportation node between the Southern and the Central Regions. Furthermore, it is a *changwat* with several resort areas and vast virgin land suitable for sugar cane and pineapple farming.

In the Northeast, the highest in-migration rate was for Nong Khai, which had a rate in 1965-1970 of about 143 per 1,000 population. Nong Khai gained a large number of migrants from the dry area in the middle of the Northeast Region. The outstanding *changwat* of out-migration in this area were Khon Kaen, Nakhon Ratchasima, Maha Sarakarm and Roi Et. Loei also gained from the dry areas in the interior of the Northeast.

In the Southern Region, the in-migration rate for Satun jumped from 27 per 1,000 in 1955-1960 to 150 per 1,000 in 1965-1970. The population of this *changwat* grew by almost 70 per cent, from 70,000 to 120,000 during the decade. Of the 14,852 in-migrants, 43 per cent came from Songkhla, the neighboring *changwat* and almost 25 per cent from Nakhon Si Thammarat, also not very far away.

High in-migration rates are also observed in respect of several *changwat* along the border of the country. Satun and Yala border on Malaysia; Ranong on Burma, Trat on Democratic Kampuchea and Nong Khai and Loei are separated from the Lao People's Democratic Republic by the Mekong. Communication and transportation to and from these areas have been much improved in recent decades. Since immigration to Thailand from neighbouring countries has never been properly policed, it is hard to distinguish foreign from native migrants in the border *changwat*. Some of the in-migrants to these areas are doubtless immigrants from neighbouring countries, though no precise information in this regard is available.

2. Net migration by *changwat*

The net gain and loss for each *changwat* are presented in figure 4. The highest gainers by regions are Kamphaeng Phet (Northern), Satun (Southern), Nong Khai (Northeast), and Rayong (Central). The rates for these *changwat* were 142, 102, 110 and 122, respectively. In terms of net loss, the highest rates were 82 for Phichit (Northern), 84 for Nakhon Nayok (Central), 58 for Roi Et (Northeast), and 37 for Nakhon Si Thammarat (Southern). It is interesting to note that most of the *changwat* in the central parts

of the Central and Northeast Regions lost population through migration at a rate higher than 30. On the whole, the 32 gaining *changwat* experienced average net gains of 48 per 1,000 population and the 39 losing *changwat* experienced average net losses of 36 per 1,000. For all *changwat*, in-migration rates ranged from 15 to 198 per 1,000, and the out-migration rate ranged from 16 to 12. The distribution of net migration rates was as follows:

Net migration rates per 1,000 population	Number of <i>changwat</i>	
	Gaining	Losing
120+	2	-
100-119	2	-
80-99	2	3
60-79	6	5
40-59	5	6
20-39	4	11
10-19	5	8
10-	6	6
Mean	47.6	35.9

The *changwat* with heaviest out-migration in the Central Region were Chachoengsao, Chainat, Nakhon Nayok, Nakhon Pathom, Ayutthaya, Samut Songkram, Sara Buri, Suphan Buri, Sing Buri, and Ang Thong. These *changwat* experienced out-migration rates of almost 100 per 1,000 or higher; hence despite high natural increase, their populations grew during the decade by 10 per cent or less. For 1960-1970, the average percentage increase in population in the 71 *changwat* throughout the country was 32 per thousand.

D. MIGRATION TO MUNICIPAL AREAS

At the outset, it should be noted that the Thai Censuses have never adopted a definition of urban or rural residence. However, the population living in a municipal area is generally regarded as urban.^{9/} In the 1970 Census of Population and Housing the persons who were reported as migrants were also classified as municipal or non-municipal residents. Publications relating to the 1970 census present for the first time data on lifetime and inter-*changwat* migration by five-year age groups and by sex for each municipal area. However, information on the

^{9/} Municipal areas in Thailand are divided into three categories: *Nakhon* (city), *muang* (town) and *tambon* (commune). Each *changwat* has at least one municipal area, a *nakhon* or *muang* which is the administrative seat of the *changwat*. Although most municipal areas have characteristics which are recognized as urban, some of these areas are so geographically extensive that the population is actually more rural than urban.

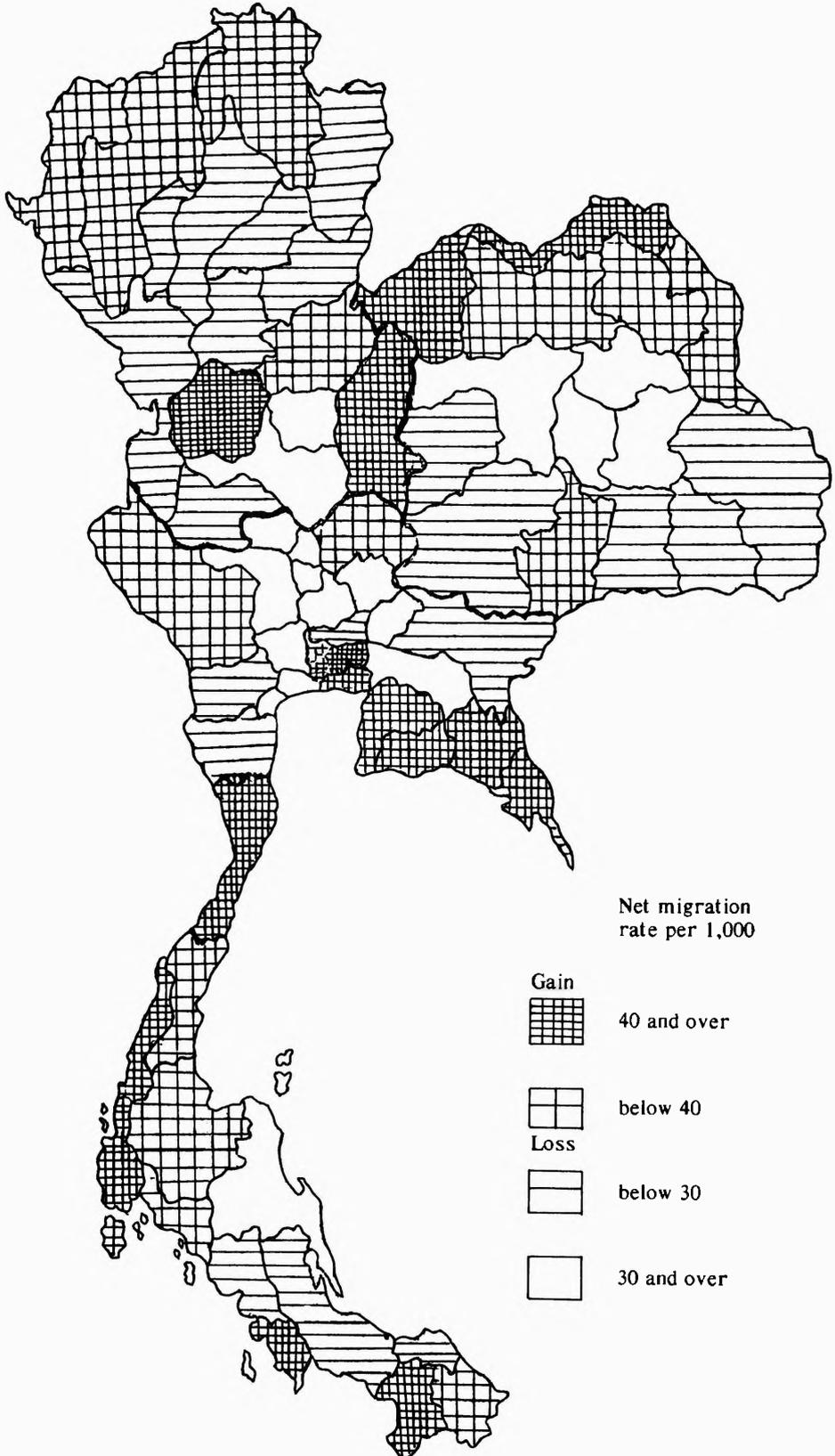


Figure 4. Net migration by *changwat*, 1965-1970

origin of migrants is not available. Therefore, a direct measure of rural to urban, or urban to urban migration cannot be made. Nevertheless patterns of migration to municipal areas, about which no earlier study was attempted, can be investigated. In this section, Bangkok-Thon Buri is separately considered because of its extraordinary characteristics, as already indicated.

1. Lifetime migration in municipal areas

In 1970, there were 120 municipal areas of which only three, Bangkok, Thon Buri, and Chiang Mai, were *Nakhon* or cities while 82 were towns and 35 commune municipalities.^{10/} These municipal areas together accounted for 1105.6 km², an increase of 29.2 per cent over the area of municipalities in 1960. The total population in the 120 municipalities in 1970 was approximately 4,500,000. When Bangkok and Thon Buri are excluded, the 118 municipal areas together had about 2,000,000 inhabitants. Among these, 23 per cent were reported as lifetime migrants, (persons who were born in a different *changwat* than that of current residence). This proportion is quite large compared to the 14 per cent of lifetime migrants for the country as a whole at the time.

Table 20 shows the number of persons who were

tions. Clearly the variation is not great. It should be noted that these percentages of lifetime migrants are higher than the percentage for the entire country, as shown in table 11. However, migration was largely intraregional. A classification of the population in municipal areas by region of current residence and region of birth (table 21) shows that approximately 90 per cent of the population was living in the region of birth. The significance of distance is obvious. In each region, about 5 per cent of the lifetime migrants moved from a neighbouring region. For example, 5.0 per cent of the lifetime migrants in the Northern Region came from the Central Region; 4.4 per cent of those in the Central Region came from Bangkok-Thon Buri. In the Northeast Region 4.7 per cent and in the Southern Region 4.6 per cent of the lifetime migrants originated from the Central Region.

2. Five-year migration in municipal areas

Of the total population aged 5 years and over in municipal areas, approximately 226,000 or 14 per cent, were reported as persons who had changed their *changwat* of residence between 1965 and 1970. Table 22 shows that male migrants outnumber female migrants in all age groups except 10-19 and 60 years and over. The difference between the proportions for municipalities and the country as a whole

Table 20. Number of persons in municipal areas by region of birth, 1970

Region of present residence	Number and percentage of persons born in							
	Number	Total Percentage	changwat of residence		Other <i>changwat</i>		Foreign countries	
			Number	Percentage	Number	Percentage	Number	Percentage
Northern	439,854	100.0	333,001	75.7	94,451	21.5	12,402	2.8
Central	717,669	100.0	534,502	74.5	159,802	22.3	23,365	3.2
Northeast	445,273	100.0	320,643	72.0	110,518	24.8	14,112	3.2
Southern	454,992	100.0	331,577	72.9	105,919	23.3	17,496	3.8
Total	2,057,788	100.0	1,519,723	73.8	470,690	22.9	67,375	3.3

Source: Same as table 13.

living in municipal areas by *changwat* of birth and *changwat* of residence. In 1975, the municipal areas in the Northeast had the largest percentage of lifetime migrants, 24.8 per cent. The Northern Region had the lowest percentage, 21.5, and the Southern and the Central Regions had intermediate propor-

is rather large. In fact, migration rates in municipal areas are twice as large as those of the nation for every age group. For example, migration rates at ages 10-19 and 20-29 are 117.7 and 221.0 per 1,000 population in the municipal areas. The corresponding rates for the whole country are 61.0 and 104.1

^{10/} Thailand, *1970 Census of Population and Housing, Whole Kingdom* (Bangkok, National Statistical Office, 1973), p. xv.

Table 23 presents the distribution of migrants in municipal areas by region of previous and current residence. The highest percentage of intraregional

Table 21. Population of municipal areas by region of birth^{a/} and region of present residence, 1970

Region of birth	Region of present residence							
	Northern		Central		Northeast		Southern	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Northern	383,071	90.2	14,808	2.1	7,592	1.8	4,172	1.0
Central	21,003	5.0	623,607	90.0	19,472	4.7	19,582	4.6
Bangkok- Thon Buri	11,897	2.8	30,667	4.4	15,455	3.7	11,288	2.7
Northeast	6,267	1.5	15,985	2.3	373,569	89.2	6,417	1.5
Southern	2,272	0.5	7,635	1.1	2,616	0.6	382,500	90.2
Total	424,510	100.0	692,702	100.0	418,704	100.0	423,959	100.0

Source: Government of Thailand, 1970 Census of Population and Housing, Whole Kingdom (Bangkok, National Statistical Office, 1973), population table 8B.

Note: a/ Exclude migrants with unknown *Changwat* of birth.

Table 22. Number of in-migrants^{a/} by age and sex, municipal areas, 1965-1970

Age	Total population in municipal areas	Number of in-migrants		
		Total	Male	Female
All ages	1,776,831	226,119	121,593	104,526
5-9 years	285,154	26,947	13,693	13,254
10-19 years	526,195	61,959	29,892	32,067
20-29 years	326,914	72,237	39,835	32,402
30-39 years	257,803	36,678	21,921	14,757
40-49 years	168,408	15,953	9,691	6,262
50-59 years	108,263	7,072	4,028	3,044
60 years and over	104,094	5,273	2,533	2,740

Source: Government of Thailand, 1970 Census of Population and Housing, *Changwat* Series (Bangkok, National Statistical Office, 1973) Table 9B.

Note: a/ Exclude migrants with unknown age.

migrants during the 1965-1970 period was found in the Southern Region. The smallest percentage was found in the Central Region. To some extent this region is a satellite of Bangkok-Thon Buri, but it also adjoins every other region. Consequently the Central Region has the highest percentage of interregional migrants and it ranked first in terms of absolute gain. The Southern Region, on the other hand, adjoins only one region and is far away from many parts of the country.

For the country as a whole, in-migration rates for the municipal areas in each region are shown by age and sex in table 24. The highest rates are found

in the Northeast, with male rates slightly higher than those for females. In the Northern Region, migration rates are lowest, especially among females, because they tend to move to the Bangkok-Thon Buri metropolitan area rather than to other urban areas. The Central Region also has a low rate of in-migration to municipal areas because of migration to Bangkok-Thon Buri. The total migration rates for both sexes in regard to the Central and South Regions are almost the same. One in eight persons in the municipal areas of the Central and the Southern Regions is an in-migrant, as against one in six in the Northeast and one in 10 in the Northern Region.

Table 23. Number of migrants between 1965 and 1970 in municipal areas, and percentage distribution by region, 1970

Region of present residence	Total	Region of previous residence				
		Northern	Central	Bangkok-Thon Buri	Northeast	Southern
Northern	38,308	21,941	6,657	6,092	2,503	1,115
Central	74,616	9,339	35,638	16,417	8,782	4,440
Northeast	66,833	4,169	9,457	10,766	40,759	1,682
Southern	46,372	1,635	5,451	6,640	1,919	30,727
Total	226,129	37,084	57,203	39,915	53,963	37,964
Percentage distribution by region of present residence						
Northern	100.0	57.3	17.4	15.9	6.5	2.9
Central	100.0	12.5	47.8	22.0	11.8	5.9
Northeast	100.0	6.2	14.2	16.1	61.0	2.5
Southern	100.0	3.5	11.8	14.3	4.1	66.3
Total	100.0	16.4	25.3	17.6	23.9	16.8
Percentage distribution by region of previous residence						
Northern	16.9	59.2	11.7	15.3	4.6	2.9
Central	33.0	25.2	62.3	41.1	16.3	11.7
Northeast	29.6	11.2	16.5	27.0	75.5	4.4
Southern	20.5	4.4	9.5	16.6	3.6	81.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as table 13.

Table 24. Migration rates in municipal areas by age, sex and region, 1965-1970

Age and sex	Total	Region			
		Northern	Central	Northeast	Southern
Both sexes					
5-9 years	94.5	76.1	86.8	138.5	81.0
10-19 years	117.7	90.0	110.9	159.8	115.1
20-29 years	221.0	177.7	214.0	276.9	210.4
30-39 years	142.3	110.8	131.1	200.7	130.2
40-49 years	94.7	74.2	91.5	134.6	86.9
50-59 years	65.3	53.6	65.0	86.3	60.2
60 years and over	50.6	35.3	54.0	73.3	45.1
Total	127.3	98.9	120.0	178.4	119.3
Male					
5-9 years	94.6	76.3	88.0	137.7	80.2
10-19 years	113.8	87.2	110.7	154.1	106.3
20-29 years	247.0	203.8	256.1	292.1	222.0
30-39 years	167.7	133.3	157.6	240.1	151.1
40-49 years	113.5	91.0	111.4	158.0	101.2
50-59 years	75.2	64.1	75.5	99.4	66.0
60 years and over	54.4	35.8	62.4	76.8	44.1
Total	137.4	108.9	135.4	186.8	122.9
Female					
5-9 years	94.4	76.0	85.6	139.4	81.9
10-19 years	121.6	92.9	110.0	165.4	123.8
20-29 years	195.9	151.7	170.7	262.6	199.7
30-39 years	116.1	89.1	103.4	177.8	108.4
40-49 years	75.4	57.7	71.1	110.2	71.2
50-59 years	55.6	43.5	55.0	73.5	54.2
60 years and over	47.7	34.9	47.2	70.6	45.0
Total	117.2	89.2	104.6	170.0	115.7

Source: Same as table 13.

In terms of age selection, the Northeast experienced the highest migration rate in every age group. At the peak ages, 20-29, one in four persons in the municipal areas of the Northeast was a migrant. Even for the youngest and oldest age groups, migration rates were high. As for the Central, the Northern, and the Southern Regions, their age patterns are similar to the Northeast, but the rates are much lower.

Males outnumber females among migrants to municipal areas as is shown by the sex ratio of migrants in table 25. By region, the ratio of male to female migrants in municipal areas is highest for the Central Region. The largest differences between male and female migrants is found between ages 20-49, with sex ratios of 154.0 and 160.1. In the Northern Region, it is evident that while women were migrating to Bangkok-Thon Buri, men were moving within the Region. The sex ratio of migrants in the municipal areas of the Northern Region was 119.2, as against 79.1 in Bangkok-Thon Buri. Finally, it should be noted that, at ages 10-19 the number of female migrants exceed that of male migrants in every region except the Central. This is also true at the older ages, as is evident from table 25.

3. Migration and growth of municipal areas

The growth of the Bangkok-Thon Buri metropolitan area has always been of major concern of the country. During the 1947-1960 period, the population of Bangkok-Thon Buri increased by 117.9 per cent. But between 1960 and 1970, this percentage had dropped to 46.5. This indicates that other areas were also experiencing high growth. Between 1960 and 1970, there were 15 *changwat* in which the

population in municipal areas increased by more than 45 per cent. For 33 *changwat*, however, the percentage increase of population in their municipalities fell between 15 and 35 per cent. In six *changwat*, the population of municipal areas increased by 35 to 45 per cent, while in another 14, the percentage increases ranged from 1 to 15. Only one *changwat* registered a decrease of population in municipal areas.

Table 26 show that migration played an important role in those *changwat* which experienced a substantial growth of municipal population. Of the 15 *changwat*, eight had increases in the number of municipalities. They were Krabi, Samut Prakan, Kamphaeng Phet, Ubon Ratchathani, Roi Et, Chainat, Samut Songkram and Trang. The rapid growth of 226.5 per cent in Krabi from 1960 to 1970 resulted in a population which included 41.5 per cent lifetime migrants and 38.8 per cent five-year migrants. In Trat the population in municipalities more than doubled as a consequence of high growth in the whole *changwat* through migration and natural increase. This is also true in Samut Prakarn. The municipal population of Udon Thani, which increased by 82 per cent between 1960 and 1970 consisted of 45 per cent lifetime migrants and 23 per cent five-year migrants in 1970. The area under municipalities in this *changwat* had not changed, but it was one of a few *changwat* in the Northeast which has large municipal areas. It had the highest percentage of lifetime migrants, 44.9, while Krabi had the highest percentage of five-year migrants, 38.8.

Table 26 also indicates that five-year migrants usually constitute about one-half of the lifetime migrants. On the average, the municipal areas in

Table 25. Sex ratio^a of migrants in municipal areas by age and region, 1965-1970

Age	Region			
	Northern	Central	Northeast	Southern
All ages	119.2	130.3	108.0	105.9
5-9 years	104.2	105.7	101.8	100.8
10-19 years	93.2	101.1	91.0	84.9
20-29 years	134.1	154.0	117.0	102.9
30-39 years	144.4	160.1	141.7	144.9
40-49 years	155.0	160.1	148.6	154.1
50-59 years	140.5	130.4	132.2	128.5
60 years and over	78.6	108.0	85.7	83.1

Source: Same as table 13.

Note: ^a/Number of males per 100 females

Table 26. *Changwat* with high growth in municipal areas, 1960-1970

<i>Changwat</i>	Population in municipal areas		Percentage increase	Percentage lifetime migrants 1970	Percentage 5-year migrants 1970
	1960	1970			
Krabi (S)	2,685	8,764	226.4	41.5	38.8
Trat (C)	3,813	7,917	107.6	27.6	12.2
Samut Prakan (C)	28,961	55,439	91.4	29.6	14.2
Udon Thani (NE)	30,884	56,218	82.0	44.8	22.9
Kamphaeng Phet (N)	7,137	12,378	73.4	30.9	12.3
Ranong (S)	5,993	10,301	71.9	41.6	21.0
Satun (S)	4,369	7,315	67.4	44.3	22.3
Ubon Ratchathani (NE)	51,407	82,714	60.9	15.0	8.3
Roi Et (NE)	13,055	20,242	55.1	16.3	8.5
Chainat (C)	8,693	13,329	53.3	20.1	8.1
Rayong (C)	9,701	14,846	53.0	27.8	10.5
Samut Songkram (C)	20,333	30,540	50.2	9.9	3.8
Trang (S)	22,248	32,985	48.3	27.4	11.7
Pathum Thani (C)	3,013	4,365	44.9	29.6	18.1
Nakhon Ratchasima (NE)	57,455	83,671	45.6	27.8	13.5

Source: Government of Thailand, *Census of Population: 1960 and 1970, Whole Kingdom*, tables 1A, 1B and 8B).

these *changwat* contained more than 20 per cent lifetime migrants and 10 per cent five-year migrants. It should be noted that total in-migration rates were also high in many of the *changwat* whose municipal population also experienced high rates of growth. Such *changwat* are Trat, Samut Prakan, Kamphaeng Phet, Satun and Rayong.

4. Age and sex differentials for Bangkok-Thon Buri

Between 1965 and 1970, approximately 145,000 males and 153,000 females migrated to Bangkok-Thon Buri. This number is more than twice the 70,000 males and 60,000 females who moved to this metropolitan area between 1955 and 1960. Furthermore, female migrants outnumbered males in the 1965-1970 period, a striking reversal of the difference usually encountered. The female in-migration rate for 1965-1970 was 112 per 1,000 population while that for males was 110 (see table 27). The largest proportion of migrants came from the Central Region, a region from which male migrants outnumbered female migrants. Females in the Northern and Northeast Regions are more attracted to the metropolitan area than males. Migration from the Southern Region to Bangkok-Thon Buri is least in number and the differences between the sexes is small, with male migrants from that region

slightly exceeding female migrants.

In terms of age selection, the peak ages of migrants, 20-29, are consistent for both males and females from every region. Where females are the most numerous, they are concentrated at ages 5-9, 10-19, 50-59, and 60 years and over. In other words, females are in excess of males at the youngest and oldest ages. This is true for all groups of migrants from the four regions to Bangkok-Thon Buri.

It should, however, be noted that the sex selectivity of migrants to Bangkok-Thon Buri was very different in 1965-1970 than during the earlier period. Table 28 presents the sex ratio of migrants to Bangkok-Thon Buri during the 1955-1960 and 1965-1970 periods. Between 1955 and 1960, male migrants outnumbered female migrants from every region except the North Region. In the later period, only the Central and the Southern Regions contributed more males than females. Thus while the age patterns of migration from the four regions remained nearly constant, the sex selectivity had changed in favour of females.

The substantial increase of female migrants to the metropolitan area is due to many factors. Besides the economic, such social factors as friends, relatives, marriage and education are also pro-

Table 27. Migration rates^{a/} per thousand by region of previous residence, Bangkok-Thon Buri, 1965-1970

	Total	Previous residence			
		Northern	Central	Northeast	Southern
Male					
All ages	109.7	12.2	63.0	23.1	11.4
5-9 years	49.8	5.5	33.5	6.4	4.5
10-19 years	125.3	15.9	64.7	29.3	15.4
20-29 years	203.2	19.9	116.1	46.5	20.6
30-39 years	92.1	9.6	56.7	18.6	7.1
40-49 years	54.2	6.3	35.5	7.6	4.7
50-59 years	39.6	4.8	27.4	3.2	4.2
60 years and over	42.7	4.7	31.5	3.2	3.3
Female					
All ages	111.8	14.9	60.3	26.4	10.3
5-9 years	52.1	6.3	34.4	6.6	4.8
10-19 years	152.1	20.7	72.7	44.4	14.6
20-29 years	178.3	24.7	91.4	45.6	16.6
30-39 years	77.6	10.1	49.0	12.3	6.2
40-49 years	52.8	6.8	36.2	5.1	4.6
50-59 years	52.9	6.3	37.6	4.5	4.4
60 years and over	50.4	5.4	37.4	3.8	3.8

Source: Government of Thailand, *1970 Census of Population and Housing*, Bangkok and Thon Buri (Bangkok, National Statistical Office, 1973), table 9.

Note: ^{a/} Base for rates is population of Bangkok-Thon Buri in 1970.

Table 28. Sex ratio^{a/} of in-migrants by age and region of last residence, Bangkok-Thon Buri, 1955-1960 and 1965-1970

Age	Total	Previous residence			
		Northern	Central	Northeast	Southern
1965 - 1970					
All ages	94.9	79.1	101.0	84.7	107.6
5-9 years	99.2	90.4	101.0	100.4	96.5
10-19 years	80.6	76.1	87.0	64.7	103.1
20-29 years	108.3	76.6	120.8	96.8	118.3
30-39 years	116.1	93.5	113.2	147.8	113.2
40-49 years	102.7	92.3	98.0	149.2	103.5
50-59 years	70.3	71.1	68.4	65.6	89.9
60 years and over	62.7	64.5	62.3	61.5	65.4
1955 - 1960					
All ages	114.6	92.0	113.8	123.6	136.2
5-9 years	108.0	100.3	106.1	124.3	114.8
10-19 years	94.5	91.4	92.3	94.7	115.8
20-29 years	140.3	91.8	144.8	145.5	176.1
30-39 years	120.6	101.9	116.2	164.3	112.3
40-49 years	99.3	91.9	96.9	119.0	108.6
50-59 years	74.5	73.0	71.6	87.6	96.4
60 years and over	64.5	55.7	62.4	81.0	87.8

Source: Same as table 27.

Note: ^{a/} Number of males per 100 females.

minent. Meinkoth's study of migration from the Northeast to Bangkok in 1957 found that 90 per cent of the migrants were males. Among the married only 10 per cent were accompanied by their wives. Almost a quarter stated that they had relatives in Bangkok and about a third had come to join friends and relatives. Only 2 per cent planned to stay permanently, but many became permanent residents when they found satisfactory employment.^{11/}

Meinkoth's findings can be reconciled with the finding of high rates of female migration from the Northeast. During 1955-1960, approximately 15,000 males migrated from the Northeast as against 12,000 females. Those male migrants who had come alone and who were successful in the metropolitan area doubtless sent for their wives and children and probably persuaded other friends or relatives to join them.

Migration from the Central and the Southern Regions exhibits similar age and sex selectivity in the two periods. The proportion of females increased with time in both streams. In all four regions, differences in the sex ratio at age 5-9, 50-59 and 60 years and over are relatively small. At the oldest ages, female migrants outnumber males in every stream.

It is important to note that in a developing country the underenumeration of male migrants in a metropolitan area tends to be greater than for females. It is more likely that a man will lead a solitary existence, while a woman will usually come only if there are friends or relatives with whom to live. Since the residences of men are sometimes unstable, male migrants can be easily omitted from the census.

^{11/} Marian R. Meinkoth, "Migration in Thailand with particular reference to the Northeast", *Economic and Business Bulletin*, vol. 14, No. 4, June 1962, pp. 3-45.

E. REASONS FOR MIGRATION

Studies on migration in Thailand indicate that there are several reasons for migration but that the most important is economic. In 1957, for example, Meinkoth's study on movement from the Northeast to Bangkok indicated that the main reason for migration was obviously economic.^{12/} Among the 415 migrants interviewed, approximately 80 per cent stated economic reasons for migration while about 15 per cent came to Bangkok because of inability to grow rice or lack of food. In 1967, Bhavichitra's study on migration in Kamphaeng Phet also concluded that economic factors had very strongly influenced the decision to move.^{13/}

In 1974, a comprehensive study on reasons for migration was prepared by Prachuabmoh and Tirasawat.^{14/} According to this study, the majority of migrants moved because of economic reasons as shown in table 29. Of all migrants, 11 per cent cited the educational factor as a reason for migration while about 15 per cent stated family factors, including marriage, following relatives or friends and return home. A comparison of lifetime migrants in the Bangkok-Thon Buri metropolitan area with other urban places shows that the percentage of migrants who gave the educational factor as a reason for migration is doubtlessly higher in the metropolis. However, the percentage of migrants who moved in order to get a job was higher in other urban areas than Bangkok-Thon Buri. Finally, the study indicates that reasons for migration vary with the life cycle, for the proportion of migrants who stated educational and family factors decreases as age increases.^{15/}

^{12/} *Ibid.*, pp. 6-9, 31-33.

^{13/} Chamreang Bhavichitra, *loc.cit.*, pp. 116-134.

^{14/} Visid Prachuabmoh and Penporn Tirasawat, *Internal Migration in Thailand, 1947-1972*, Paper No. 7 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1974).

^{15/} *Ibid.*, pp. 44-57.

Table 29. Percentage distribution of lifetime migrants by stated reason for moving to present place of residence, by urban status, and by number of moves

Stated reason for move	Urban status		Number moves		Total
	Bangkok-Thon Buri	Other urban	Single move	Multiple move	
Better standard of living	2.1	3.3	3.5	2.1	2.7
To look for work	13.8	4.9	15.0	5.6	9.4
To get a job	25.9	32.0	26.6	30.5	28.9
Employer required move	8.0	22.7	5.5	21.8	15.3
To continue studying	16.5	5.8	16.5	7.7	11.2
Following relatives	10.6	4.9	9.5	6.6	7.8
Following friends	0.7	0.2	0.9	0.2	0.5
To return home	2.8	2.3	0.0	4.2	2.5
Marriage	2.1	7.2	6.1	3.7	4.6
Housing and land	3.4	2.6	2.6	3.3	3.0
Other reason	9.2	10.7	8.4	11.0	10.0
No reason	1.6	2.1	2.3	1.5	1.9
Unknown	3.4	1.2	3.2	1.7	2.3
Total percentage	100.0	100.0	100.0	100.0	100.0
Number of cases	436	428	346	518	864

Source: Visid Prachuabmoh and Penporn Tirasawat, *Internal Migration in Thailand 1947-1972*, Paper No. 7 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1974), table 9.

F. FACTORS ASSOCIATED WITH MIGRATION

Migration in Thailand is responsive to social and economic opportunities. As indicated earlier, Bangkok-Thon Buri is the central attraction for migrants. This is not unexpected since an area which has superior opportunities for employment, income and education usually experiences a high rate of in-migration. As shown in table 30, the relationship between socio-economic conditions and net migration is quite notable. Bangkok-Thon Buri, highly urbanized and extensively modernized, attracts migrants from every region while the Northeast, the least developed region, experiences the highest loss of migrants. Movement within the Northeast was also large because of the search for better opportunities. The losses through migration in the Central Region can be explained by its nearness to Bangkok-Thon Buri. Migrants in the Central Region were interregional rather than intraregional.

Gain in the North was largely an inflow from the Central Region and the Northeast. Migrants were attracted there because of the relatively high level of economic development. The low volume and rate of interregional migration in the Southern Region is due to its isolation from other regions, except the Central Region. Further, the Southern Region is

itself rather well developed. It ranked second in terms of urbanization and education, and third in income and industry. The region experienced the lowest rate of interregional migration, but both volume and rate of intra-*changwat* and intraregional migration are large. In sum, economic conditions and progress have an impact on volume and flow of migration regionally.

Table 30. Socio-economic variables and net interregional migration by region, 1965-1970

Region	Family income 1967 a/	Percentage urban b/	Percentage in non-agricultural industry c/	Percentage attending school d/	Average yield of rice per rai (hgs)	Net migration rate 1965-1970
Northern	28,332	5.9	14.4	30.9	408.9	1.0
Central	36,236	9.5	28.6	33.9	285.2	-12.6
Bangkok-Thon Buri	54,846	81.1	90.1	45.9	—	48.2
Northeast	30,484	3.7	8.2	27.6	240.6	-8.7
Southern	30,750	10.7	17.7	34.9	255.1	-2.7
Total	36,536	13.2	20.7	32.3	289.8	-

Sources: Government of Thailand, *1970 Census of Population and Housing* (Bangkok, National Statistical Office, 1973); *ibid.*, *Final Report-Crop Cutting Survey, 1970*.

Notes: (a) Average annual income in baht (20 bahts = \$US1 approximately).

Source: Socioeconomic Survey, Bangkok National Statistical Office, 1968.

(b) Percentage of population living in municipal areas, 1970.

(c) Percentage of economically active population aged 11 and over in non-agricultural industry, 1970.

(d) Percentage of population aged 6-29 who were attending school on the census date, 1970.

Chapter III

BASIC COMPOSITION OF THE POPULATION

A. SEX COMPOSITION

The distribution of the population of Thailand by males and females for the various census years is shown in table 31. It will be observed that the relative proportion of males and females in the total population has been changing over the years, though the variations have been only of very minor magnitude. At the first two censuses, the females outnumbered the males, but in the subsequent four censuses the position was reversed. According to the census held in 1970, there is a slight excess of females over males in the total population.^{1/}

A comparison of the sex-ratios (number of males per 100 females) by age groups in 1960 and 1970 is given in table 32. It will be seen that in 1960, males were more numerous than females at all ages below 24 years and 30-49 years while in all other age groups females outnumbered the males. In 1970, the males outnumbered the females only in three age groups, below 15 years, 40-44 years and 45-49 years. In both 1960 and 1970 males outnumbered the females in the younger age group 0-14 years while females were more than males in the older age groups, 50 and above.

The sex-ratios also vary from one region to another as will be seen from table 33. Both in 1960 and 1970, the number of males exceeded the number of females in the Northern and Southern Regions though there has been a decline in the sex-ratios between 1960 and 1970. In the Northeast Region, females outnumbered males and the sex-ratio remained constant in both years. The Central Region in 1960 had an excess of males over females but in 1970 the position was reversed.

The balance between the sexes in the total population is a function of a number of factors such as sex-ratio at birth, sex differences in mortality, sex-selective migration and differential completeness of coverage of the two sexes in census enumerations. "Sex structure is conveniently described by a series of 'sex-ratios' at various ages, most commonly by the

^{1/} However, an evaluation of the 1970 census data indicates a higher degree of underenumeration among males (5.5 per cent) relative to female (4.0 per cent). Adjusted census totals therefore yield a slight excess of males over females. See Fred Arnold and Mathana Phananimai, *Revised Estimates of the 1970 Population of Thailand*, Research Paper No. 1 (Bangkok, National Statistical Office, 1975).

number of males per 100 females in the same age-group (the 'masculinity ratio'). This ratio at birth is commonly around 105 in countries having reasonably good statistics, and varies only within a fairly narrow range from country to country, and within a given country from year to year. However, since age-specific mortality rates are usually greater among males than among females at every age, this ratio tends to be gradually reduced with age, eventually falling below 100. The age at which equality between the number of males and females is attained depends upon the particular schedule of mortality. Beyond this age, the number of females begin to exceed the number of males, and the excess grows larger with advancing age. Deviations from the pattern described above, when they occur, are usually caused by atypical patterns of mortality or large scale selective migration".^{2/}

Adequate and reliable data for past years are not available to determine the extent of the influence of the various factors on the sex-composition of the population of Thailand. However, data for recent years indicate that the sex-ratio at birth (number of male births per 100 female births) has been around 108.^{3/} However, age-specific mortality rates have been greater for males than for females at almost all ages during the 1960-1970 period. It is also likely that more males than females would have emigrated in recent years for purposes of studies and employment in foreign countries, thus partly explaining the excess of females over males in 1970.

Perhaps the most important factor is the differential completeness in the enumeration of the two sexes. An analysis of the 1970 census indicates that there was an over-all net underenumeration in the census of 1,701,900 persons or 4.7 per cent of the estimated population of 36,099,200. The rate of underenumeration for males, 5.5 per cent, was higher than the rate of 4.0 per cent for females. The estimated population given in table 34 shows that there were more males than females in the total population and

^{2/} United Nations, *The Determinants and Consequences of Population Trends*, New Summary Findings on Interaction of Demographic, Economic and Social Factors, Vol. I (Sales No. E. 71.X111.5), p. 262.

^{3/} This ratio is based on the number of registered births. While there is considerable underregistration of births, it is suspected that the extent of underregistration is greater in regard to female births.

Table 31. Enumerated population by sex, Thailand: census years 1911 to 1970

Census year	Population enumerated at the censuses						Sex-ratio (M/100F)
	Both sexes		Male		Female		
	Number	Percentage	Number	Percentage	Number	Percentage	
1911	8,266,408	100.0	4,122,168	49.9	4,144,240	50.1	99.5
1919	9,207,355	100.0	4,599,667	50.0	4,607,688	50.0	99.8
1929	11,506,207	100.0	5,795,065	50.4	5,711,142	49.6	101.5
1937	14,464,105	100.0	7,313,584	50.6	7,150,521	49.4	102.3
1947	17,442,689	100.0	8,722,155	50.0	8,720,534	50.0	100.0
1960	26,257,916	100.0	13,154,149	50.1	13,103,767	49.9	100.4
1970	34,397,374	100.0	17,123,862	49.8	17,273,512	50.2	99.1

Sources: United Nations, *Demographic Yearbook, 1962* (Sales No. E/F. 62. XIII.1) table 7; Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 1; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 1A.

Table 32. Age-specific sex ratios, Thailand, 1960 and 1970

Age group	Sex-ratio (males per 100 females)	
	1960	1970
0-14	101.9	102.6
15-19	102.1	97.2
20-24	100.6	97.1
25-29	97.9	96.0
30-34	101.6	97.2
35-39	101.8	99.5
40-44	100.9	101.0
45-49	102.2	100.3
50-54	97.9	96.4
55-59	97.7	96.7
60-64	93.3	92.8
65 and over	79.9	78.3
All ages	100.4	99.1

Source: Government of Thailand, *Statistical Yearbook Thailand No. 30, 1972-1973*, table 14.

Table 33. Sex-ratio ^{a/} by major region, Thailand, 1960 and 1970

Region	Sex-ratio	
	1960	1970
Whole Kingdom	100.4	99.1
Central	100.9	98.2
Northeast	98.6	98.6
Northern	101.0	100.3
Southern	103.0	100.8

Source: Same as table 31.

Note: ^{a/} Number of males per 100 females.

the sex-ratio should have been 100.7, bringing it closer to the sex-ratio for the 1960 census. It is also evident from the table that underenumeration varies considerably among age groups with the largest deficit in the early childhood years, 0-4 years, and young adult ages 15-29 years.

B. AGE DISTRIBUTION

1. National pattern

The proportionate distribution of the population by age groups for both sexes as reported in the 1970 census are shown in table 35 and figure 4. A general decline in the proportion of the total population is apparent at successive ages. This feature is characteristic of a population that has over the years been subject to more or less stable levels of mortality or fertility and relatively unaffected by excessive external migration.

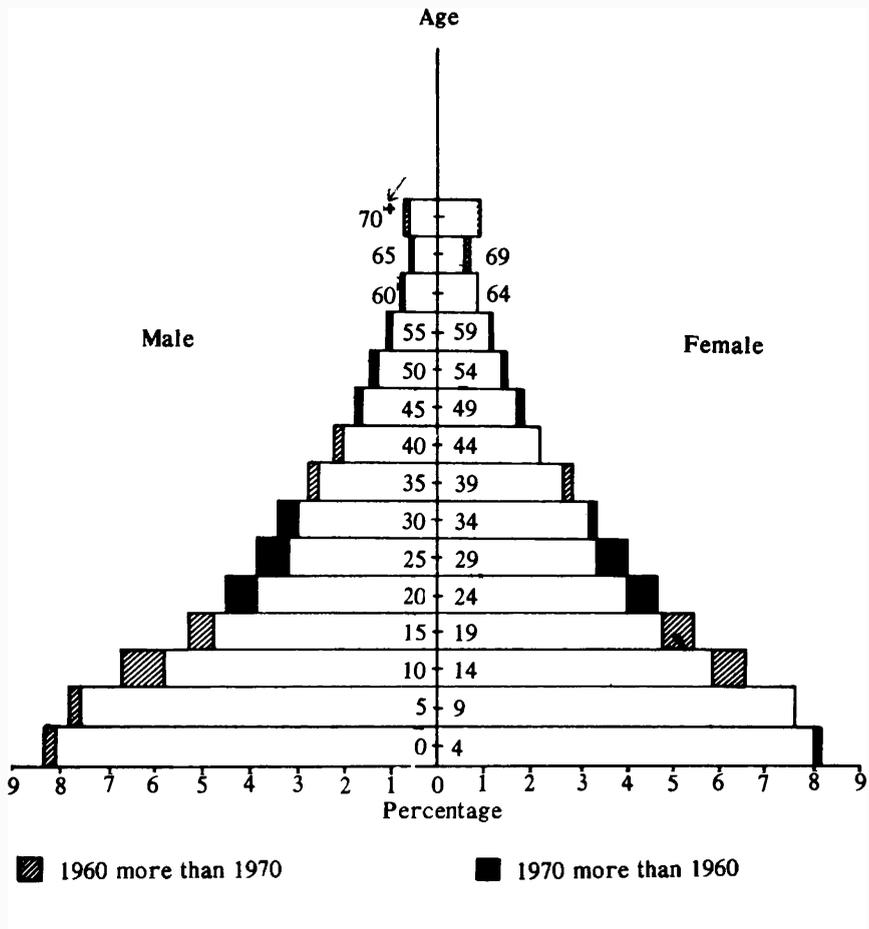
For the country as a whole, about 45 per cent of the population consisted of children under 15 years of age, while 3.1 per cent were aged 65 years and over. Thus, nearly 52 per cent of the population were in the age groups 15-64 years, conventionally regarded as working ages. These proportions were a little different in the case of males and females. For males those aged 0-14 years constituted 45.8 per cent of the total population, the corresponding proportion for females being 44.3 per cent. Males in the working age-group formed 51.5 per cent of total males while this proportion was 52.3 per cent in the case of females.

The age data from the 1970 census also shows that the proportion of the populations in the pre-school

Table 34. Comparison of the enumerated and estimated population as of 1 April 1970
(in thousands)

Age	Male				Female			
	Estimated population	Enumerated population	Difference	Percentage difference	Estimated population	Enumerated population	Difference	Percentage difference
	(1)	(2)	(3)=(1)-(2)	(4)= $\frac{(3)}{(1)} \times 100$	(5)	(6)	(7)=(5)-(6)	8= $\frac{(7)}{(5)} \times 100$
0-4	3,219.1	2,866.6	352.5	11.0	3,090.1	2,799.8	290.3	9.4
5-9	2,725.4	2,682.6	42.8	1.6	2,644.5	2,609.0	35.5	1.3
10-14	2,298.7	2,312.5	-13.8	-0.6	2,218.9	2,255.5	-36.6	-1.6
15-19	1,988.0	1,834.5	153.5	7.7	1,920.8	1,887.8	33.0	1.7
20-24	1,689.8	1,323.3	366.5	21.7	1,618.6	1,363.4	255.2	15.8
25-29	1,269.2	1,099.5	169.7	13.4	1,238.3	1,144.8	93.5	7.6
30-34	977.6	1,048.6	-71.0	-7.3	1,005.7	1,078.4	-72.7	-7.2
35-39	885.5	954.2	-68.7	-7.8	928.1	958.8	-30.7	-3.3
40-44	764.3	775.3	-11.0	-1.4	792.0	767.3	24.7	3.1
45-49	643.8	599.9	43.9	6.8	670.7	598.2	72.5	10.8
50-54	489.1	472.8	16.3	3.3	513.8	490.4	23.4	4.6
55-59	399.1	388.8	10.3	2.6	425.0	402.2	22.8	5.4
60-64	301.2	301.2	-	-	324.6	324.6	-	-
65-69	213.2	213.2	-	-	239.2	239.2	-	-
70+	251.0	251.0	-	-	353.9	353.9	-	-
Total	18,115.0	17,124.0	991.0	5.5	17,984.2	17,273.3	710.9	4.0

Source: Fred Arnold and Mathana Phananiramai, *Revised Estimates of the 1970 Population of Thailand*, Research Report No. 1 (Bangkok, National Statistical Office, 1975).



Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973); *ibid.*, *Statistical Yearbook, Volume 29, 1970-71* (Bangkok, National Statistical Office, 1972).

Figure 5. Population pyramid of Thailand, 1960 and 1970

Table 35. Percentage distribution of total, male and female population by 5-year age groups, Thailand, 1970 census

Age group	Whole Kingdom			Municipal areas		
	Both sexes	Male	Female	Both sexes	Male	Female
0- 4	16.5	16.7	16.2	12.6	13.0	12.2
5- 9	15.4	15.6	15.1	13.2	13.5	12.9
10-14	13.3	13.5	13.0	13.3	13.5	13.1
15-19	10.8	10.7	10.9	12.7	12.5	12.9
20-24	7.8	7.7	7.9	9.8	9.6	10.0
25-29	6.5	6.4	6.6	7.7	7.6	7.7
30-34	6.2	6.1	6.2	7.0	7.0	7.0
35-39	5.6	5.6	5.5	5.8	5.9	5.8
40-44	4.5	4.5	4.4	4.6	4.7	4.5
45-49	3.5	3.5	3.5	3.4	3.4	3.4
50-54	2.8	2.8	2.8	2.9	2.9	2.9
55-59	2.3	2.3	2.3	2.3	2.2	2.3
60-64	1.8	1.8	1.9	1.7	1.7	1.8
65-69	1.3	1.2	1.4	1.2	1.1	1.3
70 and over	1.8	1.5	2.0	1.7	1.4	2.1
Unknown	0.1	0.1	0.1	0.1	0.1	0.1
All ages	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 4.

Table 36. Proportions of population by broad age groups, median ages, dependency ratios and aged-child ratios for selected countries

	Proportion in ages			Median age	Dependency ratio			Aged-child ratio
	0-14	15-64	65+		Child	Aged	Total	
Thailand (1970)	45.1	51.7	3.1	17.3	87.2	5.9	93.1	6.8
Republic of Korea, (1970)	42.1	54.6	3.3	19.0	77.1	6.0	83.2	7.8
Sri Lanka (1971)	39.3	56.3	4.4	19.6	69.8	7.8	77.6	11.2
Philippines (1972) ^{a/}	43.2	53.4	3.4	18.4	80.9	6.4	87.4	8.0
India (1971)	41.8	54.7	3.3	19.7	76.5	6.1	82.6	8.0
Mexico (1970)	46.2	50.1	3.7	16.8	92.2	7.4	99.6	8.0
Japan (1970)	23.9	69.0	7.1	29.0	34.6	10.3	44.9	29.7
France (1970) ^{a/}	24.0	62.7	13.4	32.8	38.3	21.4	59.6	55.8
United Kingdom ^{b/} (1971) ^{a/}	23.9	63.0	13.1	34.1	37.9	20.8	58.7	54.8
Sweden (1970)	20.8	65.4	13.7	35.3	31.8	20.9	52.8	65.9
Netherlands (1971) ^{a/}	27.0	62.7	10.3	28.7	43.1	16.4	59.5	38.1
Poland (1971) ^{a/}	26.2	65.3	8.6	28.4	40.1	13.2	53.3	32.8
United States of America (1970)	28.5	61.6	9.9	28.1	46.3	16.1	62.3	34.7
Canada (1971)	29.6	62.3	8.1	26.3	47.5	13.0	60.5	27.4

Sources: Computed from data published in: Thailand, *1970 Population and Housing Census, Whole Kingdom*; Republic of Korea, *1970 Population and Housing Census Report*; Sri Lanka, *Census of Population 1971, Preliminary Report*; United Nations, *Demographic Yearbook, 1972*.

Notes: ^{a/} Estimated
^{b/} For England and Wales only.

ages, 0-6 years, and in the school-going age, 7-14 years, are about the same, being approximately 22 per cent for each group. About 45 per cent of all Thai women were in the reproductive ages 15-49 years in 1970 compared to a proportion of 46.4 per cent in 1960.

In 1970, the youth dependency ratio (persons aged 0 to 14 years per 100 persons aged 15 to 64 years) was 87 compared to 80 in 1960. The aged dependency ratio (persons aged 65 years and over per 100 persons aged 15 to 64 years) was 6 in 1970 compared to 5 in 1960. The median age^{4/} of the total population of the Kingdom in 1970 was 17.1 years, the median for males, 16.8 years, being slightly lower than the 17.4 years for females.

The age structure of Thailand is compared with that of a few selected countries in table 36. This international comparison makes it clear that Thailand has an age composition typical of developing countries. It is evident from the table that the proportion of children aged under 15 years is nearly double in developing countries than in the European countries and Japan. Consequently, the developing countries have a relatively small proportion of working age persons and a very small proportion of aged persons. Among the selected Asian countries, Thailand has the youngest age structure with a child dependency ratio of 87.2. It is only in another developing country, Mexico, well known for its high fertility level, that the proportion in the younger age group 0-14 years is more than that of Thailand.

The total dependency ratio for Thailand is the highest after Mexico and reflects the burden caused by the age composition on the economy of the country. "An interesting feature about the burden of dependency is that old-age dependency is heavier in developed regions and countries experiencing low rates of population growth, while childhood or youth dependency is heavier in the developing countries with high population growth rates. The child dependents are not only numerically larger, but even on a per capita basis, the expenditure on children is much more than the expenditure on old age dependents. The child has to be provided with a larger number of necessities and services over a longer period of time so that he could grow up to be a useful and productive

^{4/} "The median age may be defined as the age which divides the population into two equal size groups, one which is younger and the other of which is older than the median. It corresponds to the 50 percentile mark in the distribution", Henry S. Shryock and others, *The Methods and Materials of Demography*, Vol. 1, (Washington D.C., U.S. Government Printing Office, 1971), p. 233.

citizen. Larger the number of children, heavier is the burden on the economically productive sector of the population and greater is the share of the country's resources needed to meet the demands of this group".^{5/}

There is also another aspect to an age-structure of the type found in Thailand. The broad base of Thailand's age-sex pyramid (figure 5) illustrates the fact that each year the cohort of young men and women entering the years of fertility or the reproductive span is significantly larger than the number of older people growing out of the age of fertility during that year. In other words prospective parents are much more numerous than the present reproducing cohorts. Given the present patterns of family formation and fertility levels, the increase in the population of Thailand during the next generation could far exceed that experienced up until the present. Thus the present age-structure of Thailand's population has a very high built-in potential for further rapid increase in the future.

2. Regional pattern

The age-structure of the population also varies among the regions as is evident from table 37. It

Table 37. Percentage distribution of the population by broad age groups for regions, 1960 and 1970

Region	1960			1970		
	0-14	15-59	60+	0-14	15-59	60+
Whole Kingdom	43.1	52.1	4.8	45.2	49.9	4.9
Central	42.1	52.7	5.2	42.6	51.8	5.6
Northeast	44.7	51.5	3.8	47.4	48.7	3.9
Northern	43.2	52.1	4.7	44.7	50.2	5.1
Southern	41.2	53.8	5.0	44.9	49.4	5.7

Sources: Government of Thailand, *1960 Population Census* (Bangkok, Central Statistical Office, 1962); *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).

will be seen that in 1960, the proportion of persons aged 0-14 years was highest (44.7 per cent) for the Northeast Region and lowest (41.2 per cent) for the Southern Region. Consequently, the highest proportion of working-age population (53.8 per cent) was recorded for the Southern Region and the lowest proportion (51.5 per cent) for the Northeast Region. In 1970,

^{5/} S. Selvaratnam, "Implication of Population Growth - the Asian Context," background paper presented to the I.L.O. Asian Regional Workshop for Trade Union Education Officers on Population and Family Planning, Philippines, 11-29 March 1974, (Bangkok, I.L.O. ARTEP) (mimeo) pp. 35-37.

Table 38. Dependency ratios, aged-child ratio and median age by region, Thailand, 1970

	Dependency ratio			Aged-child ratio	Median age		
	Child	Aged	Total		Both sexes	Male	Female
Whole Kingdom	87.2	6.2	93.4	7.1	17.3	16.9	17.6
Central	79.4	6.5	85.9	8.3	18.2	17.8	18.6
Northeast	94.6	4.7	99.3	5.0	16.0	15.8	16.6
Northern	85.9	6.2	92.2	7.3	17.4	17.2	17.6
Southern	87.3	7.1	94.4	8.1	17.5	17.3	17.6

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), table 4.

Table 39. Distribution of urban and rural population by broad age groups, Thailand, 1970
(percentage)

Age group	Urban			Rural		
	Both sexes	Male	Female	Both sexes	Male	Female
0-14	39.1	40.0	38.2	46.0	46.7	45.3
15-59	56.2	55.7	56.5	49.0	48.6	49.3
60+	4.7	4.3	5.3	5.0	4.6	5.4
All ages	100.0	100.0	100.0	100.0	100.0	100.0

Source: Same as table 38.

the proportion of children aged 0-14 years increased in every region, the highest proportion (47.4 per cent) obtaining in the Northeast and the lowest in the Central Region. The proportions in the older age groups, 60 and over also increased in every region and consequently there has been a fall in the proportion aged 15-59 years in all regions.

The dependency ratios and the median ages for each of the four regions are shown in table 38. The total dependency ratio is highest in the Northeast Region and lowest in the Central Region. The child dependency ratio is also highest in the Northeast Region where consequently the median age for both males and females is also the lowest. The child dependency ratio is lowest and median age is highest in the Central Region. The relatively younger population in the Northeast and relatively older population in the Central Region may largely be due to the large migration from the Northeast to the Central Region, the bulk of the migrants being in the ages 20-40 years.^{6/}

^{6/} See chapter II above.

3. Urban-rural pattern

Differences also exist between the municipal and non-municipal areas with respect to the age distribution of the population as is evident from table 39. The non-municipal areas considered to be largely rural in characteristics had higher proportions of the population under 15 years age and lower proportions in the productive ages, 15 to 59 years. This was true of both males and females.

The dependency ratios and the median age for urban and rural areas are given in table 40. It will be seen that the burden of child dependency as well as that of aged dependency is heavier in the rural areas which have a relatively higher proportion of children and older persons in the total population. The young age structure of the rural population is also reflected in the median ages which are lower for the rural compared with the urban areas.

Table 40. Dependency ratios, aged-child ratios and median ages, urban and rural areas, Thailand, 1970

Area	Dependency ratio			Aged-child ratio	Median age		
	Child	Aged	Total		Both sexes	Male	Female
Whole Kingdom	87.2	6.2	93.4	7.1	17.1	16.8	17.4
Urban areas	67.6	5.3	72.9	7.9	19.2	18.9	19.5
Rural areas	90.6	6.3	96.9	7.0	16.9	16.6	17.2

Source: Same as table 38.

C. MARITAL STATUS

1. National pattern

A classification of the population aged 13 years and over by marital status for 1960 and 1970 is given in table 41. Although marriage is always universal in Thailand, nearly 38 per cent of males and 31 per cent of females aged 13 years and over have remained unmarried in 1970. Between 1960 and 1970, there was a decline in the proportion of both males and females who reported themselves as being ever-married, that is, those who were married, widowed, divorced or separated. Whereas in 1960, about 61 per cent of males and 70 per cent of females aged 13 years and over reported that they had been married at least once, in 1970, these proportions decreased to 60 and 68 per cent respectively.

It will also be noticed that the incidence of widowhood is higher among females than among males. In 1970, while 2.2 per cent of all males age 13 years and over were widowed, the corresponding rate for females was 8.8 per cent. Similar proportions were also recorded at the 1960 census. The higher incidence of widowhood among females reflects higher male mortality and also the fact that Thai women usually marry men at least several years their senior. Perhaps an even more important factor is the fact that widowed men have a better chance of remarrying than widowed women.

In order to compensate for changes in the age distribution of the population between 1960 and 1970, the proportions in the various marital status categories were standardized on the basis of the 1970

Table 41. Marital status of the population aged 13 years and over by sex, 1960 and 1970

Marital status	1960 Census				1970 Census			
	Male		Female		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Never married	2,911,729	36.4	2,371,421	29.5	3,834,220	37.8	3,284,751	31.4
Ever-married	4,849,874	60.7	5,651,513	70.3	6,062,776	59.7	7,156,909	68.3
Married	4,494,422	56.2	4,530,202	56.3	5,738,048	56.5	5,904,090	56.4
Widowed	229,349	2.9	817,496	10.2	218,489	2.2	925,445	8.8
Divorced/separated	126,103	1.6	303,815	3.8	104,962	1.0	307,168	2.9
Unknown	-	-	-	-	1,277	0.0	20,206	0.2
Monks ^{a/}	211,361	2.6	-	-	210,471	2.1	-	-
Unknown	29,481	0.3	22,322	0.2	40,750	0.4	30,999	0.3
Total	8,002,445	100.0	8,045,256	100.0	10,148,217	100.0	10,472,659	100.0

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 4; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1973), population table 5.

Note: ^{a/} Since local customs forbid asking the marital status of Buddhist novices and monks, the marital status of these persons was reported as unknown. However, to facilitate analysis of marital status data, monks were shown separately. As Buddhists may enter the monkhood after marriage, probably includes persons who would usually be classified as "widowed", "divorced" or "separated". Most persons enter the monkhood during Buddhist Lent, around June or July. Since the census is taken in April the number of monks, therefore, reflect those who have entered the monkhood on a more permanent basis. Some monks remain in the monkhood only temporarily. These, if married, may return to their wives, and accordingly are only temporarily separated. In regard to the nuns, they were classified as never married or ever-married according to their marital status at the time of the census.

Table 42. Standardized^{a/} percentage distribution by marital status^{a/} and sex, 1960 and 1970

	1960	1970
Male aged 13 and over		
Married	54.4	56.5
Widowed	2.9	2.2
Divorced	1.5	1.0
Single	38.1	37.8
Female aged 13 and over		
Married	53.8	56.4
Widowed	10.3	8.8
Divorced	3.6	2.9
Single	32.0	31.4

Source: Same as table 41.

Note: ^{a/} Standardized by five-year age group with 1970 age distribution as standard. The number of persons recorded as "Status unknown" has been included.

age distribution. The standardized proportions given in table 42 shows that between 1960 and 1970 there was an increase in the proportion of married both among males and females and a decline in the proportion never married.

The proportion of never married persons among those aged 13 years and over by age group for males and females is shown in table 43. It will be observed that though the over-all proportion based on census data has shown an increase between 1960 and 1970, for males there was a decline in the 20-24 and 50-69 year age groups. For females, there has been a decline in the proportion never married at all ages below 24 years.

Table 44 gives the proportion of married persons to total population aged 13 years and over in 1960 and 1970. It is very difficult to discuss the changes in the proportion married between 1960 and 1970 because of the large number of persons of "unknown" age in 1960. In 1970, the proportion married increased with advancing age up to about 45 years for males and 40 years for females. Thereafter it declined as widowhood rose substantially for both sexes. The decline was greater for females than for males since, as stated earlier, it is more difficult for widowed or divorced women to remarry.

While it is true that all women can marry at some time, not all remain married or retain a living partner. At the time of the 1970 census, well over a million women were either widowed or divorced, making up about one-seventh of all ever-married women, compared with just under one-fourth of a million males.

Table 43. Proportion of never married to the population, 13 years of age and over by age group and sex, 1960 and 1970

	Percentage of never married to population 13 years of age and over	
	1960	1970
Male		
13-14	36.4	37.8
15-19	95.6	95.6
20-24	92.9	93.1
25-29	64.2	61.3
30-34	25.2	23.7
35-39	8.8	9.8
40-44	4.5	5.1
45-49	2.9	3.1
50-54	2.3	2.3
55-59	2.0	1.9
60-64	1.9	1.7
65-69	1.9	1.7
70 and over	1.8	1.5
Unknown	1.7	1.8
	18.9	11.6
Female		
13-14	29.5	31.4
15-19	99.8	98.4
20-24	86.1	80.8
25-29	38.6	37.9
30-34	14.1	15.6
35-39	6.7	8.1
40-44	4.1	5.2
45-49	3.1	3.9
50-54	2.6	3.0
55-59	2.3	2.5
60-64	2.2	2.2
65-69	2.1	2.1
70 and over	2.0	2.1
Unknown	1.7	1.9
	12.1	8.4

Source: Same as table 41.

Table 44. Proportion of married to the population 13 years of age and over, by age group and sex, 1960 and 1970

	Percentage of married to population 13 years of age and over	
	1960	1970
Male	56.2	56.5
13-14	0.5	-
15-19	2.3	3.6
20-24	28.4	34.0
25-29	69.9	73.3
30-34	86.9	87.3
35-39	91.1	91.6
40-44	91.6	92.9
45-49	90.5	92.3
50-54	87.9	90.5
55-59	84.8	88.3
60-64	79.3	83.7
65-69	74.3	78.8
70 and over	59.3	66.2
Unknown	45.4	13.7
Female	56.3	56.4
13-14	0.2	0.9
15-19	12.5	17.5
20-24	56.2	57.8
25-29	79.5	79.1
30-34	85.9	85.8
35-39	86.3	86.7
40-44	82.5	84.5
45-49	77.2	80.1
50-54	67.7	72.5
55-59	58.2	64.7
60-64	45.1	53.7
65-69	35.6	44.2
70 and over	18.5	27.5
Unknown	46.5	14.5

Source: Same as table 41.

It is not possible to obtain an accurate picture of how marital unions persist, dissolve or otherwise change through time since reliable data are not available and also because of the relatively loosely-structured social and cultural context of marriage. Many marriages are not registered with civil authorities and marriages may or may not have a religious significance to the couple.

Table 45 gives the proportion of the population widowed by age groups in 1960 and 1970. As noted earlier, a larger proportion of women than men were widowed at all ages at both censuses. As is to be expected, the proportion widowed increases with advancing age and for both sexes. The proportions widowed have decreased between 1960 and 1970, largely due to the decline in mortality.

As will be noted in table 41, only a small proportion of those aged 13 years and over in Thailand was divorced in 1960 and 1970 and there has been a decline in this proportion between 1960 and 1970.

2. Regional pattern

The percentage distribution of the population aged 13 years and over by marital status and sex for the various region is given in table 46. It will be observed that only slight differences exist in regard to the corresponding proportions for three regions - Southern, Northern and Northeast. The various proportions in respect of males and females for the Central Region, in which the Bangkok Metropolis is located, vary significantly from those of other regions. Both for males and females, the Central Region has the highest proportion of single or never married and the lowest proportions of married persons in 1970. The lowest proportion of single women and highest proportion of married women are to be found in the Southern Region where incidence of widowhood is also highest both among males and females.

3. Rural-urban pattern

The Longitudinal Study of Social Economic and Demographic Change^{2/} conducted by the Institute of Population Studies, Chulalongkorn University provides data on marriages and mate selection. This information was obtained through retrospective questions on age at marriage, number of marriages and other items.

The Study shows that marriage takes place earlier on the average among men and women in the rural areas and latest among residents of Bangkok-Thon Buri. Among married women, the highest proportion who are married for the second or third time are found in the rural population and the lowest proportion for residents of Bangkok-Thon Buri (table 47).

Interesting differences in the marital status distributions of the rural-urban groups also emerge from the findings of the study. For most adult ages, there were lower proportions single among both males and females in the rural areas than among those in the urban areas. Within the urban population, lower proportions single prevail in the other *changwat* than in the Bangkok Metropolis.

^{2/} Visit Prachuabmoh and others, *The Rural and Urban Populations of Thailand: Comparative Profiles*, Research Report No. 8 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1972).

Table 45. Proportion of widowed to the population, 13 years of age and over by age group and sex, 1960 and 1970

	Percentage of widowed to population 13 years of age and over	
	1960	1970
Male	2.9	2.2
13-14	0.0	-
15-19	0.0	0.0
20-24	0.2	0.1
25-29	0.6	0.4
30-34	1.0	0.6
35-39	1.5	1.0
40-44	2.5	1.7
45-49	3.9	2.8
50-54	6.2	4.4
55-59	9.0	6.3
60-64	13.3	9.8
65-69	17.6	13.9
70 and over	31.3	24.8
Unknown	5.6	1.9
Female	10.2	8.8
13-14	0.0	0.0
15-19	0.2	0.2
20-24	0.7	0.8
25-29	1.4	1.4
30-34	2.6	2.4
35-39	4.7	4.0
40-44	9.2	7.4
45-49	15.1	12.4
50-54	24.6	20.4
55-59	34.2	28.5
60-64	47.4	39.6
65-69	57.2	49.4
70 and over	75.3	66.7
Unknown	23.1	7.1

Source: Same as table 41.

More specifically, for males in every age group between 15 and 50, the proportions single are lowest for the rural population and highest for Bangkok-Thon Buri residents; for females in these same age groups, the proportions single are higher in the urban areas and lower for the rural residents and, within the urban population only at ages 35 to 44 are the proportions single greater in the other *changwat* than the capital. These contrasts probably result from a combination of rural-urban differences in marriage patterns and differential migration among persons of different marital statuses. On the one hand, persons enter into marriage at younger ages in the countryside than in the cities and at higher ages in Bangkok-Thon Buri. On the other hand, migration to the cities from the rural areas probably occurs disproportionately among unmarried individuals. In addition, marriage appears to be more universal in rural areas than in urban municipalities, judging from the proportions remaining single over age 50. Although the proportion of persons who have never been married in the older age groups is not high, there is a larger proportion of such persons in the urban areas than in the rural areas.

D. ETHNIC COMPOSITION

Among the countries of Southeast Asia, Thailand has an unusual degree of ethnic and cultural homogeneity. However the shifting of the country's borders and the influx of immigrants have meant that Thailand does contain minority ethnic groups, although their number is small. In the far northwest are to be found the Shans, while the Karens occupy a broad arc stretching around the northern

Table 46. Percentage distribution of population, 13 years of age and over by marital status^{a/} and sex, by region, 1970

	Single	Married	Widowed	Divorced	Separated
Central					
Male	42.3	52.3	2.0	0.2	1.0
Female	35.9	52.1	8.6	0.5	2.5
Southern					
Male	36.0	58.3	2.7	0.4	1.2
Female	27.4	59.3	9.9	0.8	2.1
Northern					
Male	35.8	58.1	2.4	0.6	0.6
Female	28.8	58.8	9.2	1.3	1.4
Northeast					
Male	35.5	58.9	2.0	0.3	0.3
Female	30.1	57.9	8.5	1.7	1.3

Source: Government of Thailand, *1970 Population and Housing Census, Region Series* (Bangkok, National Statistical Office, 1973).

Note: ^{a/} Monks and unknown excluded.

Table 47. Average age at first marriage by sex and age at last birthday - ever-married rural and urban population

Age at last birthday	Males						Females					
	Rural		Provincial urban		Bangkok - Thon Buri		Rural		Provincial urban		Bangkok - Thon Buri	
Under 20	18.9	(17) ^{a/}	18.5	(5)	17.3	(4)	17.6	(84)	17.2	(27)	17.5	(34)
20-24	21.1	(118)	20.7	(51)	20.7	(54)	19.3	(186)	19.5	(115)	19.5	(132)
25-29	22.8	(161)	24.0	(106)	23.9	(127)	20.6	(212)	21.1	(115)	21.8	(196)
30-34	23.6	(196)	25.2	(134)	25.8	(218)	21.0	(235)	21.7	(167)	22.5	(228)
35-39	24.1	(233)	25.5	(145)	26.2	(207)	20.6	(245)	22.1	(152)	22.2	(212)
40-44	23.7	(188)	26.1	(123)	26.9	(149)	20.4	(205)	21.6	(110)	22.0	(167)
45-49	25.0	(168)	27.2	(83)	27.0	(106)	20.9	(182)	22.1	(94)	22.2	(119)
50-54	25.7	(148)	27.1	(71)	26.6	(90)	21.9	(128)	21.7	(71)	21.8	(110)
55-59	25.3	(94)	26.4	(53)	28.5	(77)	21.2	(100)	20.9	(65)	20.7	(70)
60 & over	26.4	(179)	27.5	(87)	28.3	(106)	21.9	(158)	21.3	(98)	22.1	(133)
Total ^{b/}	23.5	(1,506)	25.5	(858)	26.1	(1,138)	20.6	(1,738)	21.3	(1,014)	21.7	(1,411)

Source: Visid Prachuabmoh and others, *The Rural and Urban Population of Thailand: Comparative Profiles*, Research Report No. 8 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1972), table 18.

Notes: a/ Numbers in parentheses indicate the number of cases in each category.

b/ The total includes the following number of respondents of unknown age: rural males - 4, females - 3; Bangkok-Thon Buri males - 1, female - 10

and western borders for 600 or 700 miles. Near the border of Democratic Kampuchea live the Khmer, Chaung, Sui and Annamese or Vietnamese. In the far south, there are still pockets of Semang and Sam Sam, while off the western coast, the boat-dwelling Chao Nam stretch from the Burmese to the Malaysian borders. Most of these groups, however, are akin to the Thais both ethnically and in terms of their religion. As noted earlier, the exceptions are the ethnic Malays in the south of Thailand and the Chinese in Bangkok and other towns.

At the 1970 census, 349,564 persons or 1.0 per cent of the total enumerated population reported that they had been born in foreign countries. The census also showed that 375,372 persons or 1.1 per cent of the population were citizens of foreign countries. Of the non-Thai citizens, 311,093 or 82.9 per cent were citizens of China, while 53,107 or 14.1 per cent were born in other Asian countries such as the Socialist Republic of Viet nam, Lao People's Democratic Republic, Democratic Kampuchea, Malaysia, India, Pakistan and Sri Lanka. The balance, 3 per cent, were citizens of European countries, the United States of America, Canada, Australia or New Zealand.

In the Longitudinal Study of the Institute of Population Studies, an urban sample was drawn from the universe of all Thai, Chinese and Indian households, purposely excluding other Asian, European and American households as well as other

foreigners (table 48). The data on foreign born in this study therefore referred only to Chinese, Indians or Thais and not to the foreign community in general. That there is a large Chinese component in Thailand's urban population is evident from the survey results; one-tenth of household heads in urban areas of other provinces and one-fifth of those in Bangkok-Thon Buri are of Chinese origin. Large differences exist in the proportion that are Chinese when age groups are compared. A much greater fraction of older household heads were born in Chinese areas than of younger ones. Almost none of the household heads below age 30 were Chinese by birth whereas sizeable proportions of household heads 45 years of age or older were. In recent years, as has been mentioned, there has been only a small number of immigrants to Thailand due to legal restrictions beginning in 1949. The younger urban dwellers of Chinese origin are mainly second or later generation Chinese with only a few having been born outside of Thailand. Among rural household heads only 1 per cent reported having been born in China or Hong Kong. Thus the native born Chinese live predominantly in the cities and constitute only a very negligible proportion of the population in the rural areas.

The Indians constitute a numerically much less important minority and like the Chinese, they are more frequently found in Bangkok-Thon Buri than in the urban areas of other *changwat*.

Table 48. Chinese characteristics, ethnic origin of name and language spoken

	Rural		Provincial		Bangkok-Thon Buri	
	Percentage	Number	Percentage	Number	Percentage	Number
At least one Chinese characteristic ^{a/}						
Yes	3.4	49	16.8	162	31.5	383
No	96.6	1,409	83.2	800	68.5	833
Total	100.0	1,458	100.0	962	100.0	1,216
Ethnic origin of name						
Both names Thai	94.0	1,386	80.6	776	70.8	861
Both names Chinese	2.7	40	13.5	130	23.5	286
Name Chinese, family name Thai	0.6	9	1.7	16	0.5	6
Name Thai, family name Chinese	0.8	12	2.7	26	2.1	26
Other	1.5	22	1.3	13	1.8	22
Unknown	0.3	5	0.2	2	1.2	15
Total	100.0	1,474	100.0	963	100.0	1,216
Language spoken in home						
Thai	96.7	1,426	82.8	797	65.0	790
Chinese	0.5	7	2.3	22	6.2	75
Thai - Chinese	0.9	13	14.0	135	26.2	318
Other	1.6	23	0.7	7	2.6	32
Unknown	0.3	5	0.1	1	0.1	1
Total	100.0	1,474	100.0	962	100.0	1,216

Source: Same as table 47.

Note: ^{a/} The presence of Chinese language newspapers was not recorded for the rural sample.

The same study used several approaches to determine the ethnic distribution of the Thai population. In addition to the data on place of birth mentioned above, the interviewers were instructed to observe and record the presence of certain items in the house which are considered typically Chinese. The identification of first and family names as Chinese, Thai or other was also made. Information on the language spoken in the household was recorded as well.

The study found that all of the typical Chinese items were most frequently present in Bangkok-Thon Buri households and least frequently present in rural households. Only 5 per cent of rural households had any of the characteristic Chinese items at all, while almost a third of the households in Bangkok-Thon Buri and about half that figure of urban households in other *changwat* had at least one Chinese characteristic.

Heads of households with names that were at least in part Chinese were also about twice as common in Bangkok-Thon Buri as in the urban areas of other *changwat* and occurred infrequently among rural households in which at least one Chinese item was observed, suggesting that later generation Chinese may change their original names to Thai ones.

The most meaningful and useful single indicator of Chinese ethnic affiliation was found to be the language spoken at home. In a recent study of the assimilation of the Chinese in Bangkok, persons were identified as Chinese if they were raised in a family in which the parents spoke any Chinese dialect as their native language, the assumption being that the language spoken at home was a reliable indicator of a person's ethnic identification and frame of reference. The data from the Longitudinal Study in response to the question, "What language is used

in this household in speaking together?" show similar differences between the rural and urban categories as suggested by the other indicators of Chinese ethnicity.

The proportion of households in which only Chinese was spoken was found to be small. A much more substantial proportion were bilingual with both Chinese and Thai spoken. The Study suggests that bilingual households may often be composed of an older generation which speaks primarily Chinese and a younger generation which is truly bilingual. When households in which a Chinese dialect is the only language spoken are combined with households in which both Thai and Chinese are spoken, the proportions of ethnic Chinese households in the population indicated by this index was found to agree closely with the proportion of households in which at least one Chinese item was observed.

On the basis of the data collected in the Longitudinal Study, it appears that about one-third of the households in Bangkok-Thon Buri can be considered Chinese to at least some extent and about one in six are Chinese in the urban areas of other provinces, while in the rural areas, almost the entire population is composed of ethnic Thais.

Next to the Thais and the Chinese, the third largest group is the Malay-speaking Muslims who reside almost entirely in four *changwat* in the Southern region.

E. RELIGION

The distribution of the population by religion is

Theravada (the Doctrine of the Elders), is the official religion of the country. "Buddhism is a vital force permeating the daily lives of the people, and the member of omnipresent monks in the country has led to its description as the land of the yellow robes".^{8/}

Although Buddhism is the State Religion and the great majority of the Thai people are Buddhists, people are free to profess any faith they wish. The religious affiliation of the largest ethnic Chinese minority is difficult to identify. Some have adopted *Theravada* beliefs of the Thais and many participate in the activities of the local Buddhist temples (*wats*). However, many of the Chinese consciously retain the mixture of Confucian social ethics, formal veneration of ancestors and Mahayana Buddhist doctrines which were characteristic of the religious tradition in China.

Next to Buddhism and Confucianism the largest religious group in Thailand consists of the followers of Islam. The vast majority of those professing Islam is found in the southern-most *changwat*. The remainders are Pakistani immigrants in the urban centre and ethnic Thais in the rural areas of the Central Region.

The Christian population is the third largest group and a high percentage of them are Chinese, though there are several Roman Catholic Lao communities in Nong Khai *changwat* in the Northeast Region and several Vietnamese Roman Catholic communities in southeastern Thailand.

Table 49. Distribution of the population by religion and sex, Thailand, 1970

Religion	Both sexes		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage
Buddhism ^{a/}	32,771,544	95.2	16,314,390	95.2	16,457,154	95.2
Islam	1,325,587	3.9	661,817	3.9	663,770	3.8
Christianity	195,300	0.6	95,234	0.6	100,066	0.6
Others ^{b/}	58,245	0.2	29,188	0.2	29,057	0.2
Unknown	46,698	0.1	23,233	0.1	23,465	0.2
All religions	34,397,374	100.0	17,123,862	100.0	17,273,512	100.0

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973.), table 11.

Notes: a/ Including Confucianism.

b/ Including Hinduism and those with no religion.

shown in table 49. At the 1970 census, nearly 95 per cent of the people reported themselves as Buddhists (and Confucians). Buddhism, particularly

^{8/} John W. Henderson and others, *Area Handbook for Thailand* (Washington, D.C., U.S. Government Printing Office, 1971), p. 147.

Chapter IV

TRENDS AND DIFFERENTIALS IN MORTALITY

A. INTRODUCTION

The chief source of data on mortality trends in a country is the vital registration system. In Thailand, though a system of registering vital events has been in existence since 1917, the official vital registration statistics suffers from severe underregistration. As has been noted in annex II, it has been estimated on the basis of the Survey of Population Change conducted by the National Statistical Office that the rate of underregistration of deaths in 1964-1965 was about 30 per cent. The results of the same Survey also showed that while there was hardly any difference in the degree of underregistration of deaths among males and females, there was variation among age groups. It was found that the percentage of underregistration of deaths was highest in regard to children — 62 per cent for deaths occurring among those aged under 1 year and 54 per cent at ages 1 to 4 years, while the extent of underregistration for persons aged 65 years and over was somewhat lower, viz., 43 per cent.

Since the degree of completeness in the registration of deaths in Thailand is so low, the analyses of the trends in general mortality is based on the estimates made in annex II. As will be noted, these estimates depend upon the estimates of births. If the births occurring between two censuses are known, then their numbers minus the increase of the population (with an allowance for migration) equal the number of deaths during the period. The correction factors estimated by this method were applied to the registered data in order to obtain an approximation of the crude death rate in each year from 1920 to 1970.

B. TRENDS IN GENERAL MORTALITY

A summary measure of the mortality experience of all ages of the population is provided by the crude death rate which is defined as the number of deaths in a year per thousand of the mid-year population. The crude death rates for the various years from 1920 to 1970 estimated according to the method described in the preceding section are shown in table 50 and the trend in these rates are shown in figure 6. It will be observed that there is a variation in these rates from year to year. However, since the method of estimation is not so precise

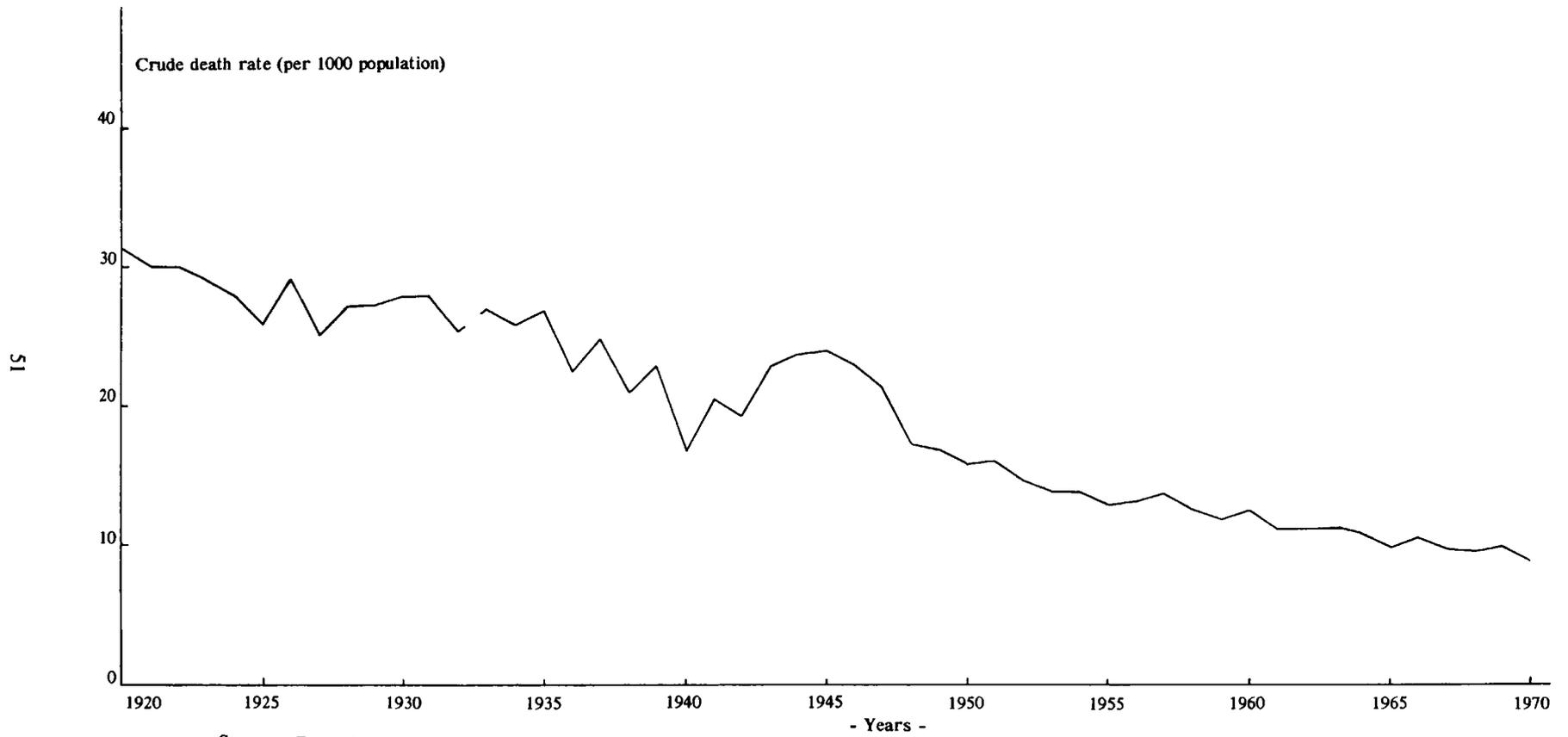
and since the degree of completeness in the registration can vary from one year to another, not much attention should be paid to the annual variation.

The long-term trend in the crude death rate has been a steady decline from 31.5 per thousand in 1920 to 8.8 per thousand in 1970. While between 1920 and 1931, the death rate declined by about 4 points, the decline between 1931 and 1942 was by about 8 points. It will also be observed that there was a steady increase in the crude death rate during the war years, 1942 to 1945, followed by a steady decline thereafter. A straight line could be fitted on the graph to represent the declining trend in mortality from 17.3 in 1948 to 8.8 in 1970.

A substantial decline in mortality during the last two decades or more has been a phenomenon characteristic of most developing countries. The spectacular improvement in mortality conditions in the years since the Second World War has largely been due to the control of epidemic and endemic diseases through low-cost public health

Table 50. Trend of crude death rates, 1920-1970 (estimation)

Year	Rate	Year	Rate
1920	31.3	1946	23.2
1921	30.0	1947	21.4
1922	30.0	1948	17.3
1923	28.9	1949	16.9
1924	27.8	1950	15.9
1925	25.8	1951	16.1
1926	29.3	1952	14.3
1927	24.9	1953	13.8
1928	27.3	1954	13.9
1929	27.4	1955	12.9
1930	27.9	1956	13.2
1931	27.8	1957	13.7
1932	25.5	1958	12.5
1933	26.9	1959	11.9
1934	25.8	1960	12.2
1935	26.7	1961	11.2
1936	22.4	1962	11.3
1937	24.7	1963	11.4
1938	20.7	1964	10.9
1939	22.7	1965	9.9
1940	17.0	1966	10.3
1941	20.6	1967	9.9
1942	19.4	1968	9.7
1943	23.2	1969	9.9
1944	23.9	1970	8.8
1945	24.0		



Source: Table 50.

Figure 6. Thailand - trend of crude death rate, 1920-1970

Table 51. Crude death rates in selected ESCAP countries, 1951-1970

Year	Thailand	Peninsular Malaysia	Japan	Hong Kong	Singapore	Sri Lanka
1951	16.1	15.4	10.0	10.2	11.6	12.9
1952	14.3	13.8	8.9	9.2	10.7	12.0
1953	13.8	12.6	8.9	8.2	9.7	10.9
1954	13.9	12.4	8.2	8.2	8.6	10.4
1955	12.9	11.7	7.8	7.7	8.1	11.0
1956	13.2	11.6	8.1	7.4	7.5	9.8
1957	13.7	12.4	8.3	7.1	7.4	10.1
1958	12.5	11.0	7.5	7.2	7.0	9.7
1959	11.9	9.7	7.5	6.8	6.5	9.1
1960	12.2	9.5	7.6	6.2	6.3	8.6
1961	11.2	9.2	7.4	5.9	6.0	8.0
1962	11.3	9.4	7.5	6.0	5.9	8.5
1963	11.4	9.0	7.0	5.6	5.8	8.5
1964	10.9	8.1	6.9	5.0	5.8	8.8
1965	9.9	7.9	7.2	4.8	5.6	8.2
1966	10.3	7.6	6.8	5.0	5.5	8.3
1967	9.9	7.5	6.8	5.1	5.4	7.5
1968	9.7	7.5	6.8	5.0	5.4	7.9
1969	9.9	7.2	6.7	4.8	5.0	8.1
1970	8.8	7.3	6.9	5.1	5.2	7.5

Sources: Thailand: table 50; other countries: United Nations, *Demographic Yearbook*, 1966-1970

measures. In Thailand, the death rate has reached comparatively low levels and it may be expected to stabilize at current levels, though in some ESCAP countries, the crude death rate has declined further and reached a level of about 5 to 6 per thousand of the population. (see table 51)

There are other independent estimates of the crude death rates for Thailand. Bourgeois-Pichat ^{1/} has estimated the crude death rates for the period 1920 to 1955 by the method already described. However, the results are different since the correction factors were based on the results of the 1956 Survey instead of the 1960 and 1970 censuses. These estimates, shown in table 52, seem to be too high and the estimated decline from 1950 to 1955 too rapid.

The United Nations ^{2/} prepared two sets of estimates based on two different methods for the period 1930 to 1955. The first method assumes

^{1/} Jean Bourgeois-Pichat, "An attempt to appraise the accuracy of demographic statistics for an under-developed country: Thailand," *Perspective on Thai Population*, Research Report No. 11 (Bangkok, IPS, Chulalongkorn University, 1974), pp. 1-31.

^{2/} United Nations, *The Population of South-East Asia (including Ceylon and China: Taiwan) 1950-1980* (Sales No. 59. XIII. 2).

Table 52. Crude death rates in Thailand estimated by different methods, 1945-1955

	United Nations ^{a/}		Bourgeois-	Present study ^{c/}
	Method I	Method II	Pichat ^{b/}	
1945	28.0	29.9	30.9	24.0
1946	25.8	29.5	32.2	23.2
1947	22.8	26.6	30.2	21.4
1948	18.2	21.0	27.3	17.3
1949	17.8	17.8	26.6	16.9
1950	17.0	16.5	24.6	15.9
1951	17.5	16.5	23.4	16.1
1952	16.8	15.6	22.2	14.3
1953	16.0	14.3	20.3	13.8
1954	16.5	13.3	19.6	13.9
1955	15.6	12.6	18.0	12.9

Sources: ^{a/} *The Population of South-East Asia (Including Ceylon and China: Taiwan) 1950-1980* (Sales No. 59 XIII. 2).

^{b/} Jean Bourgeois-Pichat, "An attempt to appraise the accuracy of Demographic statistics for an under developed country: Thailand," *Perspective on Thai Population, Research Report No. 11* (Bangkok, IPS, Chulalongkorn University, 1974).

^{c/} Table 50.

that death registration, though incomplete, is of a constant degree of completeness, that is, the percentage of deaths being registered each year is the same. The second method is based on the assumption that birth and death, though both incompletely recorded, are registered with equal completeness in any one year. It was further assumed that the birth rate has remained constant over the years. The above assumptions are quite arbitrary. Nevertheless the estimates derived (also indicated in table 52) appear to be quite close to those estimated for the purposes of the present study.

Ajit Das Gupta and others^{3/} estimated a death rate of 13.0 per thousand for 1960 as against a rate of 12.2 estimated in this study. According to the results of the Survey of Population Change the death rate for 1964-1965 was 10.9 per thousand, compared to an estimated rate of 10.9 for 1964 and 9.9 for 1965. It has, however, to be noted that since the Bangkok - Thon Buri Metropolis was excluded from the 1964-1967 Survey of Population Change, the crude death rate based on the results of this survey is slightly higher than the actual rate for the whole kingdom.

C. MORTALITY BY AGE AND SEX

As was noted earlier, the registration data on mortality by age is of poor quality. The results of the Survey of Population Change have indicated that the degree of completeness of registration varies according to age as is evident from the following summary data of the Survey:

Ages	Percentage complete	
	Males	Females
Under 1	50.4	47.4
1 - 9	69.6	58.8
10 - 59	78.8	69.1
60 and over	76.7	68.6

However, an attempt has been made to analyse the changes in mortality by age on the basis of indexes computed as follows:-

- The registration data by age for 1960 and 1970 were taken as the basis of computation;
- The number of deaths at "age unknown" was pro-rated;
- The rates for each age group were obtained

^{3/} Ajit Das Gupta and others, "Population perspective of Thailand", *Sankhya: The Indian Journal of Statistics*, Series B, vol. 27, parts 1 and 2, September 1965

by dividing the number of deaths in each age group by the corresponding census population;

(d) It was assumed that there was an improvement by 3 per cent in the completeness of registration for all ages between 1960 and 1970 — the rates for 1970 were therefore multiplied by 0.97;

(c) The indexes were obtained by dividing the 1970 rates by the 1960 rates.

The indexes derived by the method described above are given in table 53 and in figure 7. It has to be noted that these indexes only represent a value and not the actual rates.

First it will be observed that between 1960 and 1970, there was a greater proportionate decline in female than in male mortality for all ages. Secondly, the decline was greater in the younger than in the older age groups. Thirdly, the decline was much more significant in regard to females of childbearing age, 15 to 49 years. This could largely be explained by the sharp decrease in maternal mortality which is the main cause of deaths among females aged 15 to 49 years. Finally, the most striking feature is the fast decline in infant and childhood mortality. In 10 years these rates have fallen approximately 50 per cent for both males and females.

The decline in mortality has been achieved partly due to general economic progress and improvement in such factors as education, sanitation and nutrition, and partly due to special efforts that have been made to reduce infant and maternal deaths. The Division of Maternal and Child Health of the Ministry of Public Health has adopted several measures

Table 53. Indexes of age-specific death rate, 1970 (base 1960 = 100)

Age group	Male	Female
Under 1	50	49
1-4	51	49
5-9	61	57
10-14	62	61
15-19	96	74
20-24	100	69
25-29	100	63
30-34	90	65
35-39	80	65
40-44	84	73
45-49	84	83
50-54	91	88
55-59	92	90
60-64	93	91
65-69	99	98
70+	108	102

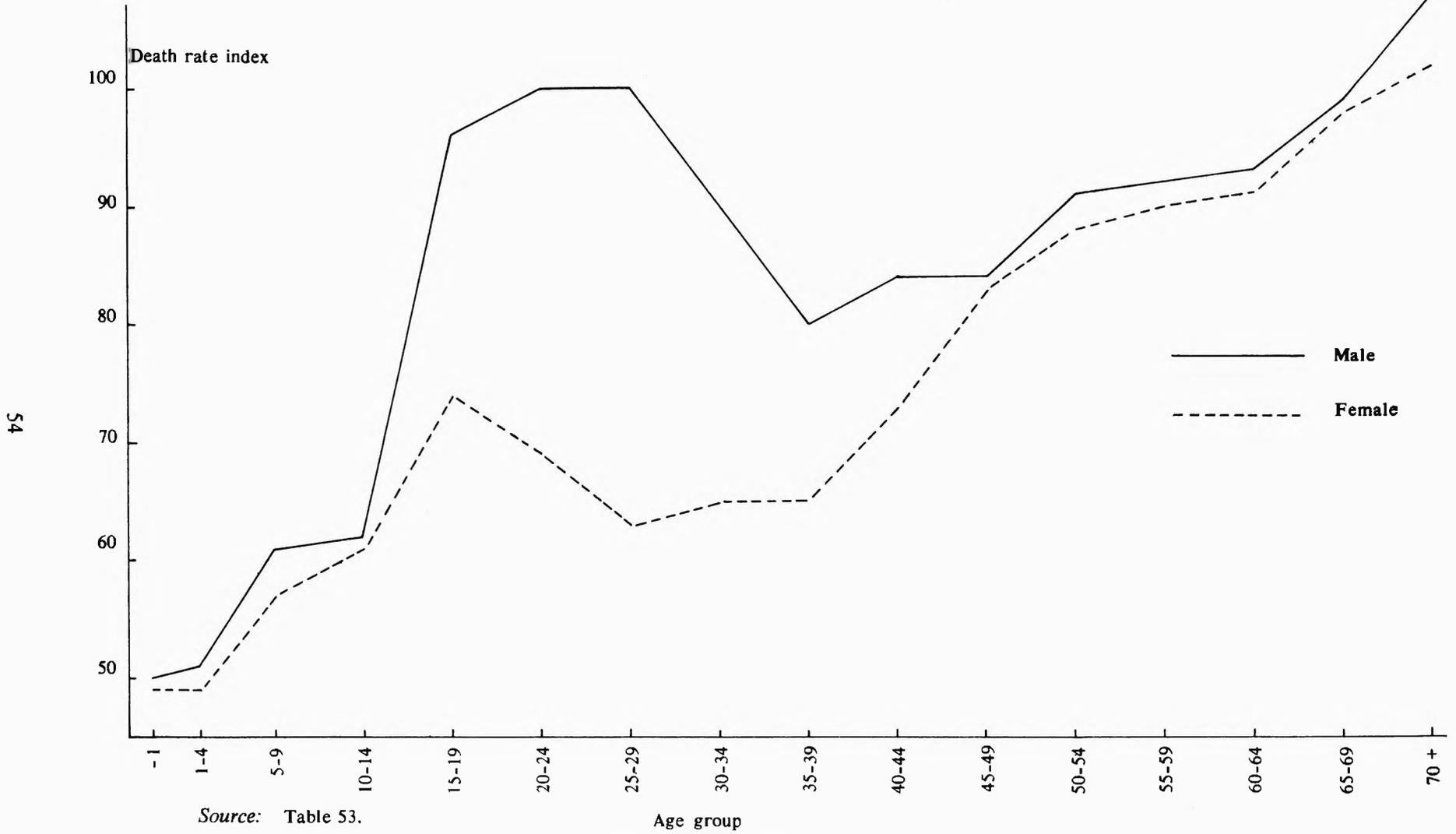


Figure 7. Thailand index of age-specific death rate 1970/1960 (1960 = 100)

to afford protection to mothers, infants and children of pre-school age with a view to reducing infant and maternal mortality. Several midwifery schools have been set up in Bangkok and other *changwat* to train an adequate number of skilled midwives who would render maternal and child health services in rural areas. The trainees are selected from villages all over the country and each of them upon graduation is obliged to serve in her native village or *changwat*.^{4/} Maternal and Child Health Training Centres are also operating in Bangkok and Chiang-mai. In addition, mobile Maternal and Child Health Units render services to people in remote areas where the services of health or midwifery centres do not exist. These units also provide the people with general preventive and curative services and carry out health education programmes through films and other media.

D. LIFE TABLES

An important measure of the mortality pattern is the life table or the mortality table which is generated from age-specific mortality rates. It is an instrument used to determine the chance that a person of a given age will live for a given period or will die at a certain age or any of the more complicated probabilities of living or dying. The technique has been extended to other phenomena with varying degrees of success. Nevertheless, it is a fact that the life table provides a descriptive model amenable to certain useful extensions.^{5/} One main advantage of the life tables over other mortality measures is that "they do not reflect the effects of the age distribution of an actual population and do not require the adoption of a standard population for acceptable comparisons of levels of mortality in different populations. Another is that a life table readily permits making mortality allowances for age cohorts, eliminating the burdensome task of compiling death statistics for age cohorts from annual death statistics by age even when the latter are available."^{6/}

In the absence of detailed information relating to mortality by single years of age, an abridged life table showing the life table functions for every

^{4/} Government of Thailand, *Public Health in Thailand* (Bangkok, Ministry of Public Health, 1966).

^{5/} R. Pressat, *Demographic Analysis* (Chicago, Aldine, Atherton, 1972), p. 107.

^{6/} Henry S. Shryock, Jacob S. Siegel and Associates, *The Methods and Materials of Demography*, vol. 21, (Washington D.C. U.S. Government Printing Office, 1971), p. 429.

fifth year of age has been prepared for Thailand. The table, which relate to the period 1969-1971, has been constructed on the basis of adjusted registration data for this period. As noted earlier, data relating to registered deaths are subject to varying degree of underregistration and the following adjustments were therefore made:-

(a) The average deaths in 1969-1971 by age and sex were calculated after pro-rating the deaths in "age unknown".

(b) The correction factors for underregistration were derived from the results of the Survey of Population Change, 1964-1969. It was assumed that the degree of completeness of birth and death registration in 1969-1971 had been the same as in 1964-1967. The following correction factors were used.^{7/}

Age group	Male	Female
Under 1	2.2129	2.2637
1 - 9	1.4368	1.7007
10 - 59	1.2690	1.4472
60 and over	1.3038	1.4577

(c) The average number of deaths was estimated by multiplying the number of registered deaths for each age group in 1969-1971 by the correction factors;

(d) The adjusted proportionate distribution of mortality (shown in table 54) was applied to the number of adjusted deaths for broad age groups. The adjusted deaths and age specific mortality rates for the 1969-1971 period are shown in table 55. It will be observed that mortality is very high in the youngest age group but thereafter it drops precipitously until it reaches the lowest level in the age group 10-14 years. Then it rises gradually to age 55 and sharply thereafter.

The abridged life tables constructed on the basis of the adjusted age-specific mortality rates referred to in (d) above for males and females are presented in tables 56 and 57. It will be observed that out of

^{7/} It will be observed that the correction factors for infants are much higher than other age groups for both males and females. Correction factors for ages 10-59 are lower than those for 60 years and over. This is due to the fact that deaths among persons aged 10-59 years are more completely registered than deaths among persons aged 60 years and over.

Table 54. Proportionate distribution of mortality by broad age group and sex, Thailand, 1964-1971

Age group	Registration data				Survey of Population Change		Adjusted	
	1964 - 1967		1969 - 1971		1964 - 1967		1969 - 1971	
	Male	Female	Male	Female	Male	Female	Male	Female
All ages	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 1	19.6	17.5	14.2	12.8	33.6	32.3	24.3	23.6
1 - 9	14.6	23.9	16.5	17.6	17.5	19.1	19.8	16.0
10 - 54	36.8	28.3	36.7	32.9	24.3	23.3	28.2	28.7
55 and over	29.0	30.3	32.6	36.7	24.6	25.3	27.7	31.7

Sources: Government of Thailand, *Public Health Statistics: Thailand, 1970* (Bangkok, Ministry of Public Health, 1971); *ibid.*, *Report of the Survey of Population Change, 1964-1967* (Bangkok, National Statistical Office, 1970); Population Sector, Manpower Planning Division, National Economic and Social Development Board, 1974.

Table 55. Population, number of deaths and age-specific mortality rate of Thailand, 1969-1971

Age	Mid-year population 1970		Average number of deaths 1969-1971		Age-specific mortality rate 1969-1971	
	Male	Female	Male	Female	Male	Female
0	692,377	657,930	45,025	39,231	.06503	.05963
1-4	2,537,888	2,443,161	25,934	18,826	.01022	.00771
5-9	2,720,319	2,641,928	10,742	7,715	.00395	.00292
10-14	2,315,666	2,237,375	4,390	4,273	.00190	.00191
15-19	2,002,202	1,936,304	5,249	4,696	.00262	.00242
20-24	1,701,938	1,631,809	5,320	4,860	.00313	.00298
25-29	1,278,342	1,248,316	4,603	4,254	.00360	.00341
30-34	985,231	1,013,544	5,132	5,107	.00521	.00504
35-39	892,984	936,060	5,943	5,908	.00666	.00631
40-44	769,706	799,228	6,687	6,103	.00869	.00764
45-49	648,693	676,403	6,968	5,851	.01074	.00865
50-54	492,516	518,410	7,919	6,555	.01608	.01264
55-59	402,032	428,632	7,904	6,223	.01966	.01452
60-64	303,489	327,067	9,263	7,505	.03052	.02294
65-69	214,820	241,018	9,327	8,086	.04342	.03355
70+	252,806	356,288	24,717	30,687	.10214	.08548
Total	18,210,959	18,093,473	185,147	165,881	.01017	.00917

Source : Population Sector, Manpower Planning Division, NESDB, 1974.

Table 56. Abridged life table for males in Thailand, 1969-1971

Age interval	Average mortality rate 1969-1971	Proportion of 100,000 born alive		Stationary population		Average remaining life time	
		Proportion of persons alive at beginning of age interval	Number alive at beginning of age interval	Number dying during age interval	In the age interval		In this and all subsequent age interval
(x to x + n)	(nM_x)	(nq_x)	(l_x)	(nd_x)	(nL_x)	(T_x)	(e_x)
0	.06503	.06298	100,000	6,298	95,591	5,755,380	57.55
1 - 4	.01022	.04010	93,702	3,757	367,612	5,659,789	60.40
5 - 9	.00395	.01957	89,945	1,760	445,570	5,292,177	58.84
10 - 14	.00190	.00946	88,185	834	438,947	4,846,607	54.96
15 - 19	.00262	.01302	87,351	1,137	433,970	4,407,660	50.46
20 - 24	.00313	.01554	86,214	1,340	428,115	3,973,690	46.09
25 - 29	.00360	.01785	84,874	1,515	420,833	3,515,575	41.78
30 - 34	.00521	.02574	83,359	2,146	411,900	3,124,742	37.49
35 - 39	.00666	.03279	81,213	2,663	399,850	2,712,842	33.40
40 - 44	.00869	.04259	78,550	3,345	384,925	2,312,992	29.45
45 - 49	.01074	.05239	75,205	3,940	366,853	1,928,067	25.64
50 - 54	.01608	.07748	71,265	5,522	343,408	1,561,214	21.91
55 - 59	.01966	.09395	65,743	6,177	314,191	1,217,806	18.52
60 - 64	.03052	.14228	59,566	8,475	277,687	903,615	15.17
65 - 69	.04342	.19659	51,091	10,044	231,322	625,928	12.25
70 - 74	.06899	.29497	41,047	12,108	175,504	394,606	9.61
75 +	.13208	1.00000	28,939	28,939	219,102	219,102	7.57

Table 57. Abridged life table for females in Thailand 1969-1971

Age interval	Average mortality rate 1969-1971	Proportion of 100,000 born alive		Stationary population		Average remaining life time	
		Proportion of persons alive at beginning of age interval	Number alive at beginning of age interval	Number dying during age interval	In the age interval		In this and all subsequent age interval
(Period of life between two exact ages stated in years)	(nM_x)	(nq_x)	(l_x)	(nd_x)	(nL_x)	(T_x)	(e_x)
0	.05963	.05790	100,000	5,790	95,947	6,085,904	60.86
1 - 4	.00771	.03040	94,210	2,864	371,466	5,989,957	63.58
5 - 9	.00292	.01450	91,346	1,324	453,425	5,618,491	61.51
10 - 14	.00191	.00951	90,022	856	448,167	5,165,066	57.38
15 - 19	.00242	.01203	89,166	1,073	443,388	4,716,899	52.90
20 - 24	.00298	.01480	88,093	1,303	437,248	4,273,511	48.51
25 - 29	.00341	.01692	86,790	1,468	430,498	2,836,263	44.20
30 - 34	.00504	.02491	85,322	2,125	421,627	3,405,765	39.92
35 - 39	.00631	.03109	83,197	2,587	409,984	2,934,138	35.87
40 - 44	.00764	.03753	80,610	3,025	395,942	2,574,154	31.93
45 - 49	.00865	.04240	77,585	3,290	380,347	2,178,212	28.07
50 - 54	.01264	.06139	74,295	4,561	360,839	1,797,865	24.20
55 - 59	.01452	.07021	69,734	4,896	337,190	1,437,026	20.61
60 - 64	.02294	.10881	64,838	7,055	307,541	1,099,836	16.96
65 - 69	.03355	.15533	57,783	8,975	267,511	792,295	13.71
70 - 74	.05588	.24292	48,808	11,856	215,251	524,784	10.75
75 +	.11938	1.00000	36,952	36,952	309,533	309,533	8.38

100,000 males born alive, only 93,700 will complete their first year of life and enter the second year, the corresponding figure for females being higher, 94,210. Nearly 51 per cent of the males and 58 per cent of the females born during 1969-1971 could expect to reach the age of 65 years.

The last column in tables 56 and 57 indicates the average number of years of life remaining at the beginning of each age interval. The expectation of life at birth for Thai males and females in the 1969-1971 period are 57.55 and 60.86 years respectively. The corresponding values for the earlier periods are as follows:

Period	Male	Female
1937-1947	37.00	39.67
1964-1965	53.94	57.79
1969-1971	57.55	60.86

It will thus be seen that over the years there has been an improvement in the mortality record of Thai people as measured by the expectation of life at birth (e_x^0). Improvement in expectation of life at birth has been due to the introduction of newly discovered

Table 58. Expectation of life at birth by sex for some countries in ESCAP region

Country	Year	Male	Female
Hong Kong	1961	63.64 ^{a/}	70.51 ^{a/}
India	1966-1967	49.20 ^{b/}	48.30 ^{b/}
Indonesia	1961	44.13 ^{c/}	47.53 ^{c/}
Japan	1964-1965	67.35 ^{d/}	72.47 ^{d/}
	1969-1970	69.06 ^{e/}	74.35 ^{e/}
Malaysia	1966	63.13 ^{f/}	66.04 ^{f/}
	1969	63.78 ^{g/}	66.73 ^{g/}
Pakistan	1962-1963	51.10 ^{h/}	48.70 ^{h/}
Singapore	1961-1963	63.30 ^{i/}	69.70 ^{i/}
Sri Lanka	1962-1964	63.28 ^{j/}	63.67 ^{j/}
Thailand	1964-1965	53.94 ^{k/}	57.79 ^{k/}
	1969-1971	57.55 ^{k/}	60.86 ^{k/}

Notes: a/ United Nations, *Demographic Yearbook 1966* (Sales No. 67.XIII.4), tables 21-23.

b/ Brijesk B. Lals, "Abridged life tables for rural India, 1966-1967" *Sample Registration Bulletin*, (New Delhi), No. 28, April 1969, pp. 3-5.

c/ United Nations, *Demographic Yearbook 1970* (Sales No. E/F.71.XIII.1), table 20.

d/ Institute of Population Problems, *The 18th. Abridged Life Tables*, Research Series, No. 166 (Tokyo, October 1965), pp. 4-11.

e/ Institute of Population Problems, *The 23rd. Abridged Life Tables*, Research Series, No. 196 (Tokyo, September 1971), pp. 4-11.

f/ Department of Statistics, *Vital Statistics, West Malaysia, 1969*, (Kuala Lumpur, 1971), pp. 195-202.

g/ Excluding Bangladesh. Based on data collected by Pakistan's Population Growth Estimation Experiment. Based data were adjusted by the Chandra-Deming formula, Muhammad Aslam, Sultan S. Hashmi and William Seltzer, "Abridged life tables of Pakistan and provinces by sex, 1962", *The Pakistan Development Review*, vol. 7, No. 1, Spring 1967, pp. 90-91.

h/ Saw Swee Hock, *Singapore, Population in Transition* (Philadelphia, University of Pennsylvania, 1970), pp. 170-193.

i/ Department of Census and Statistics, Ceylon, *Life Tables, 1962-1967* (Colombo, 1970), pp. 21-39.

j/ Based on data published in the *Survey of Population Change, 1964-1967* (Bangkok, 1970), pp. 37-38.

k/ Population Sector, Manpower Planning Division, National Economic and Social Development Board, Thailand, 1974.

medical and public health measures and techniques. The gain in life expectation between 1937-1947 and 1969-1971 has been of the order of over 20 years for males and over 21 for females. Most of the gains occurred between 1937-1947 and 1964-1967.

The expectation of life at birth for males and females in some selected countries of the ESCAP region is given in table 58. It will be noted that in all countries, except India and Pakistan, females tend to have a higher expectation of life at birth than males. Among the ESCAP countries, the life span is longest for Japanese. The comparatively shorter life span for the population of Thailand is due to the relatively high mortality level.

E. INTERNATIONAL COMPARISON

In order to bring out the differences in mortality patterns associated with differing socio-economic conditions, the proportionate distribution of total deaths by age and sex for Thailand is compared with the corresponding distribution for Sri Lanka, Japan and Peninsular Malaysia in table 59. It will be observed that up to the age of 50, the proportions in Thailand are higher than those in the other three countries for both sexes.

The proportion of deaths under 1 year of age in Thailand is nearly six times the corresponding proportion in Japan. More than one-third of the total

deaths in Thailand occur among children aged 0-4 years while in Japan only one in 20 deaths relates to the 0-4 age group. In the 5-9 age group, the proportion is about 5 per cent in Thailand and less than 1 per cent in Japan. In the older age groups, the proportion of deaths increases more rapidly in Japan than in Thailand possibly due to the effect of the ageing of population. The proportion of deaths among those aged 50 years and over is smaller in Thailand than in Japan.

F. COMPARISON BY REGION

As noted earlier, the registration data on deaths is subject to severe underregistration. The degree of completeness varies from one region to another and this renders difficult the adjustment of the registration data by region. Hence, the data obtained in the Survey of Population Change is used for comparing mortality levels by region and this data is presented in table 60. It will be seen that both crude death rate and infant mortality rate were highest in the Northern Region. The Northeast Region had the second highest crude death rate while second highest infant mortality rate was recorded in the Central Region. The lowest death rates prevailed in the Southern Region. Since the mortality level is usually associated with the socio-economic status, it is not surprising that the death rates are lower in the Central and Southern Regions and higher in the poorer Northern and Northeast Regions.

Table 59. Percentage distribution of deaths by age groups in some selected countries

Age group	Sri Lanka 1968		Japan 1968		Peninsular Malaysia 1968		Thailand 1970	
	Male	Female	Male	Female	Male	Female	Male	Female
Under 1	20.2	20.5	4.5	3.8	19.9	19.5	24.3	23.7
1-4	8.2	11.0	1.1	1.0	8.5	10.6	14.0	11.3
5-9	3.0	3.7	0.6	0.5	3.5	4.2	5.8	4.7
10-14	1.8	1.8	0.4	0.3	1.8	1.9	2.4	2.6
15-19	1.8	2.2	1.3	0.7	1.9	2.0	2.8	2.8
20-24	2.1	2.4	1.7	1.0	1.8	2.4	2.9	2.9
25-29	1.9	2.3	1.7	1.3	1.6	2.1	2.5	2.6
30-34	1.8	2.0	1.9	1.5	1.9	2.7	2.7	3.1
35-39	2.7	2.7	2.7	1.8	2.1	2.8	3.2	3.6
40-44	2.5	2.1	3.1	2.4	2.6	3.1	3.6	3.7
45-49	3.9	2.8	3.2	3.0	3.9	3.8	3.8	3.5
50-54	4.0	2.6	4.7	4.1	5.5	4.5	4.3	4.0
55-59	4.9	3.3	7.4	5.7	7.9	6.5	4.3	3.8
60-64	5.5	3.9	10.0	7.2	9.0	6.9	5.0	4.5
65-69	7.4	5.8	13.3	10.2	9.8	7.1	5.0	4.9
70+	28.2	30.7	42.1	55.3	18.3	19.8	13.3	18.5

Source: United Nations, *Demographic Yearbook 1970* (Sales No. E/F.71.XIII.1).

Table 60. Mortality rates by region and municipal and non-municipal areas, Thailand, 1964-1965

Region and municipal area	Crude death rate	Infant mortality rate
Whole kingdom	10.9	84.3
North	12.4	96.5
Northeast	11.4	83.4
Central	10.4	94.0
South	8.6	48.5
Municipal area	5.6	67.6
Non-municipal area	11.3	85.5

Source: Government of Thailand, *The Survey of Population Change 1964-1965* (Bangkok, National Statistical Office, 1967).

Despite the exclusion of Bangkok and Thon Buri municipal areas from the sample, the **Survey of Population Change (SPC)** indicates that the death rates for municipal areas are substantially lower than the non-municipal areas. The crude death rate in municipal areas is less than half and the infant mortality rate nearly three-fourths the corresponding rates for non-municipal areas.

G. CAUSES OF DEATH

In Thailand, the data relating to the registered causes of death are not very accurate. A reasonable degree of accuracy in this data could be expected only if the cause of death has been certified by a qualified medical person who has had the opportunity to examine the patient before death. In the absence of adequate medical institutional facilities, nearly 75 per cent of deaths in rural areas occur outside hospitals and other medical institutions. In the case of most deaths occurring in rural areas, the causes given are uncertain, inaccurate or unknown^{8/} because the patients either treat themselves or receive treatment from indigenous or non-qualified medical personnel. Further, the reporting agent in most cases is illiterate and this renders the recorded causes of death of little value from the point of view of assessing public health conditions.

Table 61 gives the percentage of deaths from leading causes for selected years from 1947 to 1970. Prior to 1950, malaria was the single largest cause of morbidity and mortality in Thailand, seriously affecting the health of the people and the economy

^{8/} During the period 1967-1970, an average of 41 per cent of the deaths were due to ill-defined and unknown causes.

of the country. The control programme using the house spraying technique started in 1949 helped to bring down malaria morbidity and mortality in subsequent years. The proportion of deaths due to malaria which was 22 per cent in 1947 has over the years declined to 1.5 per cent in 1970.

The percentages of deaths from diarrhoea, tuberculosis of the respiratory system and all forms of dysentery also declined between 1947 and 1970. The proportion of deaths due to diseases of pregnancy, childbirth and puerperium and typhoid has more or less remained at the same level. The proportion of deaths due to pneumonia showed an increase from 1.5 in 1947 to 4.0 in 1955 but thereafter there was a gradual decline to 2.3 in 1970. But deaths due to heart diseases, nutritional deficiency and accidents have increased over the period, deaths due to accidents recording the highest increase from 0.9 per cent in 1947 to 2.1 per cent in 1960 and to 4.2 per cent in 1970.

It may also be noted that there has been consequent changes in the rank orders of the causes of death. Malaria which in 1947 occupied the first rank was pushed down to the seventh place in 1970. However, deaths due to accidents, which occupied the seventh place in 1947, was the first important cause of mortality in 1970. Diseases of the heart occupied the ninth place in 1947 and the third place in 1970. The official figures released by the Ministry of Public Health indicate that in 1970 the 10 major causes of death in descending order of frequency were: accidents, pulmonary tuberculosis, diarrhoea, disease of the heart, pneumonia, avitaminose and other nutritional deficiency, malaria, diseases of pregnancy, childbirth and puerperium, dysentery and typhoid fever.

Table 61. Percentage of deaths from leading causes, 1947-1970

Cause of death	1947	1950	1955	1960	1965	1970
All causes	100.0	100.0	100.0	100.0	100.0	100.0
Malaria	22.2	19.4	7.7	3.6	2.1	1.5
Diarrhoea	8.2	5.2	5.1	4.6	3.7	2.4
T.B. of the respiratory system	4.1	6.6	5.5	4.1	3.5	3.3
Dysentery, all forms	5.0	3.3	2.4	0.9	0.8	0.4
Diseases of pregnancy, child birth and puerperium	1.3	1.9	2.0	1.7	1.6	1.2
Pneumonia	1.9	3.9	4.0	3.9	3.2	2.3
Accidents	0.9	1.4	1.7	2.1	3.2	4.2
Nutritional deficiency	0.7	1.3	1.5	2.1	2.1	1.7
Diseases of heart	0.6	1.4	1.5	2.3	2.3	2.5
Typhoid	0.4	0.7	0.8	0.7	0.3	0.2
Others	54.5	55.0	67.8	74.0	77.2	80.2

Source: Government of Thailand, *Public Health Statistics* (Bangkok, Ministry of Public Health, 1971).

“Among major diseases, the most prevalent are diarrhoea, dysentery, and a variety of other enteric ailments, such as helmintheasis and typhoid fever. Reportedly, they affect as much as 80 per cent of the population in any one year.”^{9/} The primary causes of these afflictions are contaminated water supplies and generally poor sanitary conditions.

Tuberculosis of the respiratory system is one of the principal infectious diseases in the country and ranks second among causes of death (first among diseases). The prevalence of pulmonary tuberculosis in Bangkok was revealed to be around 7.3 per cent. In a subsequent survey conducted in Chiang Mai a northern province much less congested than Bangkok, pulmonary tuberculosis was found to be 7.7

per cent of the population surveyed.^{10/} In order to control and reduce the incidence of the disease, the Ministry of Public Health has since 1953, engaged in a vigorous anti-tuberculosis campaign, concentrating mainly on schoolchildren and active carriers in the general population. Schoolchildren are X-rayed and given tuberculin tests every year in addition to regular and repeated vaccination.

Malaria is no longer an important cause of death but has long been a major health problem. Under the Malaria Eradication Project of the Ministry of Public Health, entire villages are sprayed with DDT in the weeks before and immediately after the rainy season. Malaria control teams inspect houses and streams for the presence of mosquitoes, examine villagers to determine whether or not they are infected and distribute drug treatment.

^{9/} John W. Henderson and others, *Area Handbook for Thailand* (Washington D.C., U.S. Government Printing Office, 1971), p. 95.

^{10/} Government of Thailand, *Public Health in Thailand* (Bangkok, Ministry of Public Health, 1966).

Chapter V

TRENDS AND DIFFERENTIALS IN FERTILITY

A. TRENDS IN FERTILITY

An accurate analysis of the levels and trends in fertility in Thailand is handicapped by a lack of reliable data on the number of births occurring in the country every year. As noted elsewhere, though a system of vital registration has existed in the country since 1917, the quality of the registration data leaves much to be desired. For several reasons there has been significant under registration of births^{1/}, and though an improvement has taken place in the coverage over the years, Das Gupta and others^{2/} estimated that in 1960, registration covered only about 75 per cent of total births. The results of the Survey of Population Change conducted by the National Statistical Office^{3/} in 1964-1965 indicated that only about 85 per cent of the births occurring in the country do in fact get registered.

Despite data difficulties, attempts have been made to study the changes in the level of fertility in Thailand by computing the sex-age adjusted birth rates by applying the "reverse survival" method to various censuses, and by correcting the registered births for underregistration on the basis of correction factors obtained by comparing for various time periods the average annual number of births registered with the estimated number of births derived from the sex-age adjusted birth rates. These methods are discussed in detail in annex II.

Thailand, like most developing countries, has been known for its high level of fertility in the past. Estimates made by the United Nations^{4/} place the gross reproduction rate at 3.2 for 1950-1955, while the results of the sample Survey of Population Change^{5/} conducted by the National Statistical Office

estimated a gross reproduction rate of 3.1 in 1964-1965. Other estimates indicate that the crude birth rate has varied between 45 and 50 per thousand of the population until as recently as the 1970 census.

Although the current fertility level in Thailand is one of the highest in the world, the curve of the sex-adjusted birth rates (see annex II figure 4) shows that there has been over the years a slight decline in the fertility rate. The crude birth rate declined from about 50 per thousand of the population during the 1920s to about 47 during the 1960s. The graph also shows a clear decline in the sex-adjusted birth rate during the Second World War years, followed by an increase during the years thereafter.

The crude birth rates based on registered data corrected for underregistration for all years from 1920-1970 are shown in annex II, table 12. It will be seen that these rates also show a slightly declining trend, from about 50 per thousand during the 1920s to about 40 per thousand during the 1960s, and a decline in the rates during the Second World War followed by an increase afterwards. Since 1956, there appears to be a declining trend though with minor fluctuations in 1959 and 1960 and again in 1964 and 1968. Nevertheless, the over-all trend has been a decline in the crude birth rate from 47.8 in 1956 to 44.3 in 1960 and to 39.4 in 1970. The crude birth rates of 42.9 in 1964 and 41.2 in 1965 are consistent with the rate of 41.8 per thousand estimated on the basis of the results of the Survey of Population Change.

Another set of estimates of the crude birth rates for all years from 1920 to 1955 was prepared by Bourgeois-Pichat^{6/} using the data of the censuses up to 1947 and of the 1956 Economic and Demographic Survey. These rates are shown in table 62. These estimates also show a decline in fertility during the Second World War and a sharp increase in fertility afterwards. Bourgeois-Pichat's estimates are somewhat different from the estimates referred to in the preceding paragraphs.

Although there have been changes in Thailand's

1/ For discussion of various factors, see annex II.

2/ Ajit Das Gupta and others, "Population perspective of Thailand", *Sankhya: The Indian Journal of Statistics*, Series B, vol. 27, parts 1 and 2, September 1965.

3/ Government of Thailand, *Report on the Survey of Population Change, 1964-1965* (Bangkok, National Statistical Office, 1967).

4/ United Nations, *Population Bulletin No. 7* (Sales No. 64.XIII. 2), Table 4.1

5/ Government of Thailand, *op.cit.*

6/ Jean Bourgeois-Pichat, "An attempt to appraise the accuracy of demographic statistics for an underdeveloped country: Thailand", *Perspective on Thai Population*, Research Report No. 1 (Bangkok, IPS, Chulalongkorn University, 1974), pp. 1-31.

Table 62. Estimated crude birth rates, Thailand, 1920-1955

Year	Crude birth rate	Year	Crude birth rate
1920	45.4	1938	45.6
1921	45.7	1939	49.4
1922	47.9	1940	48.3
1923	49.3	1941	47.7
1924	47.2	1942	45.4
1925	49.7	1943	46.8
1926	46.9	1944	43.1
1927	48.8	1945	39.8
1928	48.9	1946	44.0
1929	49.0	1947	46.1
1930	47.4	1948	46.4
1931	49.7	1949	46.7
1932	50.0	1950	47.0
1933	49.4	1951	47.4
1934	49.9	1952	47.8
1935	48.3	1953	48.3
1936	47.3	1954	48.7
1937	50.9	1955	48.9

Source: Jean Bourgeois-Pichat, "An attempt to appraise the accuracy of demographic statistics for an under-developed country: Thailand," *Perspective on Thai Population*, Research Report No. 1 (Bangkok, IPS, Chulalongkorn University, 1974), table IX.

fertility levels during the last decade, an attempt has been made to apply the stable population method to obtain another estimate of the crude birth rate^{7/}. From the female age distribution as reported at the census of 1970, a cumulative age distribution was constructed, which was found to correspond to a model stable age distribution at different mortality levels (Coale and Demeny "west" model) and a rate of natural increase of 3 per cent. By way of interpolation, a female birth rate corresponding to the cumulated age distribution was estimated for each age 5, 10, 15.....45. The best choice consisted of taking the median value, which gave a female birth rate of 41.3. The corresponding birth rate for the total population of Thailand was then found to equal 42.5 per thousand.

Ajit Das Gupta and others^{8/} estimated a crude birth rate of 44 per thousand in 1960 on the basis of data on children ever born by differencing average number of children born. It has however to be noted that the differencing technique is valid only in situa-

tions where fertility has been remaining more or less constant over the years. As noted earlier, this has not been the case in Thailand.

B. AGE-SPECIFIC FERTILITY

The age-specific fertility rates for the census years 1960 and 1970 are given in table 63. These rates were estimated by correcting the registration data on births by age of mother. This correction is based on the assumption that the age pattern of fertility shown by Thailand's incomplete vital statistics is approximately correct. The general fertility rates, the standardized fertility rates, the total fertility rates and the gross reproduction rates computed on the basis of these age-specific fertility rates are shown in table 64.

The decline in fertility during the 1960s shown by the estimates of crude birth rates discussed in the preceding sections is confirmed by the age-specific fertility rates presented in table 63 and other fertility rates given in table 64. To the extent that the adjustments effected for 1960 and 1970 are valid, there was a sharp decrease in the total as well as general fertility rates. The standardized fertility rate (which eliminates the effect of changing age structure on fertility) for 1970 is higher than the ge-

^{7/} United Nations, *Methods of Estimating Basic Demographic Measures from Incomplete Data*, Population Studies No. 42 (Sales No. E. 67. XII. 3).

^{8/} Ajit Das Gupta and others, *loc. cit.*

Table 63. Age-specific fertility rates, Thailand, estimation 1960 and 1970 and as obtained from the Survey of Population Change 1964-1965

Age	Registered births		Corrected births		Female population		Age-specific fertility rates (estimated) per 1,000		Age-specific fertility rates as given by the Survey of Population Change, 1964-1965.
	1960 ^{a/}	1970 ^{b/}	1960 ^{c/}	1970 ^{d/}	1960 ^{e/}	1970 ^{f/}	1960	1970	
15-19	49,552	95,001	65,437	122,974	1,238,223	1,988,567	52.8	61.8	66.4
20-24	238,243	299,335	314,617	387,475	1,206,031	1,436,209	260.9	269.8	258.9
25-29	250,736	267,369	331,115	346,097	1,048,096	1,205,959	315.9	287.0	302.6
30-34	183,152	213,814	241,866	276,772	871,233	1,136,043	277.6	243.6	273.1
35-39	119,887	154,439	158,320	199,914	681,001	1,010,021	232.5	197.9	222.4
40-44	49,348	63,259	65,168	81,886	564,691	808,278	115.4	101.3	112.3
45-49	10,356	12,745	13,676	16,498	483,719	630,156	28.3	26.2	24.1
Total	901,274	1,105,962	1,190,199	1,431,616	6,092,994	8,215,233	1,283.4	1,187.6	1,259.8

Notes: ^{a/} Government of Thailand, *Statistical Yearbook, No. 29, 1970-1971* (Bangkok, National Statistical Office, 1972).

^{b/} *Ibid.*, *Public Health Statistics* (Bangkok, Ministry of Public Health, 1971).

^{c/} Col. (a) x 1,190,199/901,274. (1,190,199 previously estimated number of births for 1960).

^{d/} Col. (b) x 1,431,616/1,105,962. (1,431,616 previously estimated number of births for 1970).

^{e/} 1960 census data, unknown pro-rated.

^{f/} Corrected, see annex II.

Table 64. Thailand: estimated fertility rates based on 1960 and 1970 censuses and Survey of Population Change, 1964-1965

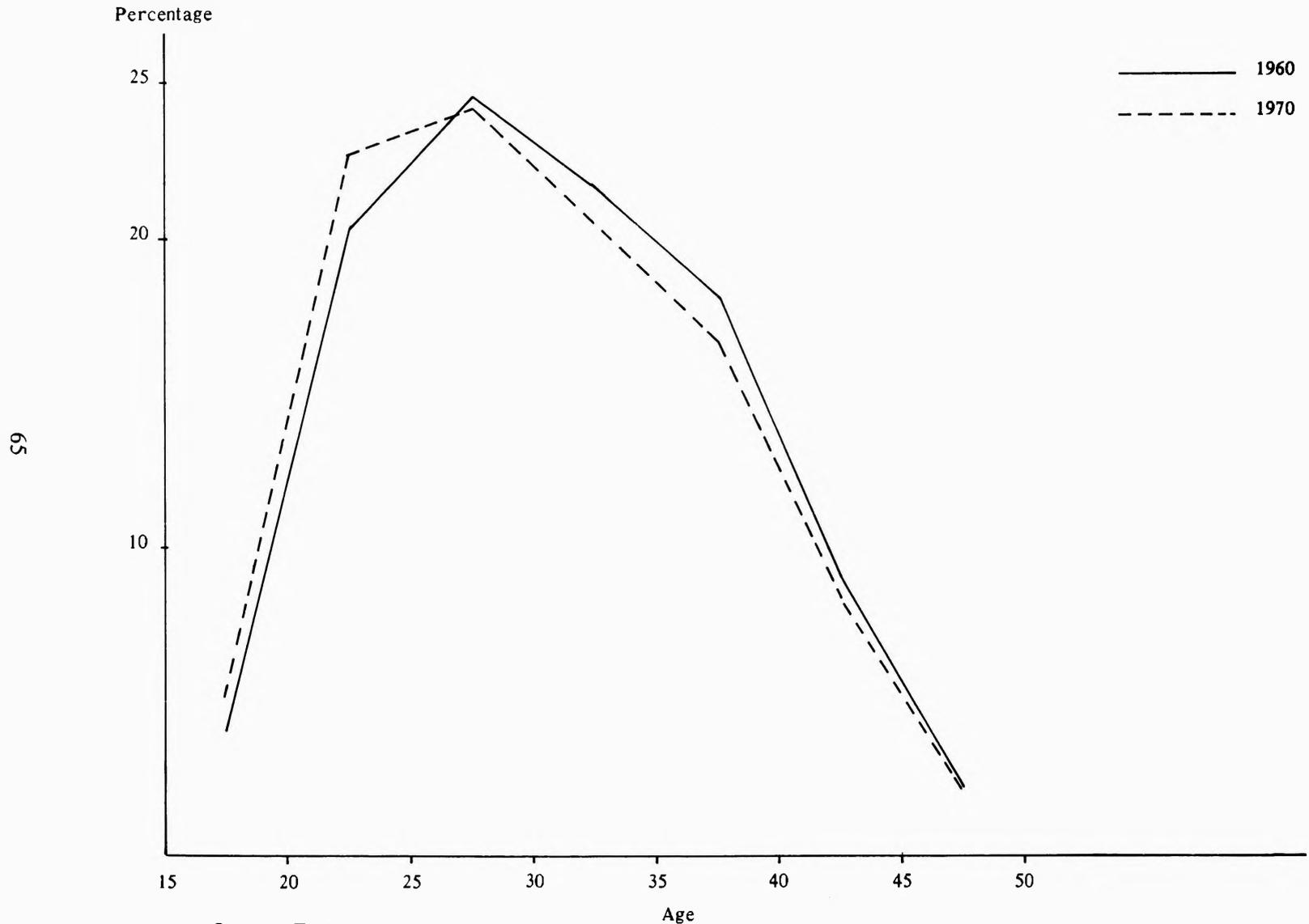
Fertility rate	1960	1970	1964-1965
General fertility rate	195.3	174.2	188.8
Standardized fertility rate ^{a/}	195.3	183.8	193.0
Total fertility rate	6,415.5	5,938.0	6,249.0
Gross reproduction rate	3.1	2.9	3.1

Note: ^{a/} Standardized by using age composition of the 1960 census.

Table 65. Percentage distribution of female population aged 15 to 49 years by age group, Thailand, 1960 and 1970

Age group	1960	1970
15-19	9.4	10.9
20-24	9.2	7.9
25-29	8.0	6.6
30-34	6.6	6.2
35-39	5.2	5.5
40-44	4.3	4.4
45-49	3.7	3.5

Sources: Government of Thailand, *1960 Population Census* (Bangkok, Central Statistical Office, 1962)., *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).



Source: Table 66

Figure 8. Thailand: percentage of total fertility contributed by women in each 5-year age group

neral fertility rate. This indicates that between 1960 and 1970 the age structure has become unfavourable to high natality. This is further confirmed by a comparison of the age structure of females in the child bearing ages 15 to 49 years in 1960 and 1970 (see table 65).

The proportions of total fertility contributed by women in each five-year age group in 1960 and 1970 are given in table 66 and changes in these proportions are presented in figure 8. It will be observed that though there has been a decline in over-all fertility between 1960 and 1970, this decline did not occur in every age group. In fact the age-specific fertility rates for the first two age groups, 15-19 and 20-24 increased during this period while the rates in respect of the age groups from 25-29 to 40-45 recorded a decline. The increase in the fertility rates of women in the ages 15-24 has largely to be ex-

plained in terms of the increase between 1960 and 1970 in the proportion of ever-married women in these ages as is evident from table 67.

The age-specific fertility rates derived from the results of the Survey of Population Change, 1964-1965, are shown in table 63. If there has been a decline in fertility between 1960 and 1970, the rates obtained from the Survey should represent an intermediate value between the 1960 and 1970 rates. This is true in regard to the rates in regard to the age groups from 25-29 to 40-44. The rates, obtained from the Survey of Population Change, appear to be consistent with the rates estimated from vital statistics.

The age-specific fertility rates for 1960 estimated by Das Gupta and others by differencing census data on children ever-born are compared with the rates

Table 66. Percentage of total fertility contributed by women in each five-year age group, 1960 and 1970

Age group	1960	1970
15-19	4.1	5.2
20-24	20.3	22.7
25-29	24.6	24.2
30-34	21.6	20.5
35-39	18.1	16.7
40-44	9.0	8.5
45-49	2.2	2.2

Source: Computed from data in table 63.

Table 67. Proportions of women ever-married in each reproductive age group, 1947, 1960 and 1970 ^{a/}

(Percentage)

Age group	1947	1960	1970
15-19	19.4	13.8	19.0
20-24	70.0	61.2	62.0
25-29	89.1	85.7	84.3
30-34	94.3	93.2	91.9
35-39	96.0	95.7	94.7
40-44	96.8	96.8	96.1
45-49	97.1	97.3	96.9

Sources: *Statistical Yearbook of Thailand, 1945-1955*, reports of population censuses, 1960 and 1970.

Note: ^{a/} Excluding marital status unknown.

Table 68. Comparison of estimated age-specific fertility rates for 1960

Age group	Based on adjusted registration data	Based on census data on children ever-born.
15-19	52.8	68.6
20-24	260.8	220.7
25-29	315.8	313.5
30-34	277.5	303.5
35-39	232.4	242.1
40-44	115.4	131.0
45-49	28.3	46.7

obtained from corrected registration data for the same year in table 68. It will be observed that the estimates of Das Gupta and others are higher than the estimates derived from vital statistics for all age groups except the 20-24 and 25-29. It has however to be noted that the age-specific fertility rates obtained by differencing average children ever-born entails a period and generation mix of experience. The technique will be valid if fertility had been keeping nearly steady during the past few decades. "Even a small declining trend in fertility, proportionate for all age groups of women, will however make itself

age-distribution of fertility be also changing; from the effects of cumulation again, a recent trend of rising ages at marriages, for example, will inflate the differenced age-specific fertility of the age-group to which the weight of marriages has shifted. These features inherent in the technique of differencing, should be borne in mind in deriving current fertility from total children born"^{9/}.

The 1970 age-specific fertility rates for Thailand are compared with the rates for the Philippines, Singapore and Sri Lanka in table 69. It will be seen

Table 69. Comparison of age-specific fertility rates for Thailand with selected countries in Southeast Asia

Age group	Thailand 1970	Philippines 1967	Singapore 1968	Sri Lanka 1963
15-19	61.8	41.4	31.8	52.5
20-24	269.8	140.9	170.1	228.7
25-29	287.0	193.6	243.5	279.4
30-34	243.6	167.9	153.5	240.4
35-39	197.9	138.9	85.7	157.6
40-44	101.3	52.5	36.3	45.9
45-49	26.2	11.0	7.2	6.6
Total fertility rate	5.938	3.731	3.640	5.055

Source: Thailand: table 63 above; other countries: United Nations, *Demographic Yearbook, 1969* (Sales No. E/F. 70. XIII. 1).

felt in the differenced series and render progressively inflated values with rising age of women. The age-specific rates for the terminal fertile ages 45-49 in particular, could be substantially inflated by the differencing technique from the cumulation effect of small remainders of excess earlier generation fertility. The position becomes more complex if the

that fertility in Thailand for all age groups is higher than the corresponding rates for the other countries. In order to facilitate comparisons in age patterns of

^{9/} Ajit Das Gupta and others, *loc.cit.*, para 2.27.

Table 70. Percentage of total fertility contributed by women in each five-year age group—selected countries

Age group	Thailand 1970	Philippines 1967	Singapore 1968	Sri Lanka 1963
Total	100.0	100.0	100.0	100.0
15-19	5.2	5.5	4.4	5.2
20-24	22.7	18.9	23.4	22.6
25-29	24.2	25.9	33.4	27.6
30-34	20.5	22.5	21.1	23.8
35-39	16.7	18.6	11.8	15.6
40-44	8.5	7.0	5.0	4.5
45-49	2.2	1.5	1.0	0.7

Source: Computed from data in table 69.

fertility, the relative contribution of women in each age group to total fertility is shown in table 70. For each country, the maximum fertility occurs in the 25-29 age group but for Thailand the percentage contribution of this and the 30-34 age group is lower than that of other countries. The proportionate contribution to total fertility of women in the older age groups is higher in Thailand.

The age-specific marital fertility rates for 1960 and 1970 are given in table 71. These rates were obtained by dividing age-specific fertility rates by proportion of females currently married in each age group. This procedure assumes that all births are legitimate or occur within the marital union and hence tends to over-estimate the marital fertility rates. However, in the absence of any data on illegitimate births, it is not possible to estimate precisely the marital fertility rates. Since they are computed from age-specific fertility rates, it is not surprising that the age-specific marital fertility rates follow approximately the same pattern of

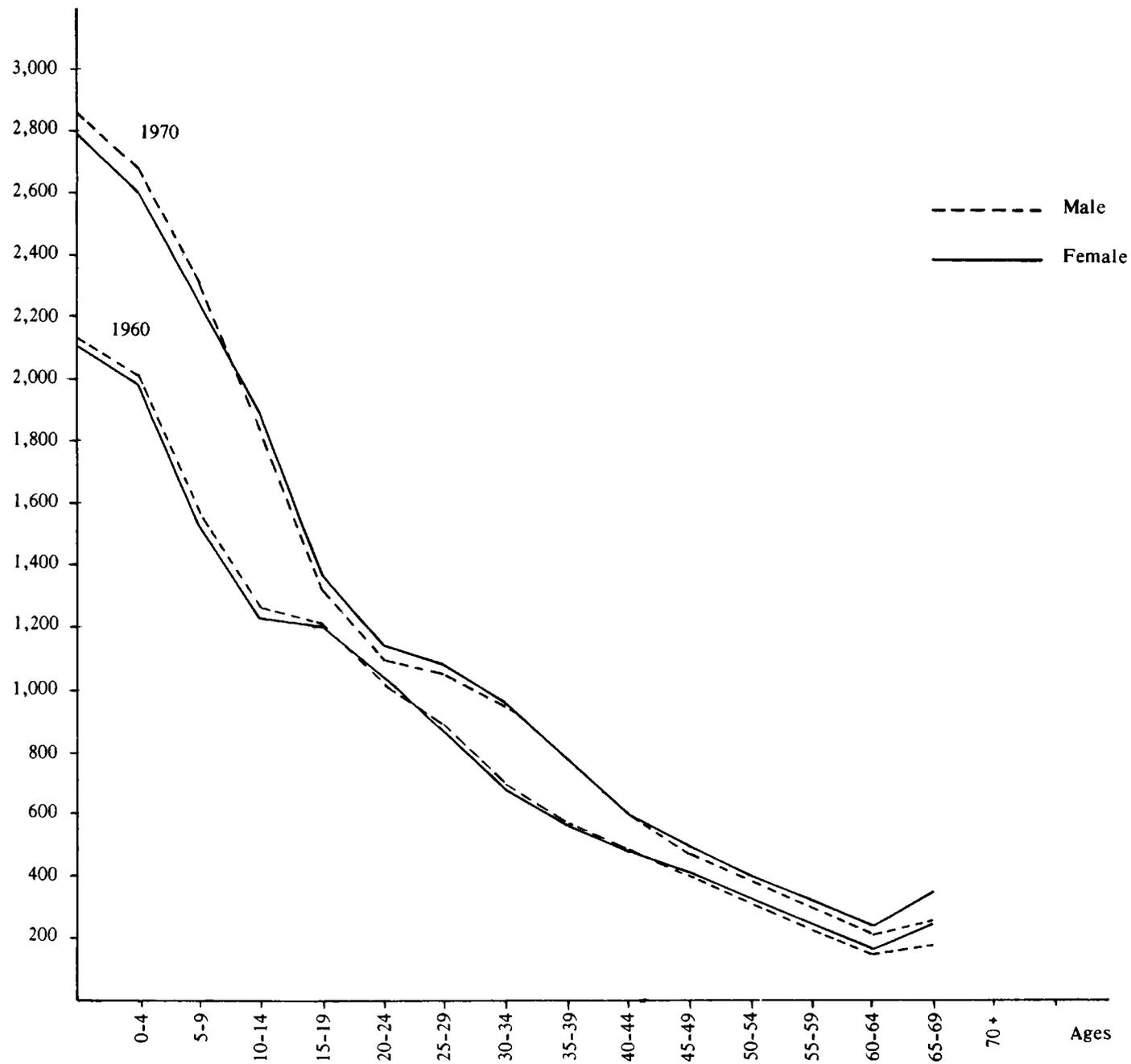
change as age-specific fertility rates. During the decade 1960-1970, these rates declined for all age groups except the 20-24 age group. These rates, however, indicate a prolongation in the reproductive span of Thai women.

Age-specific marital fertility rates were also calculated from the results of the Longitudinal Study of Social, Economic and Demographic Change conducted in April and May 1969 and 1970 and April and May 1972 and 1973. A comparison with the results of this study is somewhat difficult because this study was made up of two surveys, one rural and one urban separated by a one-year interval^{10/}. In order to estimate the current levels of rural and urban fertility, the number of live births occurring to currently married women approximately in the year prior to the survey were tabulated and used as the basis for calculating age-specific marital fertility rates. The rates (see table 72) are very similar to the rates discussed earlier, if the estimations for 1970 and the results of the first round of the Longitudinal Study are compared. The comparison of results of the two rounds of the Study indicate a fall in the rates at all ages except for the age group 25-29. In any case, the results of the Longitudinal Study confirm the earlier findings regarding the decline in fertility that started at least during the previous decade. This decline seems to have accelerated recently, probably due to the increasing contraceptive practices among married women aged 15-49 years.

^{10/} For further discussion on this aspect, see annex I, and *The Methodology of the Longitudinal Study of Social, Economic and Demographic Change*, Research Report No. 6, (Bangkok, Institute of Population Studies, Chulalongkorn University, 1971).

Table 71. Marital fertility rates, Thailand, 1960 and 1970

Age group	1960	1970
15-19	422.4	353.1
20-24	464.1	466.8
25-29	397.4	362.8
30-34	323.2	283.9
35-39	269.3	228.3
40-44	139.9	119.9
45-49	36.5	32.7



Source: Reports of 1960 and 1970 censuses

Figure 9. Thailand: age distribution of the population, 1960-1970

Table 72. Age-specific marital fertility rates based on corrected vital statistics and the results of the Longitudinal Study

Age group	Vital statistics (adjusted) 1970	Longitudinal Study <u>a/</u>	
		1968-69	1971-72
15-19	353	412	408
20-24	467	442	395
25-29	363	361	362
30-34	284	267	207
35-39	229	228	191
40-44	120	180	145
45-49	33	36	18

Source: *Tables on Fertility and Family Planning: Longitudinal Study of Social, Economic and Demographic Change in Thailand - Rounds I and II* (Bangkok, IPS, Chulalongkorn University, 1974)

Note: a/ In order to obtain a national aggregate, rural sample women were weighted seven times the urban sample.

C. PARITY PROGRESSION RATIOS

As elaborate measure of the chance of having an additional child is the parity-progression ratio ("probabilities d'agrandissement") developed by Henry^{11/}. When the numbers of ever-married women by number of children ever-born alive are cumulated from the highest parity to the lowest for respective age groups, parity progression ratios can be calculated as follows:

$$A_n = \frac{W_{(n+1)}}{W_n}$$

where, W_n , $W_{(n+1)}$, and A_n denote the number of women whose parity is n and over, the number of women whose parity is $n+1$ and over, and parity progression ratio from parity n and over to parity $n+1$ and over, respectively.

Table 73 gives the parity progression ratios

Table 73. Parity progression ratios, 1970

Number of children ever born alive	Ever-married women of 45 years and over		Parity progression ratios
	Number	Cumulative total	
0	46,388	2,220,656	.98 (0.93 if the 122,735
1	147,335	2,174,268	.93 unknown are counted
2	158,143	2,026,933	.92 as childless women)
3	175,545	1,868,790	.91
4	205,092	1,693,245	.88
5	225,840	1,488,153	.85
6	238,454	1,262,313	.81
7	233,490	1,023,859	.77
8	217,768	790,369	.72
9	188,733	572,601	.67
10 and over	383,868	383,868	

^{11/} Louis Henry, *Fecondite des mariages: Nouvelle methode de mesure* (Fertility of marriages: a new method of measurement), Travaux et documents, Cahier No. 16, Institut national d'etudes demographiques (Paris, Presses universitaires de France, 1953).

calculated for women aged 45 years and over from the data of the 1970 census of Thailand. It will be seen that for all birth orders, the probability of an additional birth is always higher than 67 per cent. That is to say that, in Thailand, whatever the number

of children she has had, the probability for a woman of having another one is at least 67 per cent.

In Thailand, nearly all married women have children. Childlessness or infertility, as measured by the proportion of ever-married women aged 45 years and over without any children, appears to be very low according to table 74. In fact, this proportion is about 2 per cent if only those women whose number of children was reported as zero are included in the calculation. There were, however, a substantial number of women in respect of whom the number of children was reported as unknown. If these women are also included in the calculation on the assumption that they were childless, then the proportion of childless ever-married women aged 45 years and over works out to about 7 per cent.

the highest fertility rate is observed in respect of women aged 25-29 years, their relatively small number in 1970 would have been a factor in bringing about a decline in the birth rate between 1960 and 1970. These observations are further confirmed by a comparison of the age distribution of women of child bearing ages in 1960 and 1970 given in table 75.

The smallest increase (15.1 per cent) during the 1960s is observed for the prime child-bearing age group, 25-29 years. The proportion of the female population in this age group had dropped from 8.0 per cent in 1960 to 6.6 per cent in 1970. The proportion in age groups 20-24 and 30-34 years, which are also highly fertile in Thailand recorded a decline during this period. The proportion of the female population decreased from 9.2 per cent in 1960 to

Table 74. Number of ever-married women with no children in 1970

Age group	Total ever-married women	Number without children		(2)	(3)	(4)+(5)
		Number	Unknown	(1)	(1)	
	(1)	(2)	(3)	(4)	(5)	(6)
15-19	357,636	148,670	23,576	41.6	6.6	48.2
20-24	843,592	59,173	99,150	7.0	11.8	18.8
25-29	963,640	25,748	56,533	2.7	5.9	8.6
30-34	989,625	15,834	36,984	1.6	3.7	5.3
35-39	906,593	11,607	28,398	1.3	3.1	4.4
40-44	736,266	10,371	23,350	1.4	3.2	4.6
45-49	578,865	9,407	20,572	1.6	3.6	5.2
50-54	477,010	8,456	19,404	1.8	4.1	5.9
55-59	392,412	7,587	18,138	1.9	4.6	6.5
60 and over	895,104	20,938	64,621	2.3	7.2	9.5

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).

D. DETERMINANTS OF FERTILITY

1. Age structure

As was noted earlier, the Second World War and its aftermath caused a drop in the birth rates between 1940 and 1948. This is evident from figure 9, which shows the age distribution of the population as given by the last two censuses of 1960 and 1970. That cohort born during the period 1940-1948 was between the ages 12 and 20 years in 1960 and its relatively small number can be seen in the age distribution for 1960. The hollow in the curve is more accentuated for the age group 15-19 years. Those women aged 15-19 years in 1960 were 25-29 years old in 1970. Since

7.9 per cent in 1970 in the age group 20-24 and from 6.6 per cent in 1960 to 6.3 per cent in 1970 in the age group 30-34. A decrease from 3.7 per cent to 3.5 per cent is also noticed for the age group 45-49. Though there was an increase in the proportionate share of the other three age groups, the proportion for all child bearing age groups 15-49 years declined from 46.5 in 1960 to 45.3 in 1970.

These changes in the age distribution of the female population since 1960, especially of women in the more fertile age groups, have had a definite effect on the decline in the birth rate.

The effect of age structure on crude birth rates

Table 75. Number of women in each child-bearing age group, 1960 and 1970

Age group	Number		Percentage of total population		Percentage change 1960-1970
	1960 a/	1970 b/	1960	1970	
15-19	1,238,223	1,988,567	9.4	11.0	60.6
20-24	1,206,031	1,436,209	9.2	7.9	19.1
25-29	1,048,096	1,205,959	8.0	6.7	15.1
30-34	871,233	1,136,043	6.6	6.3	30.4
35-39	681,001	1,010,021	5.2	5.6	48.3
40-44	564,691	808,278	4.3	4.5	43.1
45-49	483,719	630,156	3.7	3.5	30.3
Total	6,092,994	8,215,233	46.5	45.3	34.8

Notes: a/ Number reported as age unknown was pro-rated.
b/ Census data adjusted for underenumeration (see annex II).

can be observed from the data on standardized birth rates for 1960 and 1970 calculated on the basis of the age composition of females in child-bearing age as observed in the 1960 census (see table 76). If the age structure of 1960 had remained unchanged, the standardized birth rate for 1970 would have been 41.7. On this assumption, the birth rate should have fallen by 5.9 per cent during 1960-1970. But in actual fact the birth rate declined by 11.1 per cent during this period. Thus, of the total 11.1 per cent decline only 5.9 per cent can be attributed to the real decline in fertility. Therefore, about 47 per cent of the decline in the birth rate during this period was a result of changes in the age distribution, and 53 per cent the result of real declines in age-specific fertility rates. It will also be noted that if the age and marital status distribution had remained constant during the period 1960-1970, the birth rate would have only fallen from 44.3 in 1960 to 41.1 in 1970 instead of 39.4 as actually estimated for 1970. Thus the change of marital status composition during the

1960s, as given by the censuses, seems to contribute to an increase of fertility rather than to a decline.

2. Age

It has been generally found that the number of live births per ever-married woman increases steadily with the age of women during the child-bearing period from 15 to 49 years of age as shown in table 77. On an average a Thai woman would bear about 6 children by the time she completes her reproductive years.

However, this does not necessarily imply that fertility rates of the Thai women uniformly vary with their age. As measured by age-specific rates, the fertility levels of the ever-married Thai women are curvilinearly related with the women's age as shown in table 78. The rate reaches its maximum value when women are about 25-29 years of age

Table 76. Crude and standardized birth rates, 1960 and 1970

Year	Crude birth rate	Birth rate standardized on 1960	
		Age distribution	Age and marital status distribution
1960	44.3	44.3	44.3
1970	39.4	41.7	41.1
Percentage change			
1960-70	-11.1	-5.9	-7.2

Table 77. Mean number of live births by age of ever-married women

Age group	Bangkhen ^{a/}	Potharam ^{b/}	1970 Census ^{c/}	
			Rural	Urban
15-19	0.9	-	0.7	0.8
20-24	1.5	1.5	1.8	1.7
25-29	2.6	2.9	3.1	2.7
30-34	3.9	4.3	4.4	3.9
35-39	4.8	5.4	5.7	4.9
40-44	5.9	6.2	6.5	5.6
45-49	-	-	6.7	5.8

Notes: ^{a/} Donald O. Cogwill and others, *Family Planning in Bangkhen, Thailand* (Bangkok, Center for Population and Social Research, Mahidol University, 1969), p.13. .

^{b/} Amos H. Hawley and Visid Prachuabmoh, "Family growth and family planning in a rural district of Thailand", Bernard Barelson and others (ed.), *Family Planning and Population Programmes* (Chicago, Chicago University Press, 1966), p. 530.

^{c/} John Knodel and Visid Prachuabmoh, *The Fertility of Thai Women*, Research Report No. 10 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973), p. 12.

Table 78. Various estimates of age-specific fertility in Thailand, various years

Age group	1960 ^{a/}	1964-1965 ^{b/}	1968-1969 ^{c/}	1970 ^{d/}	1971-1972 ^{e/}
	(Das Gupta, and others)	(Survey of Population Change)	(Chulalongkorn Longitudinal Study)	(Robinson estimates from 1970 Census)	(Chulalongkorn Longitudinal Study)
15-19	.0686	.0664	.07198	.0862	.07128
20-24	.2207	.2589	.25548	.2279	.22831
25-29	.3135	.3026	.28566	.2824	.28645
30-34	.3035	.2731	.22906	.2673	.17759
35-39	.2421	.2224	.19768	.2102	.16559
40-44	.1310	.1123	.15212	.1037	.12254
45-49	.0467	.0241	.02882	.0398	.01441
	1.3261	1.2598	1.22080	1.2175	1.06617

Notes: ^{a/} A. Das Gupta and others, "Population perspectives on Thailand" *Sankhya: Indian Journal of Statistics*, Series B, vol. 27, parts 1 and 2, September 1965.

^{b/} Government of Thailand, *Report of the Survey of Population Change, 1964-1967* (Bangkok, National Statistical Office, 1970).

^{c/} John Knodel and Visid Prachuabmoh, *The Fertility of Thai Women*, (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973).

^{d/} Warren C. Robinson, "Notes on fertility trends in Thailand" (Bangkok, National Economic and Social Development Board, 1974), p. 8a.

^{e/} *Tables on Fertility and Family Planning, Longitudinal Study of Social, Economic and Demographic Change in Thailand, Rounds I and II* (Bangkok, Institute of Population Studies, Chulalongkorn University, 1974).

Table 79. Average number of children ever-born to ever-married women by age at first marriage

Age at first marriage	Rural				Urban			
	15-29	30-44	45+	Total	15-29	30-44	45+	Total
Below 18	2.2	6.5	7.5	5.3	2.3	5.6	6.4	4.7
18-19	2.3	6.4	7.4	5.4	2.1	5.4	6.1	4.6
20-21	1.9	5.6	6.6	5.0	1.7	4.9	6.2	4.4
22-24	1.5	5.2	6.4	4.8	1.5	3.8	4.7	3.3
25-29	1.0	3.5	5.0	3.5	0.9	2.8	4.0	2.8
30 and over	-	1.5	3.8	2.7	-	1.8	2.1	1.9
No answer	-	-	4.5	4.7	-	-	-	-

Source: John Knodel and Visid Prachuabmoh, *The Fertility of Thai Women*, Research Report No. 10 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973), table 7.

and declines thereafter to the lowest value at 45-49 years of age.

3. Age at marriage

However, the significance of age in relation to fertility is probably due to other social and cultural factors that expose women to the risk of child-bearing. The earlier the women are exposed to child-bearing, the greater the chance that they will have a larger family size. This is particularly the case in a society where knowledge and practice of birth control are not widespread. Significant among the factors that expose women to the risk of child-bearing is women's age at first marriage. The younger the age at which women are married, the longer they are exposed to this risk and the more children they eventually bear. Table 79 shows that among women who were ever-married, those who married at younger ages actually had a larger number of children ever-born than those who were married at comparatively older ages.

4. Duration of marriage

Implicit in the relation between age and age at first marriage, on the one hand, and fertility on the other, is a major socio-demographic factor, i.e., the duration of marriage. Nonetheless, this does not mean that all couples who marry young will have a longer duration of marriage than those who marry at older ages, as some of the early marriages may end sooner in divorce, separation or widowhood. Generally, the longer a couple are married, the more children they eventually have. In order to study the extent to which duration of marriage af-

fects fertility, it becomes necessary to control for age and/or age at marriage, since the duration of marriage is dependent on or compounded with current age at marriage and current marital status. Table 80 shows that duration of marriage does have an effect on women's cumulative fertility. Among those who were married at the same age, those whose marriage lasted longer generally had a larger number of children ever born than those with shorter duration of marriage. It may, however, be noted that those whose marriages lasted 30 years and over tended to average a smaller number of live births than those with a shorter marriage duration. This is probably due to a higher degree of recall lapse on the part of the older couples with longer marriage duration.

5. Marital stability

Another variable that is implicit in the relationship between duration of marriage and fertility and that has been found to have an effect on fertility is the stability of marriage^{12/}. Divorce, separation, or desertion, as well as death of the husband, is most likely to affect women's fertility unless these events are immediately followed by remarriage. In Thailand, it has been observed that there is a clear relation between marital status and fertility level. A woman who was currently married in 1960 and living with spouse averaged 4.56 compared with only 3.34 live births for those who were married but with spouse absent, a differential of over 25 per cent.

^{12/} See Sidney Goldstein and others, *The Effect of Broken Marriage on Fertility Levels in Thailand*, Paper No. 4 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973).

Table 80. Average number of live births of the rural ever-married women by age at marriage and duration of marriage

Age at marriage	Duration of marriage			
	0-9 years	10-19 years	20-29 years	30 years and over
15-17	2.0	5.0	7.6	7.6
18-20	2.5	5.2	7.4	6.9
21-23	2.2	5.2	7.0	6.1
24 and over	1.9	4.5	5.8	5.6

Source: Suchart Prasithrathsin "Economic and fertility behavior of the rural people in Thailand", unpublished, Ph.D. Thesis, Brown University, 1971.

The fertility levels of widows and divorced women were also considerably below those of women who were married and living with spouse. The average number of live births to those married with spouse absent falls between the level of the widowed and the lower level of the divorced (see table 81).

levels and suggests the important influence which increasing urbanization may have on fertility levels in the country as a whole. But the predominantly rural character of Thailand accounts for the high fertility level characterizing the country as a whole."^{13/}

Table 81. Average number of live births per 1,000 ever-married women by current marital status and age

Age	Married		Widowed	Divorced or separated
	Spouse present	Spouse absent		
13-19	498	530	690	532
20-24	1,442	1,085	1,119	1,030
25-29	2,780	1,992	2,183	1,495
30-34	4,204	2,987	3,135	2,264
35-39	5,456	3,972	4,030	2,919
40-44	6,273	4,602	5,004	3,702
45-49	6,386	5,103	5,221	3,816
50 and over	6,146	4,432	5,398	4,045
Total	4,280	2,647	5,139	2,540
Total standardized for age	4,560	3,344	3,697	2,735

Source: Sidney Goldstein and others, *The Effect of Broken Marriage on Fertility Levels in Thailand*, Paper No. 4 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973), p. 23.

6. Rural-urban residence

In Thailand, as in most countries, women who live in urban areas tend to have lower fertility than their rural counterparts. It will be seen from table 82 that the number of children ever born to women who live in Bangkok averaged about 24 per cent below the average number born to those living in rural agricultural area. This "corroborates the significant impact of the urban metropolis on fertility

7. Education

Table 83 shows the average number of children born classified by level of education, age and resi-

^{13/} Sidney Goldstein, "The influence of labour force participation and education on fertility in Thailand", in *Population Studies* (London), vol. 26, No. 3, November 1972, p. 423.

The findings of the Longitudinal Study have been confirmed by another analysis of fertility differentials by literacy and educational levels based on 1 per cent sample tabulations of the 1960 census data. This analysis indicates that in rural and urban residence categories, illiterate women were characterized by higher cumulative fertility than literate women and a general inverse relationship between years of schooling and the mean number of children ever born was evident. "Standardization for age considerably reduces the differential between literate and illiterate women, but even with age controlled, women classified as illiterate are characterised by higher fertility".^{15/}

8. Labour force participation

The analysis based on the 1 per cent sample tabulation of the 1960 census data referred to in the preceding section also indicated that for the country as a whole, women who were in the labour force had a higher level of cumulative fertility than those who were housewives (see table 84). The age-specific

population. Among those in the early years of child bearing, labour force participation is more incompatible with fertility than it is among older women. "The higher fertility levels of older employed women compared to the housewives may reflect several situations: (1) Higher cumulative fertility may force women to work in order to meet the greater consumption needs of the larger household size. (2) The availability in the household of older children who are able to care for the younger children may permit a higher degree of labour force participation by these mothers. (3) For women aged 45 and over, the end of childbearing may facilitate labour force participation"^{16/}.

In contrast to the rest of the nation, the fertility level of economically active women in Bangkok is markedly below that of housewives. Possible explanations are the absence of parental surrogates in the urban centre, a greater ability to rely on the income of husbands and other family members, fewer job opportunities and the more disciplined nature of work.

Table 84. Number of children ever born per 1,000 ever-married women by age, labour force status and urban/rural residence, 1960

Age	Whole Kingdom		Bangkok	
	In the labour force	Housewife	In the labour force	Housewife
13-19	478	688	a/	964
20-24	1,359	1,598	1,488	1,641
25-29	2,661	2,760	2,371	2,605
30-34	4,067	3,987	3,127	3,657
35-39	5,315	4,862	4,347	4,331
40-44	6,044	5,616	4,602	5,140
45-49	6,187	4,895	4,093	4,406
50 and over	5,948	5,058	3,688	3,658
Total	4,253	3,742	3,374	3,407
Total standardized for age	4,406	4,022	3,256	3,675

Source: Sidney Goldstein "The influence of labour force participation and education on fertility in Thailand", table 4, *Population Studies* (London), vol. 26, No. 3, November, 1972.

Note: a/ Fewer than 10 women.

data also shows that the relationship between labour force participation and cumulative fertility operates differently for the various age groups of the

9. Occupation

The fertility rate also varies according to the

^{15/} Sidney Goldstein, "The influence of labour force participation and education on fertility in Thailand", *loc.cit.*, p. 433.

^{16/} *Ibid.*, p. 425.

occupational attachment of women. The analysis of of the 1960 census data (see table 85) also showed that for the country as a whole "women engaged in farming have by far the highest fertility, 4,503 per 1,000 ever-married women, standardized for age. Women engaged in sales work have the next highest level, 3,887. This in turn is followed by the fertility of women engaged in crafts, in professional and administrative work, and in service and transportation; for all these age groups, fertility levels varied within the relatively narrow range of 3,500-3,600, levels approximately 1,000 below those of the women working on farms"^{17/} .

10. Material possession

The information obtained in the Longitudinal Study was analysed to examine the relationship between fertility and material possession or wealth. The information obtained from each household head regarding the household's possessions was used as the basis for computing a single index for the household called the material possession score. Although

as much as an indicator of modern behaviour as it does of wealth.

The average number of children ever born for wives of household heads in rural and urban areas according to the level of their household's material possession score is shown in table 86. It will be observed that among rural women, the material possession score was not consistently related to fertility. However among the urban women, there was a curvilinear relationship between the two variables.

11. Land ownership

The relationship of land ownership to fertility is neither asymmetrical nor unidirectional. Ownership of land can determine fertility behaviour; fertility levels can determine land ownership. Thus the results of the analysis of the interrelationship between land ownership and fertility have to be interpreted with caution. The average number of live births by land ownership and age of women is shown in table 87. There appears to be a consistent pattern

Table 85. Number of children ever born per 1,000 ever-married women by occupation and age, 1960

Age	Farmers and miners	Sales workers	Service and transport workers	Craft workers	Professional and administrative workers
13-19	477	511	a/	542	a/
20-24	1,365	1,496	1,338	1,163	974
25-29	2,683	2,704	2,375	2,419	2,188
30-34	4,129	3,714	3,705	3,535	3,591
35-39	5,404	5,073	4,243	4,767	3,671
40-44	6,196	5,211	4,672	4,830	4,087
45-49	6,356	5,298	4,983	4,831	4,727
50 and over	6,162	4,698	4,549	4,559	5,162
Total	4,315	4,143	3,580	3,460	3,322
Total standardized for age	4,503	3,887	3,592	3,627	3,508

Source: Sidney Goldstein, "The influence of labour force participation and education on fertility in Thailand", table 5, *Population Studies* (London), vol. 26, No. 3, November 1972, p. 429.

Note: a/ Fewer than 10 women.

the determination of this score was not exactly the same for rural and urban sample households, the principle was the same. In both cases each individual item was assigned a weight inversely related to the number of households which claimed it as a possession. The material possession score may serve

of relationship between fertility and land ownership. Those who were landless had on the whole a higher fertility than those who owned all the land or those who owned part of the land and rented part of the land.

However, according to the results of the Longitudinal Study, "there appears to be little systematic

^{17/} *Ibid.*, p. 428.

Table 86. Average number of children ever born by material possession score and residence — wives of household heads

Material possession score	Rural	Urban
Lowest	4.76	3.85
Low	5.49	4.27
Middle	5.44	4.56
High	5.42	4.11
Highest	5.70	3.79

Source: John Knodel and Visid Prachuabmoh, *The Fertility of Thai Women*, Research Report No. 10 (Bangkok, Institute of Population Studies, Chulalongkorn University, 1973), table 18.

Table 87. Average number of live births by land ownership and women's age

Age	Land ownership		
	Own all	Own and rent	Landless
15-19	-	-	-
20-24	1.9	1.5	-
25-29	3.3	2.0	4.4
30-34	4.3	3.9	4.7
35-39	6.2	4.9	6.3
40-44	6.7	6.5	7.4
45-49	6.7	7.6	6.0
50 and over	6.7	6.2	6.9

Source: Suchart Prasithrathsin, "Economic and fertility behaviour of the rural people in Thailand," unpublished Ph.D. thesis, Brown University, table 8.11.

relationship between land ownership and children ever born. For wives of all ages, the highest fertility is found among those who live in the small minority of households which rent all their land and the lowest among wives in households which operate land they neither own nor rent but for which they have some other land tenure arrangement. The lower fertility among this group is also apparent in the two age groups where a sufficient number of cases are found to permit calculation of their average cumulative fertility. Because of the diversity of situations represented by this group, interpretation of this finding is difficult. The higher fertility of the renters is limited to women under 45 years of age. Older women in this category have average fertility levels. Although families with a large number of children might be expected to be more likely to rent

land in addition to what they own, the group that both own and rent have lower than average fertility and only among women aged 45 and over does their average number of children ever born exceed the average for the age group. Renting land may also be indicative of low status and be linked in a more indirect way to fertility levels"^{18/}.

12. Religion

A study of the fertility differentials among various religious groups in Thailand was undertaken on the basis of the data of 1 per cent tape tabulation of the 1960 census data^{19/}. The results of this study, summarised in table 88, show that for the country as a whole the number of children reported born to all ever-married women^{20/} standardized for age averaged 4,261 per thousand. Further, this average varied considerably by religion being highest (4,367) for Buddhists and lowest for Muslims (3,391). A pilot study undertaken by the National Research Council in Southern Thailand also confirmed that Thai Muslims had lower fertility than the Buddhists.^{21/}

Several reasons have been advanced for the lower Muslim fertility rates. It has been suggested that more frequent divorce and remarriage may reduce the Muslim rates, but this does not adequately explain the lower Muslim rates in the youngest age group particularly since Muslims tend to marry earlier. Though various survey replies indicate a comparatively low level of contraceptive practice among Thai Muslim women, "the conclusion seems inevitable that in some way Muslim women in Thai-

^{18/} John Knodel and Visid Prachuabmoh, *op.cit.*, pp. 50-51.

^{19/} Sidney Goldstein, "Religious fertility differentials in Thailand, 1960", in *Population Studies (London)*, vol. XXIV, No. 3, November 1970.

^{20/} It has been pointed out by Goldstein that the Thai census data on number of children ever born are of questionable quality since (a) they do not include births to women who reported themselves as never married or to women of unknown marital status; (b) they do not include births to 6 per cent of the ever-married women who are tabulated as not stating the number of children born to them; and (c) the data point to a definite memory problem on the part of the older women whose children died in infancy or early childhood or who were no longer living at home (*ibid.*, pp. 327-328). However he has argued that "the fairly consistent patterns which emerge and the corroboration given these patterns by independent surveys suggests that they may have some general validity" (*ibid.*, p. 336)

^{21/} Soontaree Suvipakit, *A Pilot Study of Family Health in Thai Muslim Communities in South Thailand*, Report No. 1, Yala Project (Bangkok, National Research Council, 1969).

Table 88. Average number of children ever born per 1,000 ever-married women by religion, standardized for age

Urban/rural status	Religious groups				Index (rural, agricultural = 100)
	Buddhist	Muslim	Confucian	Total	
Bangkok	3,319	3,902	3,520	3,375	76
Other urban, non-agricultural	3,812	2,802	3,875	3,778	85
Urban, agricultural	4,013	3,613	4,045	3,997	90
Rural, non-agricultural	4,019	3,261	4,270	3,982	89
Rural, agricultural	4,517	3,411	4,708	4,461	100
Total	4,367	3,391	3,842	4,261	

Source: Sidney Goldstein, "Religious fertility differentials in Thailand, 1960", table 2, *Population Studies* (London), vol. XXIV, No. 3, p. 330.

land either voluntarily or involuntarily limit the number of children they bear to a greater extent than do either Buddhist or Confucian women. Greater reliance on older traditional methods of birth control or higher rates of sterility due to poorer health may both be explanatory factors."^{22/}

It has also been pointed out that Buddhism differs from other major religions in that there is no scriptural injunction to Buddhists that "they should multiply and be fruitful". Yet countries with a predominantly Buddhist population tend to have high fertility rates. There must, therefore, be subtle and less obvious features of Buddhist culture which tend to produce the high fertility rates.^{23/} Among these features may be included the desire for sons and the Buddhists' beliefs in and practices of five moral precepts, particularly the one that prohibits people from killing or taking lives.

The desire for a son may arise partly from the desire of the parents, particularly in the rural areas,

^{22/} Sidney Goldstein, "Religious fertility differentials in Thailand, 1960," *loc.cit.*, p.336.

^{23/} Trevor O. Ling, "Buddhist factors in population growth and control", *Population Studies* (London), vol. XXIII, No. 1, March 1969, pp. 53-60.

to see at least one of their sons entering monkhood because the most meritorious act a Thai Buddhist male can perform is to serve as a monk. Another reason for the desire to have a son is the desire to perpetuate the family name; the Thai family system is patrilineal in nature. A recent survey included questions aimed at assessing the extent of preference for sons. To the question "who do you think is better, a daughter or a son?", about 60 per cent of the respondents expressed no sex preference, but one-third said that sons were better than daughters. But when asked whether it was necessary to have a son in the family, a great majority responded positively as is evident from table 89. However, there has so far been no attempt to study empirically the reasons why Thai people have or do not have preference for children of a given sex.

Table 89. Necessity of having a son in a family

Necessity of having a son	Northern village	Northeast village	Total
Necessary	74.8	86.9	81.6
Not necessary	18.0	1.8	8.6
Don't know and no answer	7.2	11.3	9.8

Source: "Religious beliefs and their impact on the social economic and demographic change of rural Thai people" (Bangkok, Mahidol University, 1974) (mimeo).

Chapter VI

POPULATION POLICY AND FAMILY PLANNING

A. POPULATION POLICY

During the first half of the present century, Thailand's official stance on population was understandably pro-natal. The population at the beginning of the century was around 8 million and was growing slowly owing to high death rates. In fact, one of the major reasons for setting up the public health service in the early part of the century was to increase the rate of population growth by reducing mortality^{1/}. In the context of the need to develop and defend the country, the population was considered to be inadequate. This is reflected in the following statement of the then Minister of Interior.

"I would say that our country still has a small population relative to the expanse of her land. You can be sure that the land is capable of accommodating no less than five or six times the present population with no adverse result on the living standards at all. Development of the country, all in all, rests upon the people. On the defense side, a growing population certainly means a growing number of troops. From the macro-economic point of view, increase of population will inevitably encourage the growth of agriculture, commerce and industry resulting probably in an abundance of goods and services. As we have seen, the governments national development programmes are financed mainly with revenues from tax sources, which in turn will rise in volume in step with the population growth. Thus you will see how essential is the number of people to our national development, and we have to face a problem of how to increase it."

Even as late as 1942, when Thailand's population was estimated at about 18 million, the Prime Minister at the inauguration of the Ministry of Public Health declared that the country's population was

^{1/} Health services were initially provided by the Ministry of Interior and the Acting Minister of Interior in 1914 stated "The Government will now be free to deal with the problem of disease control and health promotion, which will lead to an increase in population to cope with the fact that our country is still sparsely populated. One can be sure that our land is lucrative enough to support no less than 10 times the present number of people. The problem is only that the death rate happens to be too high, so an attempt to reduce the death rate among the people shall therefore be made without delay".

not sufficient to achieve national greatness and that at least a 100 million people were needed to make the country a real power. During the Second World War, the Minister of Public Health appointed a Wedding Promotion Committee to encourage and increase early marriages. The slogan was "Get married young and make the nation prosper". In 1956, bonuses for large families were authorized by an Act entitled "Welfare of Persons with Numerous Offsprings".

However, as noted in chapter I, the rapid decline in mortality during the years following the Second World War resulted in unprecedentedly high rates of population growth. The average annual growth rate during the 1947-1960 intercensal period average 3.2 per cent was one of the highest in the world. The consequences of this accelerated increase in population were brought to the attention of the Government for the first time through a World Bank Mission report submitted in 1959. This pointed out that Thailand's rapidly increasing population was creating "many alarming problems, such as a shortage of schools and public services as well as a shortage of living accommodations" and emphasized that solutions to these problems lay "largely in the limitation of family size through the dissemination of information about birth control techniques"^{2/}

In response to the recommendations made by the World Bank Mission, the Cabinet in 1960 appointed a series of committees to study the problems and make suitable recommendations. In the meantime, on 3 October 1961, the Cabinet made the following decision:

"Let birth control be a matter of voluntary action on the part of the people, who should be aware of their own status and how many children they should have. As for giving advice on matters of birth control, this should be allowed and should be done, but it should not yet be done in an open manner."

This decision was followed throughout the rest of the 1960s, by several Cabinet statements to the

^{2/} International Bank for Reconstruction and Development, *A Public Development Programme for Thailand* (Baltimore, Maryland, John Hopkins Press, 1959), pp. 3 and 160.

effect that the Government had no policy of controlling the number of births, but that hospitals and health clinics be permitted to disseminate information on family planning to married couples who expressed a desire to space births or to limit the number of children they wished to have. Further, in October 1967, the Prime Minister affixed his signature to the United Nations sponsored World Leaders Declaration on Population.^{3/} In early 1968, the Cabinet gave permission for family health services, which were earlier started as a pilot project in Potharam District, to be extended to other areas of the country, provided that information on contraception was restricted to women who already had children. Late in 1968, His Majesty the King of Thailand publicly voiced his concern about the high rate of population growth and expressed support for extending family planning services to the people as part of Government's maternal and child health programme.

In addition to the setting up of study committees referred to earlier, between 1963 and 1968, three national population seminars were also held, each of which submitted recommendations to the Government. The reports of nearly all of these various committees and seminars warned of the dangers of a very rapidly growing population and urged the wider adoption of birth control practices. Of particular importance are the following conclusion and recommendations^{4/} of the 1968 national seminar:-

(a) The increase of the population at the current rate would have adverse effects causing obstacles to economic and social development in the country in the future;

(b) The Government should stipulate a definite policy immediately on the matter of cutting down on the rate of population increase;

(c) Women in Thailand became pregnant too often and had too many children that they did not want. Such circumstances were bound to cause a deterioration in the health of both mothers and children and would also cause women and children to die prematurely, at a very high rate. Moreover, the rapid increase in population would cause many kinds of public health problems;

(d) The Government should support and promote work by the Ministry of Public Health and medical institutions concerned with family planning, so that they would be able to expand family planning work to all hospitals and health clinics throughout the nation as quickly as possible;

(e) There should be teaching and training on contraception and family planning, given in medical schools, nursing schools and midwifery schools.

These and other recommendations prompted the Cabinet decision of 7 November 1969 to request the National Economic Development Board "in its capacity as the national planning agency, to study and submit policy recommendations to the government concerning suitable measures to be taken regarding present population growth". The National Economic Development Board together with the Ministry of Public Health and the Institute of Population Studies prepared a comprehensive report^{5/} for the Cabinet on the difficulties caused by a high rate of population growth to the country's socio-economic development efforts and strongly recommended the adoption of a population policy. In March 1970, the Cabinet accepted the report and declared that "the Thai Government has the policy to support voluntary family planning in order to resolve various problems concerned with the very high rate of population growth which constitutes an important obstacle to the economic and social development of the nation."

The Cabinet also appointed a committee consisting of representatives of various governmental and private agencies for study, over-all planning, co-ordination and evaluation of the various activities connected with the implementation of Government population policy. The National Population Policy Committee is chaired by the Minister of Public Health and his Ministry is assigned the responsibility for providing family planning services throughout the Kingdom.

^{5/} Joint Working Group on Population Policy, "Population policy for national economic and social development," (Bangkok, January 1970) (mimeo).

^{3/} This Declaration affirmed the world leaders' belief, *inter alia* that "population problem must be recognized as a principal element in long range national planning if governments are to achieve their economic goals and fulfill the aspirations of their people"; "the opportunity to decide the number and spacing of children is a basic human right"; "lasting and meaningful peace will depend to a considerable measure upon how the challenge of population growth is met" and that "the objective of family planning is the enrichment of human life, not its restriction".

^{4/} These are extracted from a larger set of conclusions and recommendations all of which urged positive governmental action on matters related to population growth. For full details, see *The Third National Population Seminar of Thailand*, 2-5 April 1968, "Conclusion and recommendations of the Seminars" (Bangkok, 1968) (mimeo).

Thus since March 1970, a national policy was adopted officially permitting the promotion of birth control. "It is now the firm policy of the Royal Thai Government to support voluntary family planning as a means of containing the growth of population to a rate which is commensurate with the employment potential of the country and which will allow the Government to develop adequate education, health and other services. The objective is to bring the annual population growth rate down from its present level of 3.0 per cent to approximately 2.5 per cent by the end of the plan period. Economic and social development plans during the plan period are based on the attainment of this population growth target".^{6/} The change of Government in October 1973 strengthened the hands of those leaders who favoured a stronger population programme. Consequently when the new constitution was drafted in 1974, an article was included which raised population policy to the level of a constitutional objective. The provision, section 86, read as follows:

"The State is to formulate population policy to suit the natural resources of the nation, social and economic conditions and technical progress for the interest of the economic and social development and security of the State".

B. FAMILY PLANNING

1. Pre-policy activities

The family planning programme in Thailand, unlike those in many countries, has been characterized by a steady evolution of activities that began on a modest and cautious scale in 1965. "Before there was an official policy, government employees were devoting work time to the promotion of family planning under the aegis of 'family health research'. Foreign agencies were distributing advice and supplies in various parts of the country, but Thai counterpart funds were generally small, partly for the reason that then, as now, family planning in Thailand was an integrated service - meaning that personnel and facilities already supported out of other budgets were assigned, part-time, to the additional task of family-planning work. Most birth control was funded in response to a macrocosmic belief that the nation was growing far too quickly, but on-the-scene workers tended to be motivated principally by worries that one particular child might not have enough food. The history of birth

control action in Thailand is brief, colorful, controversial and confusing to outsiders."^{7/}

As noted earlier, an official family planning programme was adopted only in 1970. The period prior to 1970 could be conveniently divided into two phases. The first phase dates from the beginning of activities in 1965 until 1967. The activities were limited primarily to postpartum programmes; in four large hospitals (Chulalongkorn, Siriraj, Vajira and Women's) in Bangkok. A handful of clinics, opened in two northeastern provinces in 1966, accounted for almost all activity outside Bangkok. It may, however, be noted that "the largest-scale and most effective actions were taken, ironically, by government agencies. Chulalongkorn Medical School gained fame after 1965 for operating the world's largest IUD clinic (as measured by more IUD insertions than any other clinic); despite the prohibition of advertising, word-of-mouth communication brought women from 64 of the nation's 71 provinces."^{8/}

The second phase covers the 1968-1970 period. In 1968, the Ministry of Public Health opened a family planning section in the headquarters. In the same year, the Under Secretary of State for Public Health initiated a three year Family Health Project^{9/} to study the needs, wants, knowledge, understanding and attitudes of the people with regard to family health services and the social changes resulting from such services as well as to train public health personnel concerned with the operation of the project. The Family Health Project also aimed at testing the acceptability and promotion of family planning among both the rural and urban populations but without official support from the Government. There were no funds specially allocated for operating this programme. Family planning activities were integrated with existing health services. The basic rationale to the approach was that the use of the health personnel and facilities reduced both the cost of the programme and unnecessary duplication.

The main activities of the Family Health Project during the three years, 1968-1970, may be summarized as follows:-

^{7/} Ralph Thomlinson, *Thailand's Population: Facts, Trends, Problems and Policies* (Bangkok, Chulalongkorn University), p. 97.

^{8/} Ralph Thomlinson, *ibid.*

^{9/} Government of Thailand, *Family Health Project: Thailand* (Bangkok, Ministry of Public Health, 1970).

^{6/} Government of Thailand, *The Third National and Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board 1971), p. 99.

(a) A large number of medical and para-medical personnel were trained, including 330 doctors, 700 nurses and 3,090 auxiliary midwives. The doctors and nurses were trained in the large family planning clinics of several Bangkok hospitals. The auxiliary midwives were trained in the *changwat* with an emphasis on motivation and education of eligible women and on the methods of contraception. In addition suitable training courses were also conducted for 1,985 male health workers;

(b) On completion of training, the personnel returned to their *changwat* and clinics were opened. Though initially services were provided only in those clinics which had a physician, by the end of 1970, there were approximately 3,500 clinics offering family planning services in Thailand. These included rural sub-centres staffed by auxiliary midwives who since mid-1970 have been allowed to prescribe oral contraceptives;^{10/}

(c) The following supplies and materials were distributed: 372 sets of medical equipment for family planning clinics; 3,600,000 cycles of oral contraceptives; 194,483 intrauterine devices together with 8,579 insertors; 9,300 printed lectures on family planning/population; 5,000 copies each of four programmed instruction manuals. In addition 4,000 flipcharts, 30,000 copies of a family planning news letter and 560,000 leaflets on IUD and oral contraception were also distributed.

Besides these activities which were being carried out within the Ministry of Public Health, there was a great deal of activities outside the Ministry during 1968-1970. In 1970, the Planned Parenthood Association of Thailand was formed the main emphasis of which was on public information and motivation in close co-operation with the Government. The Population Research and Training Centre at Chulalongkorn University, which provides a graduate training programme leading to a M.A. degree in demography was upgraded by the Cabinet to independent status (now called the Institute of Population Studies). In collaboration with the Ministry of Public Health, the Institute for Population and Social Research at Mahidol University

^{10/} During 1969-1970, a pilot study was initiated in which auxiliary midwives were allowed to prescribe oral contraceptives directly, making use of a checklist to rule out any contra-indications to their use. The purpose of this study was to get services more quickly to women who wanted to practise contraception and to prove that allowing midwives to prescribe them was safe. As a result of the success of the pilot study, the Ministry of Public Health ruled that midwives throughout the country could distribute oral contraceptives using the same checklist.

engaged in research activities. A Population Section was created in the National Economic Planning Board. The Ministry of Education began to take an interest in population matters and introduced family life education into its adult literacy programme. A large number of research studies in the fields of population and family planning were also carried out.

It will thus be seen that the ground has been well prepared for the Government to embark on its official National Family Planning Programme (NFPP). Besides having a large number of health workers already trained, family planning has been integrated into the general health services and rural health workers have been rendering family planning service to the people in their areas as one of the basic health services. Further, co-ordination and co-operation has been established between various Government departments and private agencies concerned with population problems and family planning activities. There has also been an apparent motivation for small families and a desire to practise contraception among the rural people of lower socio-economic status^{11/}. The total number of acceptors in 1970, in the absence of a public information programme, was 225,439, which was more than the original unofficial target of 180,000. It may also be noted that these targets were achieved solely by the existing health staff without any incentives or bonuses and without the recruitment of full-time family planning field workers.

2. Post-policy programme

As noted earlier, since March 1970, Thailand has had a national policy officially permitting the promotion of family planning practices. Since family planning activities were already being carried out openly but quietly within the Ministry of Public Health, the new policy in a sense legitimized the on-going activities. However, an important consequence of the adoption of an official national policy was the establishment of the National Family Planning Programme within the Ministry of Public Health and the formulation of a five-year proposal^{12/} for inclusion in the **Third National Economic and Social Development Plan**

^{11/} Nearly 80 per cent of the acceptors lived in rural areas and 90 per cent had only 4 years or less of education. See National Family Planning Project, "Analysis of June 1969 and June 1970, family planning acceptor coupons," Evaluation Report No. 1 (Bangkok, Ministry of Public Health, May 1971).

^{12/} National Family Planning Programme, *Five-Year Plan, 1972-1976* (Bangkok, Ministry of Public Health, 1971), (mimeo).

(1972-1976). The specific objectives of the five-year plan were as follows:-

(a) To reduce the population growth rate from over 3 per cent to about 2.5 per cent by the end of 1976;

(b) To inform eligible women, particularly those living in rural and remote areas, about concepts of family planning and to motivate them to use contraception;

(c) To make family planning services readily available throughout the country;

(d) To integrate family planning activities within over-all maternal and child health services and thus mutually strengthen the activities in these closely related fields.

In addition to specifying new acceptor targets, the plan listed new proposals to strengthen the programme and to facilitate the spread of services. First, the mobility of midwives, the only field workers in the programme, was to be increased by providing each of them with a women's lightweight motorcycle. Secondly, a new class of family planning worker would be assigned to all clinics to give general assistance to the physician, maintaining records and statistics, and conducting motivational and follow-up activities in areas immediately surrounding the clinics. Thirdly, a new category of family planning field workers (a full-time paid field worker or a village level volunteer) was to be recruited to supplement the work of midwives as all eligible women could not be reached. Fourthly, a new Division of Public Information was to be set up to introduce the first public information programme for family planning. Fifthly, it was proposed to develop special efforts of planning, improved *per diem* arrangements and improved training and transportation in order to upgrade the quality of supervision relating to the delivery of health care. Sixthly, the plan proposed continuing heavy emphasis on the training of medical and para-medical personnel. Finally, the plan also listed a set of research projects to be carried out by universities in Bangkok.

3. Organization and administration

At the time of the declaration of the population policy in 1971, the Cabinet assigned primary responsibility for implementation of the national family planning programme to the Ministry of Public Health, which together with the National Economic and Social Development Board co-ordinates all population activities. The Under-Secretary of State for Health is the Director of the Programme. The Director of the Family Health Division is designated

Deputy Programme Director, while the Head of the Division of Family Planning Programme is designated Programme Officer. The organization chart of the National Family Planning Programme, shown in figure 10, indicates that the programme is given some administrative identity and independence within the Division responsible for maternal and child health activities in the Ministry of Public Health.

The National Family Planning Programme has been provided with a staff of its own; at the end of 1974 this numbered 29 officials and 93 employees spread over five sections. From the outset, family planning activities were integrated into the existing health services of the Ministry of Public Health and other governmental agencies providing health care. The activities were simply integrated into the workload of existing personnel; no separate infrastructure was created. However, in order to expand activities during the 1972-1976 period, there was the need to develop a category of full-time family planning field workers to supplement the activities of the health personnel. The results of a research study^{13/} also confirmed that field workers would be potentially valuable additions to the programme.

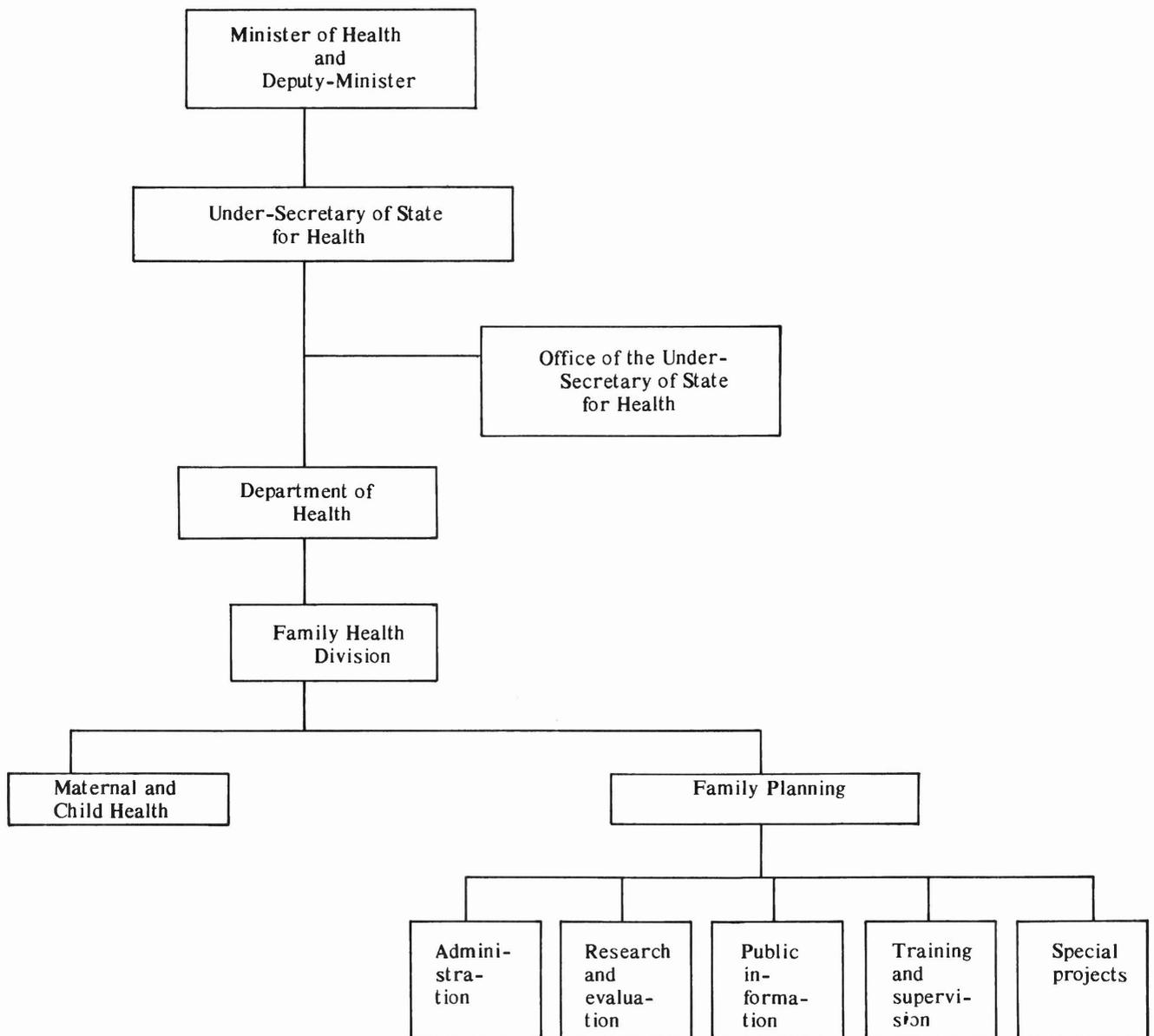
The NFPP thus began to recruit two types of personnel in 1972. The first type are called **family planning workers** and are high school graduates trained for record keeping and medical aspects to assist in the family planning clinics. The other type are called **home visitors** and serve the programme as family planning motivators at the community level. At present, there are 107 family planning workers and 150 home visitors stationed throughout the country, particularly in the North-eastern Region.

Since the beginning of family planning activities within the Ministry of Public Health, the main supervision was done by the supervisory staff of Family Health Division who made trips to every service unit to supervise technically both MCH and Family Planning services at the same time. Moreover, to enable a good quality family planning record keeping system, during 1971-1972 the NFPP recruited nine record supervisors to supervise family planning at the clinic level.

4. Methods and targets

The programme, to date, has placed emphasis

13/ Institute for Population and Social Research, "The Thai Field Worker Evaluation Project", working papers No. 1-4, (Bangkok, Mahidol University, a.d.) (mimeo).



Source: Family Health Division, Ministry of Public Health, Bangkok.

Figure 10. Organization chart of the National Family Planning Programme: Thailand

on three methods of contraception: the IUD, orals and female sterilization. Oral contraceptives have been available from the time of their introduction on world markets. Sterilization has also been freely available, although female sterilization has proved more acceptable without any effort. In 1962, the Ministry of Public Health rescinded a 1957 regulation which had prohibited female sterilization in Ministry hospitals for women who had fewer than five children and which had required the concurrence of a board of three doctors for sterilization. At present female sterilization can be justified on grounds of the poor socio-economic conditions of the couple and is generally performed shortly after delivery. Male sterilization is also encouraged and a significant number of vasectomies are performed by physicians in private practice.

Traditional methods of contraception have not been widely used in Thailand, though the private family planning association has provided foam tablets and cervical caps for many years. Injectable contraceptives, however, were not offered in the Government programme until 1975. The condom has not played any significant role to date mainly because in Thailand it has a negative image associated with its primary use as a protection against venereal disease. However, an attempt is being made to popularize the use of the condom by changing this image.

Abortion, unlike sterilization, has not so far played any significant role in preventing unwanted births for two main reasons. First, abortion is illegal in Thailand except under limited circumstances. The Thai penal code stipulates that such an operation could be performed by a medical practitioner only when pregnancy endangers the life of the woman concerned or when her pregnancy has resulted from rape. Secondly, this is the one method that is clearly affected by Thai religious values. Because of the Buddhist injunction against the taking of life, most doctors are reluctant to perform abortions even in those situations when it would be technically legal.

The wide variety of methods available has offered a continuing challenge to develop delivery networks appropriate to each method and, equally, to review the regulations governing the provision of specific services so as to open up as many networks as possible. The existing network represents a hierarchy of service points that correspond to the recognized administrative divisions of government. At the village level, there is the *midwifery centre* (third class centre) staffed by one midwife. At the

next higher, or *tambon*, level there is the second-class health centre staffed by one nurse and one junior sanitarian. The **first class centre** with six to eight beds at the district level is manned by a doctor and a supporting staff of 14 health personnel. Finally there is the general hospital at the *Changwat* capital. This network, however, is far from complete.

Further, not all networks are capable of providing all types of services; there is a "medical gradient" associated with the various methods of contraception, ranging from such doctor-provided services as female and male sterilizations to the medically-supervised but not medically-provided services such as insertion of IUDs, to the delivery of such medically unsupervised, totally client-regulated methods as the use of condoms, foams and jellies. However, for the dominant family planning method used in Thailand, the pill, many delivery networks can be, and are being, used to reach different regions and groups.

The five-year plan referred to earlier established acceptor targets in respect of each method. These targets were based on past performances and on estimates of what can be expected in the various Government medical institutions and centres. The targets^{14/} for the period 1971 to 1976 are shown in table 90. By applying a set of continuation rates to both continuing and new acceptors, estimates were made of the number of women years of protection that would be achieved and of the number of births that would be prevented (see table 91). It was then possible to translate these figures into reductions in the crude birth rate and finally in the rate of population growth. Assuming a fall in the crude death rate from approximately 10 to 8 per thousand, these calculations lead to a lowering of the population growth rate from over 3 per cent to approximately 2.5 per cent in 1976^{15/}.

5. Information and education

No attempt was made to develop a public infor-

^{14/} In view of the unexpected successes in 1971, these targets are in the process of being revised. However, provincial targets have never been publicly announced and not targets exist for individual service units.

^{15/} It is apparent that the 2.5 per cent demographic target for 1976 is derived from the acceptor target, not *vice versa*. It may also be noted that the full burden of reducing the crude birth rate by 8.6 points is put on the family planning programme; that is, the calculations take no account of socio-economic developments that might contribute to falling fertility independent of family planning.

Table 90. Targets: acceptors by calendar year and method, 1971-1976

(in thousands)				
Year	Orals	IUD	Sterilization	Total
1971	200	80	20	300
1972	235	90	25	350
1973	280	90	30	400
1974	280	90	35	405
1975	280	90	40	410
1976	280	90	40	410
Total	1,555	530	190	2,275

Source: National Family Planning Programme, *Family Planning in Thailand; 1967-1971* (Bangkok, Ministry of Public Health, 1972).

Table 91. Women-years of protection and births prevented

Year	Women years of protection			Total
	Due to work 1965-1969	Due to work 1970	Due to work 1971-1976	
1971	197,938	106,604	7,324	311,866
1972	174,718	120,600	155,525	450,843
1973	160,186	98,119	350,003	608,308
1974	150,120	84,861	544,336	779,317
1975	142,145	76,941	744,175	963,261
1976	134,217	71,834	925,929	1,131,980

Births prevented and birth rate reduction

	Number of births prevented	Birth rate reduction per 1,000 population
1971	103,955	2.78
1972	150,279	3.88
1973	202,767	5.07
1974	259,770	6.29
1975	321,084	7.55
1976	377,323	8.61

Source: Family Health Division, Ministry of Public Health, Bangkok.

mation programme during the 1968-1970 period. Health educators assigned to the project merely helped develop training aids, pamphlets for acceptors and newsletters, and assisted in the training programme. The mass communication pilot project ^{16/} was conducted in three Northeastern dis-

^{16/} Government of Thailand, "The 1971 Mass Communication Pilot Project 1971; preliminary report of KAP presurvey," (Bangkok, Ministry of Public Health) (available in Thai, mimeo).

tricts from August 1971 to February 1972. Success of the project ^{17/} led to the initiation of major public information activities which have since been expanded. These include the use of radio, television and the cinema, the development of nine mobile public information units to cover the rural areas throughout the country, the printing of newsletters, calendars, posters, leaflets and pamphlets, match and book covers, and the development of a research and planning unit in the communication field. With support from the United Nations Fund for Activities (UNFPA), the campaign initially emphasized the training of health personnel in communications techniques to support the existing network of person-to-person communications. Regional and provincial level task forces are being established to expand the training and communications programme throughout the country. The national programme, with assistance from the United Nations Development Support Communication Services (DSCS), conducted special courses at its Bangkok headquarters for leaders of the regional training programme and task forces. The Communication Unit also sent four mobile vans equipped with sophisticated audio-visual aids and staffed by health educators to support regional and *changwat* level communications activities. This unit, with the assistance of DSCS, has developed a variety of promotional aids for village-level audiences such as films, newsletters, posters and leaflets. Plans were also drafted for research studies to evaluate the success of the information campaign.

6. Training

One of the major objectives of the 1968-1970 Family Health Project was to train at least one doctor and one nurse from each of the 84 *changwat* hospitals and all doctors, nurses and auxiliary midwives working in rural health centres. Because there were over 4,000 people to be trained during the three years and because there was a shortage of training staff, all courses were, of necessity, of one week duration, although it was realized that longer periods of training would be desirable. Practical clinical experience was provided at four large Bangkok hospitals. Physicians, social scientists and other personnel experienced in the field of population and family planning took part in the teaching programme. Auxiliary midwives were trained in the *changwat*

^{17/} There was an almost 100 per cent increase in the number of new acceptors in those areas covered by the pilot project compared with an increase of about 31 per cent in the rest of the country where there no mass communication activities were conducted for family planning during this period.

by members of the central training staff, assisted by those local doctors and nurses who had received prior training in Bangkok.

In all courses, essentials of population dynamics were taught and the effects of rapid population growth on various aspects of socio-economic development were emphasized. Methods of contraception to be used in the programme were described in detail. For nurses and auxiliary midwives, an effective series of programmed instruction manuals was developed,^{18/} which simplified the training, particularly that provided at *changwat* level. The manuals were devoted to methods of contraception and were supplemented by lectures and discussions.

As noted earlier, during the three years, a total of 330 physicians, 700 nurses and 3,000 auxiliary midwives received the basic training course. In addition, 1,985 male health workers were given brief two day orientation courses so that they would be prepared to support the programme in the rural areas.

While all health personnel engaged in rendering family planning services at clinic level were trained, population and family planning were intensively taught in the school of public health and in nursing and midwifery schools. In 1973, the strategies for training were modified. The training programmes were expanded to offer a refresher course to the health staff regarding the technique of person-to-person motivation and contraceptive knowledge. Operation and making use of sophisticated audio-visual aids were also taught so that the trainees could plan collaborative work with the mobile health education teams. Plans are underway to train all nurses and midwives attached to clinics with financial support from UNFPA.

7. Research and evaluation

At the beginning of the Family Health Project, a special section was created to evaluate the programme on a continuing basis. The Research and Evaluation Unit is staffed by a physician and a number of social scientists with training in demography and statistics. The Unit has developed an efficient system for recording the number of new acceptors showing the methods chosen by acceptors and the

types of service points through which new acceptors are recruited.

For evaluation by clinic, a patient record form was developed in which the original (thin paper) was to be sent to the Central Evaluation Unit, while the duplicate, a thicker, cardboard record, remained at the clinic. The record form contained basic demographic data, which allowed analysis of the characteristics of the acceptors in the programme. In addition, a special monthly report form was to be prepared in triplicate each month, one copy being sent directly to the Central Evaluation Unit, the second copy being sent through normal reporting channels and the third remaining at the clinic. This reports were to be prepared locally in those clinics staffed by a physician. In health centres without physicians, the monthly reports were collected at district level where a combined report for the district was then submitted according to the above procedure^{19/}. Reports are also received from non-governmental organizations that provide family planning services including the four medical schools, 21 clinics of the Bangkok Municipal Health Bureau and the McCormick Missionary Hospital in Chiang Mai.

The Research and Evaluation Unit is responsible for checking the reports and for preparing a monthly report on acceptance by method. By and large, service units submit their reports to the Unit with reasonable promptness and with an apparently high accuracy and integrity. By the end of 1970, over 90 per cent of all units participating in the programme were submitting reports on time.

In late 1970, the various statistic forms were revised, generally with the objective of making the system simpler for the field personnel. In October 1973, the service statistics were computerized with a view to speeding up the processing of the data as well as to minimizing errors of compilation and tabulation. Consolidated figures for the whole system are made available in a rather bulky computer print-out, available in about a dozen copies. The report presents the results from each *changwat* separately, giving acceptance by method for each reporting unit for the current month, previous month, same month last year and year to date. This monthly report is distributed within the Ministry of

^{18/} Carol Mullins and Gordon W. Perkin, "The use of programmed instruction in family planning training programme; a preliminary report", *Studies in Family Planning* (New York), No. 37, January 1969.

^{19/} For detailed description, see C. Suvannavejh, P. Klinchom and J.G. Oscar Alers, *A Synopsis of the Thai Family Planning Service Statistics System* (Bangkok, National Family Planning Programme, Ministry of Public Health, 1973) (mimeo).

Public Health and to two or three interested outside agencies. No monthly abstract of these statistics is prepared for public distribution^{20/} or for distribution within the health sector. The only feedback to regional offices is the copy of the performance statistics for each *changwat* which are sent to its Chief Medical Officer, giving a picture of activities in that *changwat* but not in others.

The Research and Evaluation Unit is also responsible for promoting, co-ordinating and conducting various research studies to obtain more information needed for monitoring the programmes performance and to assist in measuring the programme impact upon the target population. These research studies fall into three major areas: (a) bio-medical research undertaken in the hospitals attached to the medical schools and the WHO Research Team attached to the Chulalongkorn Hospital; (b) demographic and social science research undertaken primarily at the Institute of Population Studies, Chulalongkorn University; the Institute for Population and Social Research, Mahidol University; the National Statistical Office; the National Economic and Social Development Board; and the National Research Council; (c) operational research concerned with the evaluation of different programme activities undertaken by the Research and Evaluation Unit itself to obtain better understanding of the working of the National Family Planning Programme.

The first research-cum-action programme was the Potharam Project^{21/}, a 19-month action programme run by the Ministry of Public Health in a predominantly rural district about 80 kilometres to the west of Bangkok. Some of the other outstanding research projects are the Study of Oral Contraceptives and Liver Fluke Disease (1969-1971)^{22/}, Study of Auxiliary Midwives Prescription of Oral

^{20/} At present, data on the system's performance are made public mainly through a convenient and attractive annual report, which appears about 15 months after the close of the year. Though recent reports have been very attractively prepared, there is yet the need to prepare a brief quarterly, or at least semi-annual, abstract for general distribution.

^{21/} Amos H. Hawley, James T. Fawcett and Visid Prachuabmoh, *The Potharam Study*, Research Report No. 1, Bangkok, Institute of Population Studies, Chulalongkorn University, 1970; see also Visid Prachuabmoh "Factors affecting desire or lack of desire for additional progeny in Thailand", of Donald J. Bodgue (ed.), *Sociological Contributions to Family Planning Research* (Chicago, 1967), pp. 408-409.

^{22/} E. Chulacharil, U. Pethakil and A.G. Rosenfield, "Oral contraception and liver fluke disease", *Journal of Obstetrics and Gynecology of British Commonwealth*, Vol. 79, No. 7, 1972.

Contraceptives (1969-1970)^{23/}; Family Planning Mass Communication Pilot Project (1970-1971)^{24/}; the Postpartum Programme (1966-1973)^{25/} and the contraceptive follow-up surveys^{26/}.

The National Family Planning Programme has also conducted several studies in collaboration with other institutions. For instance, the Thai Field Worker Evaluation Project^{27/} was undertaken in co-operation with the Institute of Population and Social Research and the Faculty of Public Health of Mahidol University. In 1971-1972, a second collaborative study was undertaken to assess the acceptability of condoms among rural couples^{28/}. More recently, a collaborative study funded by the International Development Research Centre (Canada) has been conducted to evaluate various ways of introducing changes in the attitudes of traditional midwives towards family planning.^{29/} Since 1971, the National Family Planning Programme has conducted Cu-T device study^{30/} funded by the Population Council. The results of the various studies have formed the basis for decision-making and policy changes in relation to the administration of the family planning programme.

^{23/} A.G. Rosenfield and C. Limchareon, "Auxiliary midwife prescription of oral contraceptives: An experiment in Thailand", *American Journal of Obstetrics and Gynecology*, vol. 114, 1972.

^{24/} Government of Thailand, "The 1971 Mass Communication Pilot Project," preliminary report of KAP survey, *op.cit.*

^{25/} A.G. Rosenfield and S. Varakamin, "The postpartum programme in Thailand" *American Journal of Obstetrics and Gynecology*, vol. 114, 1972.

^{26/} C. Suvanavejh and Alers T. Oscar, "Communication of Contraceptive Use in Thailand: Results of 1971 Follow-up Survey of New Acceptors," (Bangkok, National Family Planning programme, 1973) (mimeo).

^{27/} See Institute of Population and Social Research, "The Thai Field Worker Evaluation Project", (*op.cit.*)

^{28/} D. Muangman and others, Research Report: "Condom Usage and Commercial Distribution of Condoms as Contraceptive in Rural Thailand, Saraburi Province B.E. 2515 - 2516," (Bangko, Mahidol University, 1972) (mimeo).

^{29/} S. Keovichit and others, "The preliminary report on the study of utilization of Mohumyae in Family Planning Programme (Bangkok, Faculty of Public Health, Mahidol University, 1974) (mimeo).

^{30/} S. Varakamin, "The Cu-t Device: Rural Field Trial in Thailand" in Abstract of *First International Planned Parenthood Federation Southeast Asia and Oceania Regional Medical and Scientific Congress*, Sydney, August 14-18, 1972.

8. Special Projects

a. Postpartum Programme

In 1966, when the Population Council initiated its international postpartum programme, four hospitals in Bangkok became participants. These four hospitals together performed over 50,000 deliveries every year. In 1969 the programme was extended to include 10 ministry of Public Health hospitals, of which two were MCH centres, located outside Bangkok in small urban centres that serve primarily rural populations. In 1970 an additional MCH centre hospital was added to the programme.

All participating hospitals served at least 1,000 obstetrical patients (including abortions) per year. The largest hospital outside Bangkok had 6,959 obstetrical patients in 1970 and the smallest 1,404 with a mean of 3,700 obstetrical patients per year. The programme was most successful at the three MCH centres where special motivational and educational efforts were carried out in the antenatal clinics, in the labour rooms and, most important, in the postpartum wards, with all hospital staff taking part in these efforts. Because the MCH centres are part of Health Services, they are also able to provide unusually fine follow-up services. Such follow-up efforts are more difficult for the *changwat* hospitals because they are primarily clinically oriented hospitals and do not relate as closely to the rural health services.

The programme achieved very good results in that the 11 Ministry of Public Health hospitals participating in this programme provided 12 per cent of all acceptors in the national programme while the four Bangkok hospitals contributed an additional 10 per cent in 1970. In the three hospitals with MCH centres, an average of 58 per cent of all obstetrical patients accepted family planning services. Forty per cent of all acceptors in the 11 hospitals accepted services prior to their discharge from the hospital after delivery or abortion. At one MCH centre, 43 per cent of all obstetrical patients in 1970 accepted sterilization. The continuation rate in the Thailand postpartum programme was among the highest in an international comparative follow-up study conducted in 1970. The rate at 12 months for the IUD was 79, falling to 65 at 24 months. The rate for the pill at 12 months was 72.

The logical outgrowth of this most successful programme has been to stress the pregnancy and puerperal periods as times of motivation for family planning. The Ministry's programme will attempt,

to increase coverage of pregnant women as a means to improve both the family planning programme and over-all maternal and child health. Auxiliary midwives in the field are advised to reach recently delivered women as a primary target for motivational efforts.

b. Accelerated development of Maternal and Child Health and Family Planning Services Project

This special project funded partly by UNFPA began in 1972 and is expected to be completed in 1976. The immediate objectives of the project are: (i) to demonstrate, by means of a pilot project in four Northeastern *Changwat*, the feasibility of delivering effective family planning services by taking advantage of the high motivation that exists in partum and postpartum situations and by providing family planning information and contraception; (ii) to improve the FP/MCH services of the hospitals and rural health centres in the project area thus providing as many people as possible with readily accessible FP/MCH services; (iii) to integrate existing resources so that sufficient numbers of appropriate staff are trained and optimally used; (iv) to use experience gained with the pilot project for further development of these concepts on a nation-wide scale.

The project has been rephased and modified due to a slower than anticipated rate of project implementation and increased costs for construction and equipment. In order to facilitate the extension of FP/MCH services into rural areas, the training of some 1,025 traditional birth FP/MCH attendants is being undertaken in the four provinces.

c. Expanded Sterilization Project

The immediate objectives of this project, which is funded by UNFPA, are: (a) to increase the availability of surgical operations of male and female sterilization by providing financial assistance to hospitals, health centres and other selected institutions; (b) to reach a target of approximately 265,000 sterilizations in 48 months of project operations and to provide reimbursement for around 2,000,000 of these sterilizations; (c) to ensure that the public demand for sterilizations can be met by the National Family Planning Programme so far as possible; (d) to undertake trials of the feasibility of mobile sterilization teams.

The subsidy rates are 150 baht or \$US 7.50 for tubal ligation and 50 baht or \$US 2.50 for vasectomy. It would appear that tubal ligation is much more

widely accepted than vasectomy as is evident from the following data of procedures performed by the end of December 1973:

	Cases for which subsidy payment was claimed	Total cases
Tubal ligation	35,522	52,159
Vasectomy	1,752	3,160
Total	37,274	55,319

It is also proposed to carry out a follow-up study of rural vasectomy acceptors. The results of this study will assist in the planning for future project activities and will provide information needed for the design of motivational materials specifically aimed at encouraging acceptance of vasectomy by rural residents.

d. Family Planning Communications Development and Integrated Campaigns Project

The purpose of the project is to assist the Government in developing planned and integrated support communication for the National Family Planning Programme. With financial support from UNFPA and technical support of DSCS, the Information, Education and Communication (IEC) Unit of NFPP began this programme in early 1973. The activities of the project are directed towards:

(a) The production and dissemination of orientation materials on the population dynamics of Thailand and the National Programme;

(b) The production and dissemination of motivation-information materials through mobile units in rural and remote areas, as well as through mass media in order to spread a wider knowledge and adoption of family planning, its practices and the services that exist for its support;

(c) The production and sustained use of materials for all aspects of training health personnel in the process of family planning and related development work;

(d) The development of training methods and supporting aids in the field of motivation and information for all health field staff to ensure long-term communication support for family planning;

(e) The development of an integrated multi-

sectoral approach to family planning communication by the co-ordinated use of all possible channels and services whose activities have bearing on social and economic development.

Initially, refresher training courses were organized for task forces at the central, regional and *changwat* levels. These task forces were then assigned to organize similar training for health personnel. The curricula of training include such topic as the techniques of communication, especially person to person communication and contraceptive knowledge. The project's communication-support of training of health personnel is more or less complete. The IEC Unit has distributed various promotion aids and has operated mass media programmes through radio and television. In addition, since 1974, NFPP has sent mobile health education vehicles equipped with sophisticated audio-visual aids to support the training programme in the *changwat* and field training programmes at village levels.

9. Non-Ministry Programmes

As noted earlier, apart from the medical institutions under the direct control of the Ministry of Public Health, the hospitals attached to the medical schools, military, municipalities and private hospitals, both in Bangkok and in rural areas have opened family planning clinics. By and large, these clinics obtain contraceptive supplies from the Logistics Unit of NFPP and co-operate with the Research and Evaluation Unit of NFPP by sending reports and other returns.

The Planned Parenthood Association of Thailand (PPAT) serves as a means of informal co-ordination among family planning leaders and assists the NFPP in disseminating family planning information to the public. The PPAT also undertakes training courses for various community leaders and carries advertising campaigns through newspapers, magazines, radio and television programmes. It also co-ordinates and promotes beyond family planning activities.

The National Economic and Social Development Board (NESDB) is responsible for the co-ordination and evaluation of the progress of the population programme in Thailand. The NESDB, the National Research Council and the Population Institutes conduct various research studies relating to the administrative and organizational aspects of health services and population programmes including the assessment of the impact of different programmes on behaviour, cost benefit and cost effectiveness

analysis, and evaluation of training methodology as related to health personnel.

Population programme and family planning have been integrated into the curricula of universities and the schools under the Ministry of Education. However, family planning has not yet been formally introduced into the medical school curricula; senior medical students receive some training in the field. Fourth year students at Chulalongkorn university rotate through the family planning unit, receive lectures on reproductive biology and contraception and have an opportunity to accompany the mobile unit on its visits to rural areas. Students in Chiang Mai and Siriraj Medical Schools are also exposed to family planning in the Department of Obstetrics. Preliminary discussions regarding the formal inclusion of family planning in the medical school curriculum have taken place. A lead has been taken by the newest school, Ramathibodi, in introducing the subject in an innovative new community medicine programme.

The level of commercial contraceptive distribution, especially for pills, has risen eightfold since 1964. Since 1968, the major pill distributing firms have participated in a reporting system which yields, through the good offices of an accounting firm, quarterly totals of distributed pills. Individual companies know their quarterly share of the market and interested private and public agencies know the total. Distribution of contraceptives other than pills has not been monitored so consistently.

Several studies have established that there is potential for more active use of the commercial sector. However, there has as yet been no definite effort toward joint public private sector co-operation to this end. The distribution of oral pills the commercial sector is about 3.2 million cycles a year while the total condom distribution and spermicides are about 120,000 gross and 120,000 tubes respectively.

The large contribution of the commercial sector to contraceptive practice in Thailand, 1971-1972, has been documented in two Westinghouse studies, one as yet unpublished. The first estimates that 60 per cent of current users in 1971 received supplies from the private sector. A comparable estimate for 1972 in the second report is 42 per cent. The first study underestimated the contribution of NFPP, but the second, because of serious survey sampling bias, may have overestimated it.

10. Population education programme ^{31/}

The first active education programme with population components was the Functional Literacy and Family Life Education Project launched by the Adult Education Division, Ministry of Education. Population concepts, then, were included in the part regarding Family Life Education of the out-of-school programme. In October 1971, the Population Education Seminar was held to create awareness of the scope of population education and its feasibility of implementation. Even though no immediate reaction was initiated following the seminar, it did at least succeed in laying down the groundwork among educators and administrators and in leading to further programme development. The informal endorsement of population education in the Ministry of Education in 1972, was shown by the establishment of the *Ad-hoc* Committee on Population Education in that Ministry. The Committee serves as an interim co-ordinating body for population education activities and in the formulation of population education plans for the Ministry.

With financial support from the Population Council, the Ministry of Education conducted a Feasibility Study for the Introduction of Population Education in Thai Schools. The purpose of this study, launched in 1973, was to test four approaches in the teaching of population education and to survey knowledge and attitudes among teachers, educators, educational administrators and public administrators. Results of this study will form the basis for further development of the population education programme in the Ministry. The Ministry's policy in regard to population education has been clearly stated as follows:-

"In view of the fact that population problems increasingly pose a major concern to the development of Thailand, population should be incorporated into educational systems at all levels. The implementation of population education will be subtly made in line with the unique socio-cultural foundation of the Thai Society".

The population education programme in Thailand, therefore, aims at seeking to develop an awareness about population problems, to assist the people to gain adequate knowledge about population

^{31/} For detailed discussion, see *Ad-hoc* Committee on Population Education, *Population Education in Thailand: Historical Development and Institution-wise Activities* (Bangkok, 1974).

and finally, to encourage individuals to make rational decisions regarding population and related problems.

11. Family planning budget

As noted earlier, activities connected with family planning were started by the Ministry of Public Health at a time when there was no official population policy. Hence there were no funds specifically allocated for family planning in the national budget. For these reasons, the programme was funded mainly by external donors primarily the United States Agency for International Development (USAID), The Popula-

estimates, shown in table 92, indicate that over 1,000 million baht were spent on the family planning programme during the first three-year period, 1968-1970, the amount increasing from about 300 million baht in 1968 to 462 million baht in 1970. In addition, a total of about 4.9 million baht was made available by the Government as counterpart to USAID assistance^{32/}. While these amounts relating to total Government expenditure are quite large, it is estimated that the direct costs would have been significantly higher had a separate family planning organization been established instead of the services being integrated into the existing health services.

Table 92. Total project fundings; all sources by fiscal year (FY), 1968-1973, Family Health Project, National Family Planning Project.

(in bahts)

Sources of funding	Family Health Project — National Family Planning Project					
	FY 1968	FY 1969	FY 1970	FY 1971	FY 1972	FY 1973
Estimated indirect Government Budget ^{a/}	289,148,900	341,101,400	433,902,900	487,949,850	482,664,300	540,051,136
Direct Government Budget ^{b/}	-	-	-	-	10,000,000	11,000,000
Counterpart funds	1,037,500	1,022,300	2,878,696	3,842,772	3,805,876	2,863,092
Foreign assistance ^{c/}	8,610,000	15,770,000	25,430,000	26,206,660	29,524,106	51,642,540
Total	298,796,400	357,893,700	462,211,596	517,999,282	525,994,282	605,556,768

Source: Research and Evaluation Unit, Family Health Division, Ministry of Public Health, Bangkok.

Note: ^{a/} Rough estimates from the combination of the budget for MCH Project, School Health Project (only 1973 after the merger), provincial health administration project, expanded and developed health centres project and provincial hospital project, Ministry of Public Health.

^{b/} Budget for family planning project, Ministry of Public Health.

^{c/} Includes assistance from USAID, UNFPA (since 1972) and the Population Council.

tion Council and the United Nations Childrens Fund (UNICEF). Even today, since the programme is fully integrated with the country's regular health services, most personnel who provide family planning services are carried on the Ministry's regular budget categories and are not separated out and designated, or funded, through family planning classifications. Almost the only category of personnel who are classified and funded as family planning personnel are those attached to the Family Health Division within the Ministry of Public Health.

Nevertheless it has been possible to make rough estimates of the cost of the programme on the basis of the budget allocation for maternal and child health, rural health and *changwat* hospital division. These

The United States Agency for International Development provides sizable assistance, primarily in the form of supplies of oral contraceptives, clinic and research equipment and vehicles. The Population Council provided much of the local currency needed at the beginning for training (supplemented in 1969 by UNICEF), hiring of local staff for the central office and other necessary miscellaneous expenses. Total foreign assistance during the three-year period

^{32/} United States Public Law 480 provides for the sale of United States surplus foods in developing countries and to use the local currency thus generated on various projects within the country of sale. However, the counterpart assistance provided by Thai Government is from the national budget rather than from locally generated PL 480.

approached 50 million baht for family planning activities alone (exclusive of support in other related fields, such as demographic and biomedical research).

In 1971, in spite of there being no official programme, the total amount spent was estimated to have increased to about 518 million baht from an estimated 462 million baht in 1970. The estimated indirect Government expenditure showed an increase of about 10 per cent over the previous fiscal year owing to the expansion of the rural public health programme. In 1971, there were also slight increases in the counterpart contributions and in foreign assistance.

During the first two years, 1972 and 1973, covered by the National Family Planning Project, a total of about 1,132 million baht was spent on the programme operation. The Government allocated 10 million baht directly for the project in 1972 and this amount was increased to 11 million baht in the subsequent fiscal year. The total of foreign assistance also increased from 26.2 million baht in 1971 to 29.5 million baht in 1972 and to 51.6 million baht in 1973.

12. Programme achievements

The number of new acceptors by method from the inception of family planning activities in 1965 to 1974 is shown in table 93. It will be observed

The increase in the total number of acceptors since 1968 is very impressive. Between 1969 and 1970 there has been an increase in the total number of acceptors of about 76 per cent. There was also a very sharp increase in the number of pill acceptors in 1970 probably due to the Ministry's decision in that year to allow auxiliary midwives throughout the country to prescribe oral contraceptives. The total number of acceptors in 1970 was 228,578 and this was higher than the unofficial target of 224,700.

By 1971, the total number of acceptors had increased dramatically to about 408,000 or by 78 per cent over the 1970 level and over three times the 1969 achievements. This was largely due to the fact that in 1971 family planning services had become available in rural health centres while in earlier years these services were mostly concentrated in the urban hospitals, particularly in Bangkok (see table 94). The number of pill acceptors recorded more than doubled over the corresponding number in 1970.

The total number of acceptors recorded a substantial increase in 1972 due largely to the increase in the acceptors of pills. However, in 1973 there was a decline in the number of new acceptors due to a fall in the number of pill acceptors. Several factors probably combined to bring about the decline in pill

Table 93. New acceptors by method and by year, 1965-1974

Year	IUD		Pill		Sterilization		Others		Total	
	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage
1965-1968	121,458	64.9	17,861	25.5	47,574	9.6	-	-	186,893	100.0
1969	54,496	41.8	60,459	46.5	15,264	11.7	-	-	130,219	100.0
1970	74,404	32.6	132,387	57.9	18,648	8.2	3,139	1.3	228,578	100.0
1971	86,034	21.1	294,607	72.2	23,546	5.8	3,648	0.9	407,835	100.0
1972	90,128	19.7	327,582	71.7	32,668	7.2	6,316	1.4	456,694	100.0
1973	93,449	22.1	268,674	63.6	49,606	11.8	10,447	2.5	422,176	100.0
1974	89,739	18.1	305,244	61.7	80,482	16.3	19,014	3.9	494,479	100.0
1965-1974	609,708	26.0	1,406,814	61.0	267,788	12.0	42,564	1.0	2,324,074	100.0

Source: Family Health Division, Ministry of Public Health.

that the average annual number of acceptors during the four years period 1965-1968 was 46,720.^{33/}

^{33/} Since the reporting system was not fully developed until mid 1968, the totals shown for all years 1965-1968 may have been an underestimate.

acceptors. One possible reason may be the "using up" of new early pill acceptors in the catchment areas of health centres. However, this may not have been a major factor particularly since the initial decline in the number of pill acceptors was very sharp. The most important factor appears to have been the change in the brand of pills early in 1972 from the popular

Table 94. New acceptors by region, 1969 to 1974

Region	New acceptors (excluding acceptors of "other methods")											
	1969		1970		1971		1972		1973		1974	
	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage	Number	Per-centage
Bangkok-Thon Buri	34,361	26.4	38,304	17.0	43,874	10.8	45,017	10.0	52,016	12.6	64,236	13.5
Central	18,717	14.4	41,350	18.3	83,308	20.6	90,382	20.1	84,185	20.5	93,546	19.7
Northeast	31,495	24.2	60,550	26.9	133,598	33.1	162,789	36.1	142,251	34.6	173,560	36.5
Northern	32,366	24.8	64,063	28.4	113,499	28.1	117,909	26.2	101,073	24.6	107,928	22.7
Southern	13,280	10.2	21,172	9.4	29,908	7.4	34,281	7.6	31,661	7.7	36,195	7.6
Total	130,219	100.0	225,439	100.0	404,187	100.0	450,378	100.0	411,186	100.0	475,465	100.0

Source: Family Health Division, Ministry of Public Health.

Table 95. Increase in acceptance rate by region, 1969-1973

Region	1969			1973			Increase of acceptance rate 1969-1973 (percentage)
	Eligible couples ^{a/}	Annual acceptors	Acceptance rate (percentage)	Eligible couples ^{b/}	Annual acceptors	Acceptance rate (percentage)	
Bangkok-Thon Buri	400,057	34,361	8.6	530,000	52,560	9.9	115
Central	979,487	18,717	1.9	1,152,612	84,297	7.3	384
Northeast	1,563,268	31,495	2.0	1,780,103	149,224	8.4	420
Northern	973,529	32,366	3.3	1,099,551	111,178	10.1	306
Southern	555,318	13,280	2.4	640,754	30,917	4.8	200
Total	4,471,659	130,219	2.9	5,203,020	428,176	8.2	283

Notes: a/ To estimate the number of eligible couples (based upon wives between the ages 15-44) 13% of the total population figure, according to the 1970 Census, was used.

b/ Based on the 1973 inhabitants registration figures.

Ovral to Norlestrin.^{34/}

The sharp increase in the total number of female sterilization procedures from about 23,000 in 1971 to over 32,000 in 1972 may have resulted from a Ministry ruling which at the end of 1971 lowered the cost to a patient from between \$US20-40 to only \$7.50 per procedure. Since 1972, there has been further substantial increases in the number of sterilizations as a result of the implementation of the Expanded Sterilization Project referred to earlier in section 8.

A more reliable index of the achievements of NFPP over the years is given by the acceptance rates calculated in respect of each year. A comparison of these rates for 1969 and 1973 is shown in table 95. It will be observed that the over-all acceptance rate increased from 2.9 per cent of all eligible couples in 1969 to 8.1 per cent in 1973. While there have been increases in the acceptance rates for each region, the most significant increase was recorded for the Northern Region where the acceptance rate increased from 3.3 per cent in 1969 to 10.1 per cent in 1973 or by 306 per cent over the 5-year period. In fact the highest acceptance rate in 1973 was observed for the Northern Region. Though the acceptance rate for the Southern Region doubled between 1969 and 1973, it still had the lowest acceptance rate in 1973. The percentage increase in acceptance rates, during this period was lowest, 115 per cent, for the Bangkok-Thon Buri metropolitan area. This is because the initial acceptance rate for this region was already very high, 8.6 per cent in 1969, and further increases would therefore be at a slower rate. However, in 1973 the acceptance rate for Bangkok-Thon Buri was only second highest, while the North-east had the third highest rate.

^{34/} Shortly after the introduction of Norlestrin reports developed concerning intermenstrual spotting and some cases of amenorrhea and doctors in clinics throughout the country forwarded complaints to the central office. The NFPP responded to these complaints by sending out mail questionnaires on 11 May 1972 to all provincial health officers throughout the country asking them to report by the end of the month any side effects experienced by women using Ovral, Norlestrin, or both, since 1 January 1972. The results, which were based on the analysis of data for 273,728 women, or about one-third of all pill users between 1 January and the middle of May, indicated that the use of Norlestrin produced a greater incidence of reported side effects than Ovral. The NFPP then took immediate steps to order new supplies of Ovral and other brands of oral contraceptives besides Norlestrin (which still continued to be used). Similar problems were noted with Norlestrin in other countries during 1972, and to the extent that this is so, it strengthens the case for attributing the decline of pill acceptors in Thailand largely to the use of Norlestrin.

A comparison of the targets and achievements by methods, for the period 1971 to 1974 is made in table 96. It will be observed that since 1971, the number of reported new acceptors of all methods has been higher than the target for each year. There has however been a variation in the achievements in respect of various methods. It will be observed that while in regard to sterilizations, there has been a steady increase in the percentage difference between targets and achievements, the corresponding percentage differences in regard to IUD and oral pills have shown fluctuations. On the basis of these achievements, the number of births prevented during 1971 to 1973 has been estimated as follows:

Year	Target	Achievement	Percentage difference
1971	104,392	105,330	+ 0.9
1972	156,558	177,976	+ 13.7
1973	212,774	250,905	+ 17.9

It has further been estimated that by the end of 1973, a reduction in the crude birth rate by 6.4 per thousand was brought about as a result of NFPP.^{35/} Thus it is estimated that the birth rate would have declined from about 40 per thousand in 1970 to less than 35 per thousand by the end of 1973. If the assumption is made that the estimated crude death rate of 9 per 1,000 in 1970 remained more or less unchanged until 1973, then the rate of growth of the population could be estimated to have declined from over 3 per cent in 1970 to about 2.6 per cent or less in 1973. As stated earlier, the demographic target of the Third Five-Year Plan is to reduce the annual rate of population to 2.5 per cent by end of 1976 and it would appear that NFPP will help to achieve this target even earlier.

13. Characteristics of family planning acceptors

Analysis of a sample number of acceptors in 1969 and 1970^{36/} has shown that:

- (a) Approximately 80 per cent of all new acceptors live in areas classified as rural;
- (b) Over two-thirds of the acceptors are from agricultural households;

^{35/} Because of the problem of underregistration of births and deaths, it is very difficult to assess the exact reduction in the national birth rate brought about as a result of the achievements of the National Family Planning Programme. But such estimates are very crucial to assess the effectiveness of the Programme since reduction in the birth rate can be brought about by a variety of factors.

^{36/} National Family Planning Project, "Analysis of June 1969 and June 1970 family planning acceptor coupon," (Bangkok, Ministry of Public Health, 1971) (mimeo).

Table 96. Comparison of the actual number of new family planning acceptors with the official targets, 1971-1974

Year	IUD			Oral pills			Sterilization			All methods ^{a/}		
	Target	New acceptors	Percentage difference	Target	New acceptors	Percentage difference	Target	New acceptors	Percentage difference	Target	New acceptors	Percentage difference
1971	80,000	86,034	+ 7.5	200,000	294,608	+ 47.3	20,000	23,456	+ 17.3	300,000	404,098	+ 34.7
1972	90,000	90,128	+ 0.1	235,000	327,582	+ 39.4	25,000	32,668	+ 30.7	350,000	450,378	+ 28.7
1973	90,000	93,449	+ 3.8	280,000	268,674	- 4.0	30,000	49,606	+ 65.4	400,000	411,729	+ 2.9
1974	90,000	89,739	- 0.3	280,000	305,244	+ 9.0	35,000	80,482	+129.9	405,000	475,465	+ 17.4

Source: Family Health Division, Ministry of Public Health

Note: ^{a/} Includes only IUD, oral pills and sterilization.

(c) Over 90 per cent of all acceptors have had four years or less of formal schooling and only 2.5 per cent have attended school beyond the tenth grade;

(d) About 50 per cent are under 30 years of age, this percentage rising to over 60 per cent for women living in urban areas;

(e) Two-thirds of the acceptors have had four or less pregnancies at the time of the interview;

(f) About 30 per cent accepted family planning services for purposes of spacing their children, with the majority not wanting any additional children;

(g) Almost 40 per cent of the acceptors began the practice of the contraception within six months after the termination of the last pregnancy;

(h) Approximately 80 per cent had never practised any contraceptive method prior to the initial acceptance in this programme;

(i) The vast majority of women (over 90 per cent) obtained information about the family planning services from person to person contact, mostly from friends and relatives, and to a lesser degree, from health personnel.

Table 97. Family planning acceptors by age, 1969-1972

Age distribution	Year (percentages)			
	1969	1970	1971	1972
Under 30	48.0	51.0	52.9	56.9
Over 30	52.0	49.0	47.1	43.1
Total percentage	100.0	100.0	100.0	100.0
Total number	(8,883)	(2,998)	(5,139)	(6,361)

Sources: National Family Planning Project, "Analysis of June 1969 and June 1970, family planning coupon", Evaluation Report No. 1 (Bangkok, Ministry of Public Health, 1971) (mimeo); Research and Evaluation Unit, "Family planning acceptor characteristics: analysis of 1971 and 1972 family planning acceptor coupons", Working Paper No. 43 (Bangkok, Ministry of Public Health, 1974) (mimeo).

However, analysis of the sampled records of acceptors in 1971 and 1972^{37/} showed significant changes in the characteristics of the acceptors in

^{37/} Research and Evaluation Unit, "Family planning acceptor characteristics: analysis of 1971 and 1972 family planning acceptors coupon," Working Paper No. 43 (Bangkok, Ministry of Public Health, 1974) (mimeo).

the two years compared to the previous two years. Table 97 shows that the proportion of acceptors aged below 30 years increased gradually while the proportion of acceptors above 30 years of age decreased year by year.

Table 98 gives the proportion of acceptors who at the time of accepting family planning methods expressed their desire to have additional children. It will be observed that this proportion has increased from 12.5 per cent in 1969 to 14.3 per cent in 1970

Table 98. Proportion of family planning acceptors by the desire for having additional children, 1969-1972

Desire for additional children	Year			
	1969	1970	1971	1972
Want more children	12.5	14.3	15.2	18.5
Do not want more children	71.9	66.8	65.8	61.9
Uncertain	15.6	18.9	18.9	19.6
Total percentage	100.0	100.0	100.0	100.0
Total number in sample	(5,564)	(2,134)	(5,137)	(6,332)

Source: Same as table 97.

and to 18.5 per cent in 1972. However, an analysis of the distribution of acceptors by open interval given in table 99, indicates only small changes in the proportion of the acceptors who accept family planning method, within 6, 12 and 24 months after termination of last pregnancy.

The analysis also indicated that characteristics of acceptors obviously vary by method (see table 100). Women accepting sterilization were older and had more living children than pill or IUD acceptors. IUD acceptors, however, typically had more living children than pill acceptors. Over 80 per cent of the acceptors of each method lived in rural areas.

Table 99. Distribution of family planning acceptors by open interval (after delivery), 1969-1972

Open interval	1969	1970	1971	1972
0 - 6 months	35.0	33.0	23.2	29.6
7 - 12 months	27.0	28.0	22.0	26.0
13 - 18 months	14.0	12.0	23.0	17.2
19 - 24 months	10.0	11.0	8.2	11.0
25 or more	14.0	16.0	23.6	16.2
Total percentage (Total number)	100.0 (6,503)	100.0 (2,555)	100.0 (5,168)	100.0 (6,377)

Source: Same as table 97.

Table 100. Acceptors by age, number of living children, place of residence, husband's occupation and method, 1971-1972

Characteristic	1971		1972		
	Pill	IUD	Pill	IUD	Sterilization
Age					
Under 20	3.9	2.7	4.9	4.1	-
20 - 24	23.9	24.2	26.8	26.3	9.7
25 - 29	24.9	28.1	25.5	29.0	32.9
30 - 34	23.1	23.2	19.9	21.7	35.1
35 - 39	16.3	15.9	15.1	14.1	18.4
40 - 44	7.0	5.2	6.5	4.1	3.5
45 and over	0.7	0.7	1.1	0.6	0.3
Total percentage	100.0	100.0	100.0	100.0	100.0
Total number	3,816	1,216	4,466	1,476	310
Living Children					
0	2.1	0.8	2.9	0.6	-
1 - 2	32.2	29.6	38.4	33.9	6.6
3 - 4	33.3	35.7	30.2	34.4	52.7
5 - 6	19.7	21.5	18.1	20.4	28.8
7 and over	12.7	12.4	10.4	10.7	11.9
Total percentage	100.0	100.0	100.0	100.0	100.0
Total number	3,813	1,221	4,453	1,478	309
Place of Residence					
Rural	84.6	87.5	86.2	83.4	80.3
Urban	15.4	12.5	13.8	16.6	19.7
Total percentage	100.0	100.0	100.0	100.0	100.0
Total number	3,218	1,074	3,833	1,363	300
Husband's occupation					
Agricultural	61.9	65.0	62.6	61.2	42.6
Non-agricultural	38.1	35.0	37.4	38.8	57.4
Total percentage	100.0	100.0	100.0	100.0	100.0
Total number	3,696	1,203	4,353	1,460	284
Desire for additional children					
Want more children	15.0	16.5	19.2	20.2	0.6
Not want more children	64.6	69.9	58.9	63.2	99.3
Uncertain	20.4	13.6	21.8	16.6	-
Total percentage	100.0	100.0	100.0	100.0	100.0
Total number	3,815	1,216	4,448	1,471	309

Source: Research and Evaluation Unit, "Family planning acceptor characteristics: analysis of 1971 and 1972 family planning acceptor coupon", Working Paper No. 43 (Bangkok, Ministry of Public Health, 1974), table 4.

Over 60 per cent of both pill and IUD acceptors had husbands who were engaged in agricultural occupations. A smaller proportion (42 per cent) of sterilization acceptors' husbands had agricultural occupations. A slightly larger percentage of IUD acceptors than pill acceptors said they did not want more children. Nearly all of the sterilization acceptors said they did not want more children.

14. Conclusions

Thailand is one of the many countries which started engaging in family planning activities only from the mid-1960s and the Government has had an official National Family Planning Programme since 1970. However, the results achieved have been among the most successful to be found anywhere in the world and there is increasing and convincing evidence that fertility has begun to decline. Several factors appear to have been favourable to this development:

(a) The Thai population, including the rural population, appears to have been unusually receptive to family planning, and although it is impossible to explain this favourable "demand" condition, it clearly reflects certain distinctive social characteristics and values of Thai society;

(b) The existence of a relatively well developed network of Government health services;

(c) The careful development of a family planning service programme in which the administrative policies governing the delivery of services have been progressively broadened;

(d) Bangkok has been unusually well endowed with a group of competent doctors concerned with the development of the family planning services at leading hospitals and this has helped in the development of "professional visibility" and recognition for family planning within the medical profession;

(e) Strong attention to inservice training pro-

grammes for doctors and nurses which has spread technical competence throughout the system;

(f) Senior officials of the Ministry of Public Health have usually viewed family planning activities by non-Ministry and non-governmental agencies as welcome extensions of the Ministry's own programme;

(g) Unusually effective technical assistance and strong financial support from external donors.

However, there are also certain weaknesses in the programme that have to be taken into consideration. In the first instance, the programme is heavily dependent on foreign financial support and is therefore vulnerable to any possible reductions in the level of such support. This, of course, will not be a danger if there is assurance that local funds can be mobilized rapidly enough to make up for any withdrawal of foreign assistance. Secondly, while there is a shortage of service points in many parts of the country, there is also underutilization of existing health centres. Thirdly, maternity wards in many *Changwat* hospitals are heavily overcrowded and there is a clear need for expansions that will provide additional beds. Fourthly, further development of some service activities, particularly mobile services, vasectomy and programme experiments, are being held back due to lack of funds. Fifthly, the programme at present is unable to meet the demand for certain types of services such as female sterilizations and vasectomies that require trained doctors. Also there appears to be a more serious shortage of nurses. Finally the programme is largely Government-oriented and like all such activities is bound to reflect the ebbs and flows of national political developments and consequent changes in senior personnel. This vulnerability could be minimized by encouraging and expanding activities outside the Government and also by extending services to areas and population groups which are not being reached by the Ministry of Public Health service points. These matters deserve more attention in the future.

Chapter VII

POPULATION PROJECTIONS

A. INTRODUCTION

Population projections play an important part in the formulation of comprehensive plans and programmes for social and economic development. The growth rate of population as well as its future size, composition and distribution are important determinants of production targets, employment goals and educational objectives as well as of the demand for housing and other social amenities. In short, achievement in every field of planning for national development is affected by or affects directly or indirectly the size and composition of future population.^{1/}

Population projections are essentially mathematical models based on sets of assumptions regarding the future course of the three components of population growth — fertility, mortality and migration — which attempt to demonstrate the consequences of these assumptions over time. Hence the accuracy of the projections is by and large determined by the accuracy of the assumptions on which they are based. Further, an important requirement of a population projection is a fairly accurate base or initial population. In the case of Thailand, as in most developing countries, a lack of firm base data^{2/} on the size and age – sex distribution adds to the uncertainty of the projections. In spite of the limitations, however, population projections do provide an important tool for analysing the effects of different levels of fertility, mortality and international migration on future size and composition of the population.

A number of population projections for Thailand has been prepared based on various assumptions of fertility and mortality. For convenience of discussion, these projections may be divided into two categories: past projections, or those prepared before 1970, and recent projections or those prepared after 1970.

B. PAST PROJECTIONS

The most important projections of the population prepared before 1970 are those published in 1963

^{1/} For detailed discussion on this aspect, see United Nations, "Report of the Expert Group Meeting on Population Projections," Asian Population Studies Series, No. 33 (Bangkok, 1975).

^{2/} The base population is usually either the population at the last census or a recent population estimate. It has been observed in annex II that the census data for Thailand, as in other countries, is subject to errors of coverage (or enumeration) and response errors (particularly misstatement of age).

by Gille and Thip,^{3/} in 1965 by Das Gupta and associates^{4/}, in 1968 by Thip^{5/} and also separately by the United Nations.^{6/} The salient attributes of these five sets of projections are summarized in table 101.

1. Projections of Gille and Thip

Gille and Thip prepared four population projections for Thailand on the basis of the sex and age distribution of the 1960 census population after adjustment for underenumeration in certain age groups. The projections which cover the 20-year period 1960-1980 were based on two assumptions regarding mortality, two for fertility and one for migration. The specific assumptions made in regard to the future course of the three components may be summarized as follows.

a. Mortality

The first assumption was that mortality would decline at a similar rate as in the past years until around 1970 (equivalent to an increase in life expectancy at birth of one year annually), but thereafter a slower rate of decline (corresponding to an increase in expectation of life of only one half year annually). The second assumption was a slowing in the rate of decline of mortality beginning in 1960 (instead of 1970) and in the years after 1965 to follow the trends of the normal mortality decline referred to in the first assumption.

b. Fertility

The first assumption was that fertility would remain constant at the current high level (a crude birth rate of 45 per thousand). The second assumption was a decline in fertility beginning around 1965 implying a reduction in the birth rate by one-third by 1980. The following birth rates were applied: 1960-

^{3/} Halvor Gille and Thip Chalothorn, "The demographic outlook of Thailand and some implications", in *Perspective on Thai Population*, Research Report No. 11 (Bangkok, IPS, Chulalongkorn University, 1974), pp. 99-119.

^{4/} Ajit Das Gupta and others, "Population perspective of Thailand", *Sankhya: The Indian Journal of Statistics*, Series B, vol. XXVII, parts 1 and 2, 1965.

^{5/} Thip Chalothorn, "Population projections for Thailand: 1960-1990", *Proceedings of the Third National Population Seminar* (Bangkok, 1968), pp. 456-469.

^{6/} United Nations, *World Population Prospects As Assessed in 1968*, Population Studies Series No. 53 (Sales No. 72.XIII.4).

Table 101. Four major sets of projections of Thailand's population, 1963-1970

A. Description

Year issued	Authors	Period covered	Projection interval	Number of projections
1963	Gille and Thip	1960-1980	Every 5 years	4
1965	Das Gupta and associates	1960-1980	Every 5 years	1
1968	Thip	1960-1990	Every 5 years	3
1968	United Nations	1965-1985	Every 5 years	1

B. Results

Authors' estimate	Assumptions			Estimates for 1980
	Fertility decline	Mortality decline	Net migration	
Gille, I	None	Medium	Zero	53,291,000
Gille, II	Rapid	Medium	Zero	42,602,000
Gille, III	None	Slow	Zero	54,335,000
Gille, IV	Rapid	Slow	Zero	49,449,000
Das Gupta	Rapid	Medium	Zero	48,510,000
Thip, I	None	Medium	Zero	53,291,000
Thip, II	Slow	Medium	Zero	52,429,000
Thip, III	Rapid	Medium	Zero	51,670,000
United Nations	Medium	Medium	Zero	49,775,000

1965: 45.0; 1965-1970: 41.9; 1970-1975: 36.6; and 1975-1980: 32.1 per thousand.

c. Migration

It was assumed there would be no immigration or emigration; that is net international migration was assumed to be zero.

The combination of two fertility and two mortality assumptions resulted in the following four sets of population projections:

- Projection I: Constant fertility, moderate mortality decline
- Projection II: Fertility decline, moderate mortality decline
- Projection III: Constant fertility, rapid mortality decline
- Projection IV: Fertility decline, rapid mortality decline

The results of these projections may be summarized as follows:

Projection	Projected population (in thousands)				
	1960	1965	1970	1975	1980
I	26,990	31,777	37,537	44,579	53,291
II	26,990	31,777	37,069	42,602	48,508
III	26,990	31,801	37,861	45,242	54,335
IV	26,990	31,801	37,381	43,212	49,449

2. Projections of Das Gupta and associates

In 1962-1963, Ajit Das Gupta in collaboration with three staff members^{7/} of the National Statistical Office prepared a single projection of the population of Thailand covering the 20-year period 1960-1980.

^{7/} The officers from the National Statistical Office collaborating with Ajit Das Gupta were Samruay Chotechanpibal, Thip Chalothorn, and Wiwit Siripak.

The projection assumed that age-specific mortality rates would decline according to the United Nations model system, corresponding to half a year annual increase in life expectancy at birth, except for 1960-1965 when a somewhat higher improvement was expected. In regard to fertility, "an exponential fall in birth rate, starting from the current level sustained till 1965 and then declining by a third by 1980 was assumed for the projection. The fall assumed was no doubt sharp in the light of existing conditions, but was not improbable; and assumption of a sharper fall had the advantage of showing up the contrast between constant and falling fertility".^{8/} Net international migration was assumed to be nil.

According to this projection, the total population of the country estimated at 27.0 million in 1960 would increase to 31.8 million in 1965; 37.1 million in 1970; 42.6 million in 1975 and to 48.5 million by 1980 — an increase of about 80 per cent over the 20 years 1960-1980. If the assumptions of Das Gupta and others held true, the population of Thailand would have reached the 50 million mark by 1983. However, the authors estimated that if fertility did not decrease at all, the 50 million mark would be attained by 1978 — a difference in timing of five years.

3. Thip's projections

In 1968, Thip Chalothorn prepared three projections of the Thailand's population covering the 30-year period 1960-1990. "The 1968 projection set is more significant and more often used for four reasons: it is more recent, its author was co-author of both of the earlier projections, it was prepared solely by a Thai government official without direction by a foreigner, and it placed greater emphasis on fertility as a determinant. Written for the Third National Population Seminar of April 1968, this paper by a National Statistical Office executive undoubtedly benefited from experience gained in making the earlier estimates".^{9/}

The mortality assumption made was the same for all three projections, viz., a moderate mortality decline corresponding to a yearly increase of half a year in the expectation of life at birth. Three alternative assumptions regarding fertility were made: (a) fertility would be constant at the level of 45 births per thousand throughout the period 1960-1990 (con-

stant fertility); (b) fertility would decline slightly beginning in 1970, the fall in the birth rate amounting to one-third its current level by 1990 (slight fertility decline); and (c) fertility will begin to decline in 1970, the birth rate being reduced by one-third by 1985 (rapid fertility decline).

The results of these projections are summarized in table 102. According to the projection based on the constant fertility assumption, the total population of Thailand will increase from about 27 million in 1960 to 53.3 million by 1980 and 77.1 million by 1990. The annual rate of population growth will also increase from an estimated 3.3 per cent during 1960-1965 to 3.8 per cent during 1985-1990. The medium projection based on slight fertility decline will result in a population of 70.5 million in 1990 or about 7 million less than that according to constant fertility assumption. If fertility were to decline more rapidly as in assumption (c) then the population in 1990 will be only about 66 million.

4. United Nations' projections

The projections made in 1968 are a part of a set of world-wide projections by age and sex on a country-by-country basis, except for the very small countries for which only projections of the total population were prepared. For Thailand the fertility assumption made was that fertility would start declining from 1975 and that once the decline begins, "fertility as measured by the gross reproduction rate would decrease by 5 per cent during the first five-year period, by 10 per cent during each of next two five-year periods and by 15 per cent during the next three five-year periods, before the decline slowed to a more gradual pace".^{10/} The future trends in mortality were assumed to conform to a pattern of generalized mortality assumption of annual gains in life expectancy of 0.6 year. The assumed fertility and mortality schedules were as follows:

Period	GRR	%
1965-1970	3.2	59.1
1970-1975	3.1	62.0
1975-1980	2.9	64.6
1980-1985	2.6	67.0

^{8/} Ajit Das Gupta, and others., *op.cit.*

^{9/} Ralph Thomlinson, *Thailand's Population: Facts, Trends, Problems and Policies* (Bangkok, Chulalongkorn University, 1971), p. 77.

^{10/} United Nations, *World Population Prospects As Assessed in 1968, op.cit.* p. 27.

Table 102. Projected total population of Thailand, 1960-1990, based on three alternate fertility assumptions

Variable and year	Assumption I: constant fertility	Assumption II: slight fertility decline	Assumption III: rapid fertility decline
Population			
1960	26,990,000	26,990,000	26,990,000
1965	31,777,000	31,777,000	31,777,000
1970	37,537,000	37,537,000	37,537,000
1975	44,579,000	44,437,000	44,281,000
1980	53,291,000	52,429,000	51,670,000
1985	64,006,000	61,281,000	59,222,000
1990	77,141,000	70,548,000	66,141,000
Crude birth rate			
1960-1965	45.0	45.0	45.0
1985-1990	45.0	33.0	25.7
Crude death rate			
1960-1965	11.7	11.7	11.7
1985-1990	6.9	4.4	3.4
Growth rate (percentage)			
1960-1965	3.3	3.3	3.3
1985-1990	3.8	2.9	2.2

Source: Thip Chalothorn, "Population projections for Thailand: 1960-1990" *Proceedings of the Third National Population Seminar* (Bangkok, 1968), pages 465-468.

According to this projection, the population in Thailand, estimated at 30.7 million in 1965 would increase to about 49.8 million in 1980 and to 57.7 million in 1985.

C. RECENT PROJECTIONS

Since 1970 several projections of the Thai population have been made, the most noteworthy being those undertaken in 1971 by the National Statistical Office,^{11/} in 1973 by Tomas Frejka^{12/} and in 1974 by the Population Division, Economic and Social Commission for Asia and the Pacific.^{13/} The important features of these projections are summarized in table 103.

11/ National Statistical Office, National Economic and Social Development Board and the Institute of Population Studies, *Population Projections for Thailand, 1960-2000* (Bangkok) (unpublished).

12/ Tomas Frejka, "Alternative projections to a stationary population: Thailand", *Country Prospects* (New York, The Population Council, 1974).

13/ ESCAP, *Illustrative Population Projections for Republic of Korea, Sri Lanka and Thailand*, (under preparation).

1. Projections of the National Statistical Office and others

A set of three alternative official population projections for Thailand were prepared in 1970 by the National Statistical Office in close collaboration with the National Economic and Social Development Board and the Institute of Population Studies of Chulalongkorn University, primarily for the use of the Third Five-Year Economic and Social Development Plan (1972-1976). These projections give the population by five-year age groups and sex for every five years 1960-2000. As the 1970 census data were not then available, the projections were based on the 1960 total census population adjusted to the age structure as disclosed by the 1964-1967 Survey of Population Change.

In moving the base population forward from 1960 to 1970, it was assumed that mortality declined slowly, net migration was zero and fertility remained constant between 1960 and 1965 and declined by 2.5 per cent between 1965 and 1970. From 1970-2000, the projections were prepared on the basis of the following assumptions:

Table 103. Three major sets of projections of Thailand's population, 1970-1974

A. Description				
Year prepared	Authors	Period covered	Projection interval	Number of projections
1970	National Statistical Office and others	1960-2000	Every 5 years	3
1973	T. Frejka	1970-2000	Every 5 years	5
1974	ESCAP	1970-2100	Every 5 years	30

B. Results				
Author's estimate	Fertility decline	Mortality decline	Net migration	Estimates for 1980 (thousands)
National Statistical Office and others	1 Slow	Slow	Nil	49,259
	2 Moderate	Slow	Nil	48,868
	3 Rapid	Slow	Nil	47,056
Frejka	1 Instant	Slow	Nil	40,300
	2 Very rapid	Slow	Nil	45,000
	3 Rapid	Slow	Nil	48,000
	4 Moderate	Slow	Nil	48,800
	5 Slow	Slow	Nil	49,200
ESCAP	1 ^{a/} Slow	Slow	Nil	49,427
	2 ^{b/} Moderate	Slow	Nil	49,069
	3 ^{c/} Rapid	Slow	Nil	48,535

Notes: ^{a/} High variant group,
^{b/} Medium variant group,
^{c/} Low variant group,

a. Fertility

(i) High fertility assumption

Fertility would begin to decline by 2.5 per cent for each five-year interval between 1965 and 1975. The rate would thereafter decline by a quarter within 30 years, i.e., the general fertility rate would be approximately 144.03 during the period 1995-2000.

(ii) Medium fertility assumption

The general fertility rate was assumed to decline by 2.5 per cent for each five-year interval during the period from 1965 to 1975 and thereafter the rate would decline to 96.65 for the period between 1995 and 2000.

(iii) Low fertility assumption

The decline in the general fertility rate was as-

sumed to be consistent with the family planning programme targets, i.e., the rate would decline by 2.5 per cent during 1965-1970, by 10 per cent during 1970-1975, by 16 per cent during 1975-1980 and thereafter the general fertility rate will decrease by 10 per cent each five-year period up to 1995-2000.

b. Mortality

The expectation of life at birth would increase about half a year annually during the period 1960-1965; after 1965, life expectancy would increase at a slower rate, i.e., about one-third of a year annually from 1965 until 2000.

c. Migration

It was assumed that international migration will not play any significant role in the growth of the population during the projection period.

The results of these projections, in thousands, are summarized below:

years 2000, 2020 and 2040 respectively. In all projections, once replacement fertility is reached, it

Year	High projection	Medium projection	Low projection
1970	36,215	36,215	36,215
1975	42,277	42,277	41,718
1980	49,259	48,868	47,056
1985	57,258	55,730	52,711
1990	66,402	62,784	58,657
1995	76,696	69,746	64,685
2000	88,035	76,571	70,574

2. Frejka's projections

These projections were based on the assumption that at some future time, the population of Thailand, for all practical purposes, will cease to grow. In all the five projections, the assumed trend in mortality is the same; it is expected to decline so that the female expectation of life in Thailand will ultimately reach 74.5 years.^{14/} In regard to the future trends in fertility, "for all projections, it is assumed that the 1965-1970 fertility pattern of an average of 6.2 children born per woman will settle eventually at the replacement level, that is at a level of slightly more than 2 children per woman. In Projection 1 this change in fertility is assumed to take effect in the early 1970s. Projection 2 illustrates demographic trends that would appear if the fertility transition occurred from 1970 to 1980. In Projections 3, 4 and 5 the fertility transition is estimated to occur in 30, 50, and 70 years, respectively; thus replacement fertility is assumed to be reached in the

is assumed to persist indefinitely."^{15/}

In all projections, net migration was considered to be practically insignificant. "If immigration and emigration of the population of Thailand remain relatively small or balanced, these projections will give an adequate idea of possible future trends. Under conditions of heavy emigration, these projections would reflect an overestimation; conversely they would reflect an understatement of possible future trends under conditions of heavy immigration".^{16/}

Since it is unlikely that the instant decline of fertility assumed in Projection 1 will take place, the trends illustrated by this projection are also unlikely to materialize. Projection 2 only illustrates the consequences of a precipitous decline in fertility. Hence only the other three projections are considered realistic; these for convenience of discussion will be termed low (projection 3), medium (projection 4) and high (projection 5). The results of these projections are summarized below:

Year	Projected population (in millions)		
	Low (Projection 3)	Medium (Projection 4)	High (Projection 5)
1970	36.6	36.6	36.6
1975	42.1	42.3	42.4
1980	48.0	48.8	49.2
1985	54.2	56.0	56.9
1990	60.5	64.0	65.6
1995	66.6	72.6	75.4
2000	72.1	81.5	86.0

Source: Tomas Frejka, "Alternative projections to a stationary population", *Country Profiles: Thailand* (New York, The Population Council, 1974), table A.

^{14/} For technical reasons, the computations were made with respect to the female population. The results nevertheless approximate the features and trends of the total population (Tomas Frejka, *op.cit.*, p. 3).

^{15/} *Ibid.*, pp. 3-4.

^{16/} *Ibid.*, p. 3.

In the low projection, the population in 2000 would be 97 per cent larger than in 1970. In the medium and high projections it would be 122 per cent and 135 per cent larger respectively.

The vital rates implied in these projections are shown in table 104. It is clear from these rates that the current structure of the population of Thailand is such that a gradual change in fertility behaviour during the next two decades would hardly be noticeable in terms of the crude birth rate and the crude death rate (medium and high projections). A rapid decline in fertility (low projection) would bring about a more marked decline in both the crude birth rate and the crude death rate. However, if the trends in population growth illustrated by the low projection are considered desirable, the needed fertility trends may prove to be difficult to attain.

trends that would occur if fertility were reduced according to various assumptions. The projections cover a 130-year period from 1970-2100.

A major difference in methodology between the projections prepared by ESCAP and the two studies discussed in the preceding sections is the introduction of nuptiality changes into the assumptions. This was accomplished by decomposing age-specific fertility rates into proportions of ever-married women by age group and age-specific ever-married fertility rates. The objective was to measure the effects of changes in the age at marriage on future population growth, since changes in the age at marriage can be inferred from changes in the age schedule of proportions ever-married.

Another difference is that assumptions which

Table 104. Projected vital rates, 1965-2000

Period	Low projection			Medium projection			High projection		
	CBR (per 1,000)	CDR (per 1,000)	NI (per- centage)	CBR (per 1,000)	CDR (per 1,000)	NI (per- centage)	CBR (per 1,000)	CDR (per 1,000)	NI (per- centage)
1965-1970	40.1	9.8	3.0	40.1	9.8	3.0	40.1	9.8	3.0
1970-1975	37.0	8.7	2.8	38.2	8.7	3.0	38.8	8.7	3.0
1975-1980	34.3	7.7	2.7	36.6	7.7	2.9	37.7	7.7	3.0
1980-1985	31.6	7.0	2.5	35.0	7.0	2.8	36.6	7.0	3.0
1985-1990	28.8	6.5	2.2	33.3	6.4	2.7	35.3	6.3	2.9
1990-1995	25.6	6.0	2.0	31.4	5.9	2.6	33.9	5.8	2.8
1995-2000	21.6	6.0	1.6	29.2	5.7	2.4	32.3	5.5	2.7

Source: Tomas Frejka, *op.cit.*, tables D, E and F.

Notes: CBR - Crude birth rate
CDR - Crude death rate
NI - Rate of natural increase

3. ESCAP's projections

The Population Division prepared a set of population projections for Thailand as part of the research project entitled "Rural and urban population projections for countries of the ESCAP region". They include 30 variants of future population which were derived from as many combinations of assumptions on nuptiality (proportions of ever-married women), ever-marital fertility and mortality. The immediate objective of these projections was to illustrate differences in size and composition of population which would result from alternate trends in fertility during the projection period and to indicate the demographic

would lead to zero population growth were not specifically included in the ESCAP's projections. A third major difference is that unlike the other two sets of projections, the ESCAP projections are the only ones to be based on the age-sex data of the 1970 population census of Thailand.

In regard to mortality, it was assumed that there would be gradual decline in mortality over the years. The survival rates by sex and age used for the projections were calculated from specially prepared future life tables for Thailand. The most recent life table for Thailand relating to the 1964-1965 period and based on the results of the Survey of Population

Change^{17/} was used as the starting point. Future life tables were then projected using an assumed trend in the expectation of life at birth and assumed sex-age patterns of mortality corresponding to different levels of the expectation of life at birth.

As stated earlier, use was made of age-specific ever-marital fertility rates of women for the fertility assumptions. The assumptions regarding the proportions of ever-married women for each five-year age group of women in the reproductive ages 15-49 were made for every five-year interval of the projection period.^{18/} Starting from the baseline data on the proportions of ever-married women by five-year age group obtained from the results of the 1970 population census of Thailand, two different time paths of proportions of ever-married women were assumed. The two assumptions have a common set of proportions of ever-married women by age as an ultimate target but they differ in regard to the time period when this target level will be reached.

According to Assumption I, the percentage of ever-married women in age group 20-24 was assumed to decline linearly from 62.1 in 1970 to 30.0 by 2010 and remain constant thereafter. According to Assumption II this decline would occur over the period of 80 years. The percentage of ever-married women in the age group 45-49 was assumed to remain constant throughout the entire projection period at the 1970 census value of 97.0 per cent. Based on these assumptions, the percentages for the other age groups were calculated.

The fertility assumptions were made in terms of age-specific fertility rates. The baseline schedule of age-specific ever-marital fertility rates of women was estimated on the basis of the 1970 population census data and 1970 vital statistics adjusted for underregistration. Three different schedules of age-specific ever-marital fertility rates, high, medium and low, were assumed as ultimate targets. The next step was to connect these target schedules with the baseline fertility schedule. Here, two variables had to be assumed. The one is the length of time required for the fertility to reach the ultimate

levels. The other is the course of fertility decline. For the former, three assumptions were made: 40, 30 and 20 years. These three different periods of time were applied to each of the three target fertility schedules. Two assumptions were made regarding the course of fertility decline. Under the "slow" assumption, only 25 per cent of the decline in age-specific marital fertility rate would occur during the first half of the time period assumed for this decline, while under the "fast" assumption, 50 per cent of the total decline in age-specific marital fertility would occur during the first half of the assumed time period.

The assumptions on ever-marital fertility thus prepared included three assumptions on the ultimate level, two assumptions on the speed of initial decline and three assumptions on the length of period required to reach the ultimate levels resulting in 18 sets of assumptions. By combining these 18 sets of assumptions on ever-marital fertility with the two sets of nuptiality assumptions, 36 sets of assumptions on age-specific fertility rates were obtained. Combinations involving the assumption of slow nuptiality decline with a very fast decline of ever-marital fertility would be unrealistic. After excluding such unrealistic combinations, 30 sets of combined assumptions were used in the present projections.

The sex ratio at birth was assumed to remain at 105 male births per 100 female births. The population was assumed to be closed to international migration throughout the projection periods.

Using the adjusted population by sex and age group according to the 1970 population census of Thailand as the base population, the projection of future populations was computed for the various assumptions by the usual component method. The following aspects of the future populations of Thailand were projected:

(a) Population by sex and age group, at five-year intervals from 1 April 1970 to 2100;

(b) The crude birth and death rates and natural rate of increase, for each five-year interval, 1970-1975 to 2095-2100;

(c) The average annual rate of population increase, for each five-year interval, 1970-1975 to 2095-2100;

(d) The total fertility rates and gross and net reproduction rate, for each five-year interval, 1970-1975 to 2095-2100;

^{17/} Government of Thailand, *Report of the Survey of Population Change, 1964-1967* (Bangkok, National Statistical Office, 1969), pp. 33-34.

^{18/} It would have been more appropriate on theoretical grounds to use age-specific marital fertility rates and proportion of currently married women; however, this was not done in view of the complexity in making assumptions on proportions of widowed and divorced women.

(e) The general fertility rate, for each five-year interval, 1970-1975 to 2095-2100;

(f) The mean length of generation, for each five-year interval, 1970-1975 to 2095-2100;

(g) The child-woman ratio, at five-year intervals from 1970 to 2100;

(h) The child and aged dependency ratios, at five-year intervals from 1970 to 2100.

On the basis of alternative sets of combined mortality-nuptiality-fertility assumptions, 30 variants of future populations for Thailand were projected over a period of 130 years from 1970 to 2100, starting from the base year population of 36,377,000 in 1970.

These variants may be classified into three major groups: "high", "medium", and "low". Each group contains 10 variants. These variant groups are named according to their respective assumptions on ultimate levels of ever-marital fertility. The results are summarized in table 105.

Table 105. Total population, Thailand, 1970, 1990, 2000, 2010, 2050 and 2100 by the 30 variants

(Population in thousands)

Variant	1970	1990	2000	2010	2050	2100
I High variant group						
1 80-H-S-40	36,377	66,704	85,734	104,994	178,036	224,057
2 80-H-F-40	36,377	65,002	82,402	100,360	166,571	209,128
3 80-H-S-30	36,377	66,022	82,048	99,600	163,453	204,155
4 80-H-F-30	36,377	64,653	80,195	96,962	157,525	196,741
5 40-H-S-40	36,377	65,286	81,964	96,771	144,232	169,278
6 40-H-F-40	36,377	63,592	78,695	92,436	134,601	157,604
7 40-H-S-30	36,377	64,606	78,303	91,534	131,656	153,053
8 40-H-F-30	36,377	63,245	76,499	89,124	126,712	147,311
9 40-H-S-20	36,377	61,915	73,881	86,298	119,353	138,633
10 40-H-F-20	36,377	61,267	73,122	85,158	117,345	136,314
II. Medium variant group						
11 80-M-S-40	36,377	66,261	84,656	102,390	162,846	182,907
12 80-M-F-40	36,377	64,573	81,205	97,699	151,676	169,930
13 80-M-S-30	36,377	65,539	80,515	96,409	147,574	164,183
14 80-M-F-30	36,377	64,197	78,772	93,932	142,225	158,246
15 40-M-S-40	36,377	65,088	81,274	95,014	133,482	139,510
16 40-M-F-40	36,377	63,191	77,623	90,224	123,407	128,591
17 40-M-S-30	36,377	64,348	77,260	89,249	120,387	124,298
18 40-M-F-30	36,377	62,817	75,228	86,584	115,201	118,942
19 40-M-S-20	36,377	61,359	72,315	83,467	107,545	110,866
20 40-M-F-20	36,377	60,629	71,468	82,221	105,463	108,738
III. Low variant group						
21 80-L-S-40	36,377	66,079	83,449	98,841	138,950	123,923
22 80-L-F-40	36,377	63,752	78,496	92,299	125,336	111,212
23 80-L-S-30	36,377	64,412	77,821	90,716	120,711	106,072
24 80-L-F-30	36,377	63,314	76,051	88,264	116,331	102,183
25 40-L-S-40	36,377	64,702	79,935	91,659	114,867	94,890
26 40-L-F-40	36,377	62,424	75,589	86,049	104,237	85,695
27 40-L-S-30	36,377	63,843	75,244	84,940	101,114	81,979
28 40-L-F-30	36,377	61,993	72,807	81,846	95,690	77,571
29 40-L-S-20	36,377	60,300	69,356	78,210	87,722	70,861
30 40-L-F-20	36,377	59,398	68,330	76,762	85,529	69,114

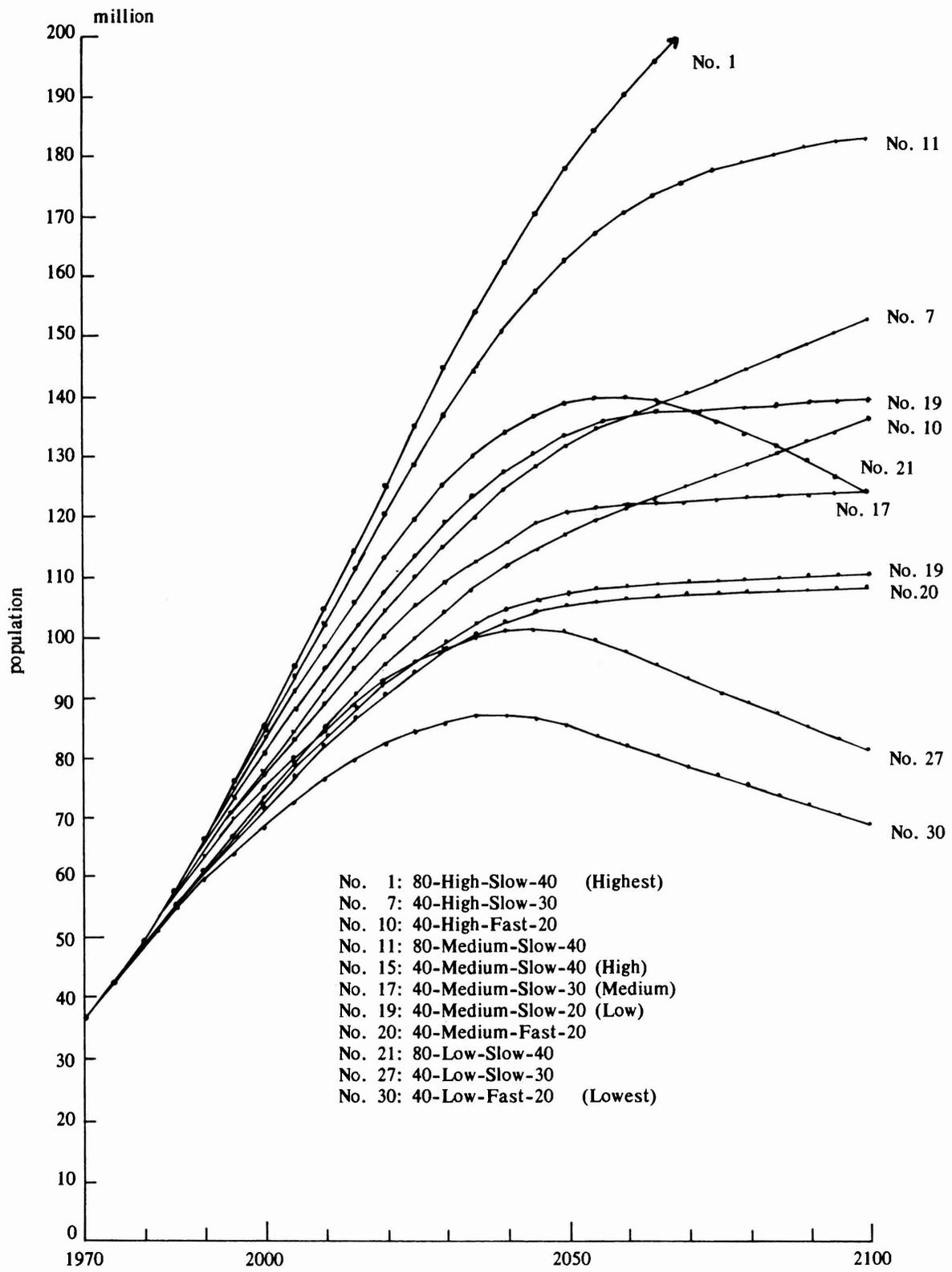


Figure 11. Projected population growth, Thailand, 1970-2100, according to selected variants.

For all variants in the high and medium groups, total population will continue to grow throughout the projection period at diminishing rates of increase. The high variant group will ultimately have a constant net reproduction rate of 1.125 after 2070. The medium variant group will have an ultimate constant net reproduction rate of 1.053 after 2070. These two variant groups, therefore, imply population increase into infinite future. In contrast with this, all the projections of the low variant group imply decreasing population after some increase during the projection period, the turning point differing between variants. Every variant among the low variant group will come to have a constant net reproduction rate of 0.920 after 2070.

Because of the diverse fertility assumptions, the range of projected population totals becomes wider year after year. The variants "80-High-Slow-40" and "40-Low-Fast-20" show the maximum and the minimum populations, respectively, throughout the projection period. According to the variant "80-High-Slow-40" the total population will be 85.7 million in 2000, 178.0 million in 2050 and 224.0 million in 2100, while according to the variant "40-Low-Fast-20" the total population will be 68.3 million in 2000, 85.5 million in 2050 and 69.1 million in 2100.

The assumption of an 80-year decline in nuptiality was considered somewhat unrealistic and was employed only for the purpose of measuring effects of delayed nuptiality decline on population growth. The assumptions of the high and low ultimate levels of ever-marital fertility were also considered less realistic than that of the medium ultimate level and they were included mainly for the purpose of measuring the different effects of different ultimate levels of fertility on population growth. Among the 30 variants, therefore, six in the medium group, number 15 ("40-Medium-Slow-40") to number 20 ("40-Medium-Fast-20") may be the most realistic.

In regard to the initial speed of fertility decline, the assumption of the "slow" decline was considered more realistic than that of the "fast" decline. Therefore, among these six variants, three, numbers 15 ("40-Medium-Slow-40"), 17 ("40-Medium-Slow-30") and 19 ("40-Medium-Slow-20"), may be taken as the most realistic variants. Table 106 presents the total populations at five-year intervals from 1970 to 2100 as projected from these three variants along with the highest and the lowest variants along the 30 sets of variants (i.e., No. 1, "80-High-Slow-40" and No. 30, "40-Low-Fast-20").

Variant number 17 ("40-Medium-Slow-30") may be considered as the medium variant in the usual sense. It is compared with the corresponding projections prepared by the Government of Thailand^{19/} and the United Nations^{20/} in table 107. As noted earlier, the base population for the latter two projections was the 1960 census. Between 1970 and 1985, the United Nations series project the highest growth rate averaging over 3 per cent *per annum* while in the present projections the projected growth rate averages slightly less than 3 per cent during the period. The lowest average growth rates (about 2.5 per cent *per annum*) during 1970-1985 have been projected by the projections prepared by the National Statistical Office.

Since a single mortality assumption is used, the growth of the population from the base year to a specified time period is highly correlated with the total number of births during that interval and therefore with the cumulative value of the annual total fertility rates up to the specified time period. In order to demonstrate the effects of fertility decline on the growth of the population during the early phase of the projection period, a comparison is made in table 108 between three selected variants having different levels of ultimate fertility. The compared variants are numbers 8 ("40-High-Fast-30"), 16 ("40-Medium-Fast-40") and 25 ("40-Low-Slow-40"). Their ultimate total fertility rates are 2.398, 2.244 and 1.960 respectively and these rates will be attained in 2010, that is after 40 years from the base year. Variant number 8 will have the fastest fertility decline followed by variant number 16, and variant number 25 will have the slowest decline as reflected in the cumulative annual total fertility rates presented in table 108. Because of such differences in the speed of fertility decline, the total population projected by variant number 8 will grow least during the first 40 years (1970 to 2010) in spite of the fact that the variant has the highest ultimate level of fertility. The total population according to variant number 25, which has the lowest ultimate level of fertility, will grow most up until 2010. In the long run, however, ultimate level of fertility will determine the growth rate of population. The crucial factor affecting the rate of population growth in the short run, however, will be the

^{19/} National Statistical Office, National Economic and Social Development Board and the Institute of Population Studies, *op.cit.*

^{20/} United Nations *World Population Prospects As Assessed in 1968, op.cit.*

Table 106. Total population, Thailand, 1970-2100, variants nos. 1, 15, 17, 19 and 30
(Population in thousands)

Year	No. 1	No. 15	No. 17	No. 19	No. 30
	80-H-S-40	40-M-S-40	40-M-S-30	40-M-S-20	40-L-F-20
1970	36,377	36,377	36,377	36,377	36,377
1975	42,362	42,282	42,282	42,282	42,161
1980	49,427	49,069	49,069	49,069	48,535
1985	57,554	56,700	56,700	55,760	54,578
1990	66,704	65,088	64,348	61,359	59,398
1995	76,290	73,530	71,144	66,674	63,782
2000	85,734	81,274	77,260	72,315	68,330
2005	95,286	88,446	83,206	78,085	72,809
2010	104,994	95,014	89,249	83,467	76,762
2015	114,986	101,397	95,140	88,141	79,928
2020	125,218	107,888	100,589	92,261	82,430
2025	135,255	113,989	105,346	96,096	84,494
2030	144,841	119,313	109,446	99,663	86,121
2035	153,881	123,734	112,995	102,674	87,073
2040	162,448	127,460	116,062	104,944	87,232
2045	170,638	130,733	118,579	106,519	86,672
2050	178,036	133,482	120,387	107,545	85,529
2055	184,635	135,495	121,472	108,193	83,990
2060	190,580	136,740	122,039	108,607	82,250
2065	195,917	137,354	122,304	108,941	80,501
2070	200,773	137,629	122,542	109,343	78,890
2075	205,237	137,852	122,887	109,684	77,276
2080	209,421	138,187	123,271	109,899	75,567
2085	213,365	138,573	123,589	110,067	73,832
2090	217,113	138,954	123,822	110,285	72,170
2095	220,670	139,269	124,040	110,571	70,614
2100	224,057	139,510	124,298	110,866	69,114

Table 107. Comparisons of total population and annual rates of growth, Thailand, 1970-2000, according to the medium variant between three projections

Year	National Statistical Office ^{a/}	United Nations ^{a/}	Present projections ^{b/} (variant no. 17)
Total population (in thousands)			
1970	36,215	36,161	36,377
1975	42,277	42,550	42,282
1980	48,868	49,775	49,069
1985	55,730	57,732	56,700
1990	62,784	..	64,348
1995	69,746	..	71,144
2000	76,571	..	77,260
Average rates of growth (percentage)			
1970-75	2.9	3.3	3.0
1975-80	2.4	3.1	3.0
1980-85	2.3	3.0	2.9
1985-90	2.2	..	2.5
1990-95	2.0	..	2.0
1995-2000	1.8	..	1.7

Sources: National Statistical Office, National Economic and Social Development Board and Institute of Population Studies, *Population Projections for Thailand, 1960-2000* (Bangkok) (unpublished); United Nations, *World Population Prospects As Assessed in 1968*, Population Studies No. 53 (Sales No. 72. XIII.4), table A.6.

Notes: ^{a/} Population as of 1 July.
^{b/} Population as of 1 April.

speed of fertility decline in earlier years of the projection period rather than the terminal level of fertility and the over-all duration of years needed to attain that level.

The present projections assumed that mortality would become constant in and after a five-year interval 2065-2070 and age-specific fertility was assumed to become constant no later than 2050. Therefore, the age composition of population will approach that of a stable population in 2100, the

terminal year of the projection period. The age composition in 2100 will differ between the high, medium and low variant groups since they have different ultimate levels of fertility (see table 109).

The age composition of Thailand's population will change from that in 1970 towards the ultimate stable compositions indicated in table 110 by different paths according to different assumptions. In general, it may be said that the proportion of children under 15 years old will shrink year after year until

Table 108. Total population and cumulative total fertility rates, Thailand, 1980-2100, according to three selected variants

Year	Variant No. 8	Variant No. 16	Variant No. 25
	40-H-F-30	40-M-F-40	40-L-S-40
Total population			
1980	48,781	48,698	48,988
1990	63,245	63,191	64,702
2000	76,499	77,623	79,935
2010	89,124	90,224	91,669
2050	126,712	123,407	114,867
2100	147,311	128,591	94,890
Cumulative annual total fertility rates up to specified years			
1980	54.640	54.395	55.805
1990	99.060	99.225	104.845
2000	130.100	133.530	141.320
2010	155.305	159.250	165.180
2050	251.225	249.010	243.580
2100	371.125	361.210	341.580
Ultimate total fertility rate			
2010 and onward	2.398	2.244	1.960

Table 109. Percentage distribution of population by broad age group, Thailand, 1970 and 2100, according to high, medium and low variant group

Age group	1970	2100		
		High variant group	Medium variant group	Low variant group
0-14	44.9	22.7	21.2	18.2
15-64	52.2	64.1	64.4	64.7
65+	3.0	13.2	14.4	17.1

Note: The figures for 2100 are approximate ones, because percentages particularly in age groups 15-64 and 65+ differ by + 0.1 or + 0.2 among variants within each variant group.

Table 110. Percentage distribution of population under 15 years old, Thailand, 1970-2100, according to five selected variants

Year	No. 1 80-H-S-40	No. 15 40-M-S-40	No. 17 40-M-S-30	No. 19 40-M-S-20	No. 30 40-L-F-20
1970	44.9	44.9	44.9	44.9	44.9
1980	43.0	42.5	42.5	42.5	41.9
1990	42.2	40.8	40.2	37.2	35.4
2000	38.7	36.3	33.0	29.7	27.3
2010	33.7	29.6	27.6	27.8	25.2
2020	31.0	26.1	25.8	24.5	21.8
2030	28.7	24.5	23.2	22.5	19.6
2040	26.4	22.4	21.9	22.1	19.1
2050	24.9	21.6	21.6	21.2	18.3
2060	23.8	21.4	21.1	21.2	18.2
2070	23.3	21.1	21.2	21.3	18.3
2080	23.0	21.2	21.3	21.1	18.1
2090	22.7	21.2	21.1	21.2	18.2
2100	22.7	21.1	21.2	21.2	18.2

reaching its ultimate level. The proportion of population aged 15-64 years will increase up to a certain point, decreasing thereafter (see table 111); and the proportion of persons 65 years and over will show a more or less steady increase throughout the projection period (see table 112). If fertility declines faster, the proportion of children diminishes faster and the proportion of population in ages 15-64 reaches its peak sooner.

In the earlier part of the projection period the proportion of children under 15 years old shows a very high positive correlation with the total population as well as the cumulative annual total fertility rates. Taking the year 1990 for example, the coefficient of correlation between the proportion of children under 15 years old and the total population is 0.9983 and that between the proportion of children under 15 years old and the cumulative annual total fertility rate up to 1990 is 0.9889, calculated on the basis of 30 variants.

In all of the 30 variants, the crude birth rate of Thailand will decline year after year with changing rates of decline until becoming almost constant a few decades before 2100. The crude death rate will decline to some extent until around the end of this century and then will begin to rise to a level at which it will become relatively constant (see figure 12).

The period when the crude death rate reaches its minimum range is from 1990-1995 to 2000-2005. The upward movement of the death rate after the minimum is reached is due to the ageing trend of population.

The average crude birth rate for the last five-year interval of the short-term projection period, i.e., 1985-1990 will vary among the variants from 36.71 (variant number. 1, 80-High-Slow-40) to 23.64 (variant number. 30, 40-Low-Fast-20) per thousand. The average crude death rate for the same period will range from 7.25 to 6.59. Table 113 indicates that the higher the birth rate, the higher the death rate in 1985-1990. The coefficient of correlation between the crude birth and death rates in 1985-1990 is calculated at 0.9833 based on the 30 variants. This high positive correlation may be explained by the fact that the higher the crude birth rate, the higher the proportion of children under 15 years old and the higher the proportion of children the higher the crude death rate. In later periods the relationship between the crude birth and death rates is reversed, showing a high negative correlation. For instance, for the period 2015-2020, the coefficient of correlation between both will be -0.9426 based on the 30 variants. In this period the crude birth rate will already be low and the lower the birth rate, the higher the proportion of old people.

Table 111. Percentage distribution of population in age group 15-64, Thailand, 1970-2100, according to five selected variants

Year	No.1 80-H-S-40	No.15 40-M-S-40	No.17 40-M-S-30	No.19 40-M-S-20	No.30 40-L-F-20
1970	52.2	52.2	52.2	52.2	52.2
1980	53.9	54.3	54.3	54.3	54.9
1990	54.5	55.8	56.4	59.1	60.9
2000	57.4	59.5	62.6	65.6	67.8
2010	62.1	65.7	67.4	66.8	69.0
2020	64.0	68.1	68.0	68.7	70.6
2030	65.0	67.8	68.3	68.2	69.7
2040	66.1	68.0	67.5	66.2	66.9
2050	65.8	66.4	65.1	64.6	64.8
2060	65.2	64.4	64.3	65.0	65.4
2070	65.0	64.4	64.8	64.4	64.8
2080	64.8	64.7	64.4	64.4	64.6
2090	64.4	64.4	64.4	64.7	65.1
2100	64.2	64.5	64.6	64.4	64.7

Table 112. Percentage distribution of population 65 years old and over, Thailand, 1970-2100, according to five selected variants

Year	No.1 80-H-S-40	No.15 40-M-S-40	No.17 40-M-S-30	No.19 40-M-S-20	No.30 40-L-F-20
1970	3.0	3.0	3.0	3.0	3.0
1980	3.2	3.2	3.2	3.2	3.2
1990	3.3	3.4	3.4	3.6	3.7
2000	3.9	4.1	4.4	4.7	4.9
2010	4.3	4.7	5.0	5.3	5.8
2020	5.0	5.8	6.2	6.8	7.6
2030	6.4	7.8	8.5	9.3	10.7
2040	7.6	9.6	10.5	11.7	13.9
2050	9.3	12.0	13.3	14.2	17.0
2060	11.0	14.2	14.6	13.9	16.4
2070	11.7	14.5	14.0	14.3	16.9
2080	12.2	14.0	14.3	14.5	17.3
2090	12.8	14.4	14.5	14.1	16.7
2100	13.0	14.4	14.2	14.4	17.1

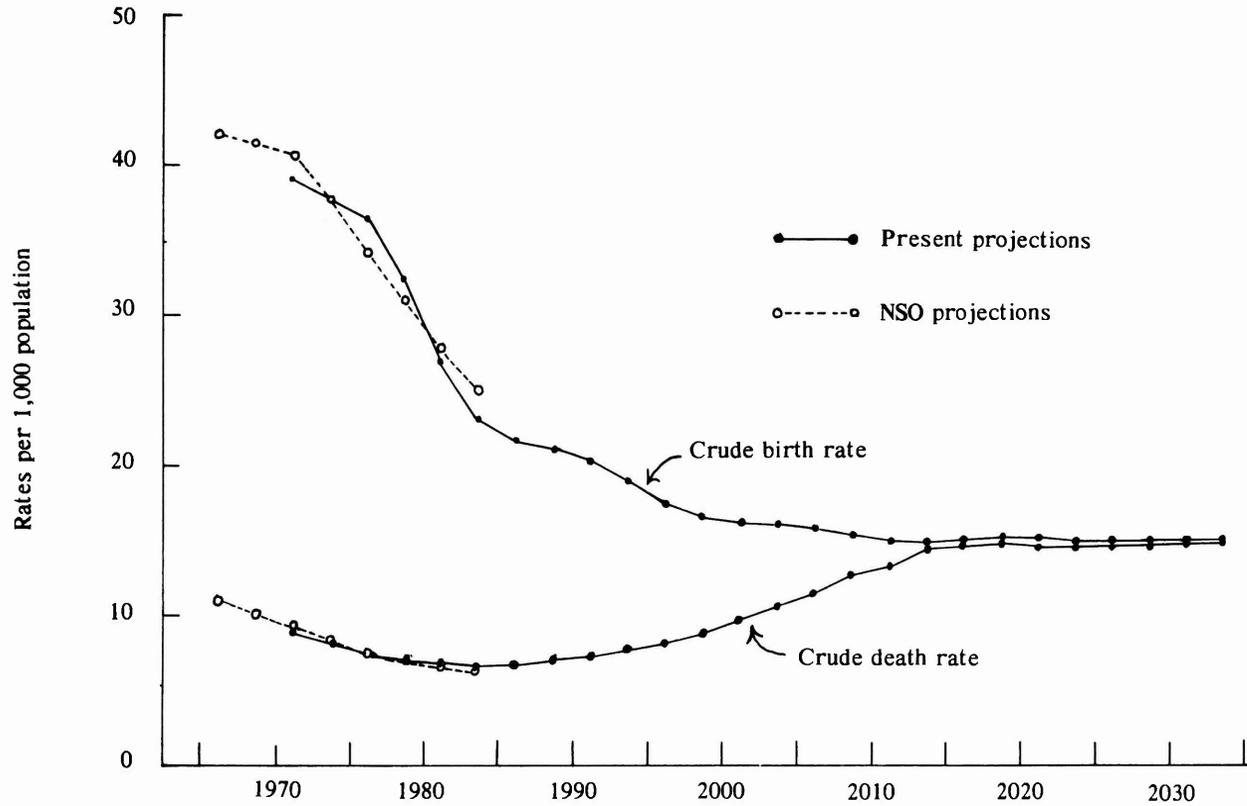


Figure 12. Projected crude birth, and death rates, Thailand, 1970-1975 to 2030-2035, according to variant number 17 (medium variant)

Table 113. Vital rates per 1,000 population, Thailand, 1985-1990 and 2095-2100, according to the 30 variants

Variant	1985-1990			2095-2100			
	CBR	CDR	NRI	CBR	CDR	NRI	
I. High variant group							
1	80-H-S-40	36.71	7.24	29.47	16.38	13.34	3.04
2	80-H-F-40	34.39	7.15	27.24	16.36	13.32	3.04
3	80-H-S-30	34.55	7.10	27.45	16.40	13.32	3.08
4	80-H-F-30	33.26	7.08	26.18	16.39	13.31	3.08
5	40-H-S-40	34.98	7.18	27.80	16.33	13.57	2.76
6	40-H-F-40	32.61	7.09	25.52	16.32	13.54	2.78
7	40-H-S-30	32.78	7.04	25.74	16.38	13.56	2.82
8	40-H-F-30	31.46	7.02	24.44	16.36	13.55	2.81
9	40-H-S-20	27.05	6.75	20.30	16.29	13.40	2.89
10	40-H-F-20	27.08	6.80	20.28	16.29	13.42	2.87
II. Medium variant group							
11	80-M-S-40	36.58	7.25	29.33	15.00	14.36	0.64
12	80-M-F-40	33.82	7.13	26.69	14.98	14.32	0.66
13	80-M-S-30	34.14	7.09	27.05	15.04	14.32	0.72
14	80-M-F-30	32.59	7.05	25.54	15.02	14.32	0.70
15	40-M-S-40	34.74	7.17	27.57	14.94	14.60	0.34
16	40-M-F-40	32.07	7.08	24.99	14.93	14.55	0.38
17	40-M-S-30	32.33	7.02	25.31	15.02	14.60	0.42
18	40-M-F-30	30.82	7.00	23.82	14.99	14.58	0.41
19	40-M-S-20	25.89	6.70	19.19	14.93	14.39	0.54
20	40-M-F-20	25.92	6.75	19.17	14.92	14.41	0.51
III. Low variant group							
21	80-L-S-40	35.92	7.21	28.71	12.41	16.65	-4.24
22	80-L-F-40	32.74	7.09	25.65	12.41	16.60	-4.19
23	80-L-S-30	30.56	6.87	23.69	12.45	16.61	-4.16
24	80-L-F-30	31.29	7.00	24.29	12.45	16.63	-4.18
25	40-L-S-40	34.24	7.16	27.08	12.35	16.93	-4.58
26	40-L-F-40	31.05	7.04	24.01	12.35	16.87	-4.52
27	40-L-S-30	31.43	6.98	24.45	12.45	16.97	-4.52
28	40-L-F-30	29.59	6.95	22.64	12.43	16.93	-4.50
29	40-L-S-20	23.66	6.59	17.07	12.38	16.64	-4.26
30	40-L-F-20	23.64	6.65	16.99	12.37	16.66	-4.29

Chapter VIII

POPULATION GROWTH AND EDUCATIONAL DEVELOPMENT

A. EDUCATIONAL SYSTEM

1. Historical background

For many centuries before the establishment of a modern school system, Thailand had a well developed indigeneous system of education centred on the temples, the villages and the palace. "Traditionally the bulk of formal education was provided chiefly by the Buddhist monk in the *wat* schools. During the customary period of temple service, most young men received some learning by memorizing or copying scripture. Other children, with the exception of the sons of wealthy persons, had little or no formal training".^{1/} The monks would teach the boys how to read and write and do simple arithmetic as well as providing a background of the basic precepts and teachings of Buddhism. The girls, from quite an early age, were often taught to read and write at home and later were also instructed in the practical tasks of housekeeping, child-care and cooking to enable them to become competent housewives.

Traditional skills of agriculture, weaving, house building and handicrafts were passed on from one generation to the next either through on-the-job training or through informal apprenticeship schemes. The children, for example, would inevitably learn traditional methods of farming through their involvement with their parents in all stages of the farming process. In addition a child might be apprenticed to a craftsman in his village to learn a particular trade or even sent to a neighbouring village specializing in a certain craft to pick up the necessary skills.

Due to a lack of printed reading materials, much of the historical and cultural heritage of the country was passed on through an oral tradition of story telling. Stories about the lives of the great kings and about past achievements of Thai people were passed on from village to village and from generation to generation through epics and traditional forms of drama.

However, the children of aristocrats and high level administrators were given a slightly more formal, more bookish type of education in the palace,

so that when they grew up they would be able to fulfil their preordained roles of governing the country.

Though there were increasing contacts with the West throughout the seventeenth and eighteenth centuries, it was in 1855 that the country was opened to foreign trade. It soon became clear that if Thailand were to hold its own effectively against foreigners, it would be necessary for it to adopt a formal Western type of education which would help speed up the process of modernization and social change. The foundation of the first institution giving modern education in 1870 marked the end of the traditional system and the beginning of the rapid changes in Thai society which continue to this day.

The central Government assumed primary responsibility for schooling with the establishment in 1887 of the Department of Education (which became a Ministry in 1892). Towards the beginning of the present century, the Government started building up a system of State schools and also exercised some control over existing *wat* or temple schools. Though lack of funds hindered the development of State schools over the years, 4,000 such schools were set up by 1921. Meanwhile there was a gradual extension of Government supervision of schools through the appointment of education officers, first at the district and later at the *Changwat* levels. Facilities for higher education were also expanded with the establishment in 1917 of the Chulalongkorn University.

The primary education of all children between the ages of 7 and 14 was made compulsory by royal decree in 1921, "but it was not until the mid-1930s that serious attempts were made to implement the requirement. Another major step to encourage a minimum level of popular education was included in the Constitution of 1932. Provision was made that the parliament would be fully elected, instead of appointed, when half the population had completed four years of elementary education or within ten years, whichever was sooner. Despite some progress, after ten years the national leaders made the determination against popular elections. In 1957 fourteen of the seventy-one provinces had reached the level where 50 per cent of their populations had had four years of education. Provisions of the 1952 amended Constitution, calling for popular elections after five years in provinces where educational requirements had been met, were not fully implemented by the time Sarit

^{1/} John W. Henderson and others, *Area Handbook for Thailand* (Washington, D.C., U.S. Government Printing Press Office, 1971), p. 108.

Thanarat placed the nation under martial law in 1958. Nevertheless, Sarit increased the allocation for education and promoted programs to improve schools, particularly at the elementary level. By the mid-1960s over 50 per cent of persons above fifteen years of age had had four or more years of schooling, and by 1970 the literacy rate among persons over ten years of age was about 70 per cent. A national scheme of education developed in 1960 set the basic pattern and objectives for the Six-Year Plan in Educational Development, 1967-1971. In general, the scheme gave greater recognition to child development and the principle of equality of opportunity, setting as its fundamental goal the full implementation of seven years of compulsory education within ten years. The Regional Education Development Plan Including Higher Education (REDPHE), a comprehensive program for all educational operations adopted in 1958, was continued under the plans that implemented the 1960 scheme.”^{2/}

In recent decades, the Government gave new impetus to education by increasing the budgetary allocation for education. Nearly a fifth of the total Government budget is today spent on education, mainly on primary education. One of the chief objectives of the Third National Economic and Social Development Plan (1972-1976) of the Thai Government is “to expand and improve compulsory education at both lower and upper *Prathom* levels to meet the needs of the increasing population in these school age groups. Also to emphasize the expansion of education at the secondary and higher levels to meet the demand for manpower at the middle and high levels”.^{3/}

2. Present system

The system of education consists of a basic 4-3-3-2 structure with the first seven years comprising the lower and upper elementary levels and the last five the lower and upper secondary levels. In vocational education, however, the upper secondary programme lasts three years. In general, higher education includes a two-year and a four-year undergraduate programme, while those at the graduate level are predominantly one-year and two-year courses leading respectively to the specialized and master degrees.

Pre-primary education, more commonly known

^{2/} *Ibid.*, p. 109.

^{3/} Government of Thailand, *The Third National Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board, 1974), p. 247.

as kindergarten, is mainly provided by private individuals and organizations rather than by the Government. The legal age at which children in Thailand start primary school is 7, though in fact many start at 6 or at ages above 7. Theoretically, seven years primary education is compulsory for all children in Thailand. In actual fact, however, enforcement of this standard is quite impracticable because there are not nearly enough schools and teachers to go round. Over the years, an impressive number of schools have been set up particularly in the hitherto neglected Northern and Northeastern Regions and the Southern half of the peninsula. The prescribed curriculum for the lower primary grades (1 to 4) gives emphasis to arithmetic and to reading and writing the Thai language. In the upper primary grades (5 to 7) a combination of academic subjects and basic vocational knowledge and skills are emphasized.

Secondary education, which begins in the eighth year or at grade M.S. 1, divides into two different streams from the start: the academic stream and the vocational stream. Further streaming of the academic secondary education takes place after grade 10, into upper secondary teacher training, physical education and the Royal Military Academy. The general academic stream and the vocational stream have a common core of liberal arts and basic science subjects but the academic branch stresses theoretical instruction and provides the foundation for further studies in higher educational institutions. Facilities for secondary schools are limited but competition for admission is intensifying as more children complete primary education and wish to continue their education. In response to these pressures, the Government has been making a determined effort to expand facilities for secondary education. However financial consideration and lack of facilities have prevented a great many students from pursuing secondary education.

In recent years the Government has placed much emphasis on the development and expansion of vocational education in the country to ensure an adequate supply of qualified manpower to meet the development requirements of the country. It is estimated that over 15,000 students attend Government technical colleges with two-year, three-year and three and a half year courses. The Government also organizes short training courses of four to six months in dress-making and hair-dressing, while agricultural extension schools provide instruction in basic agriculture in self-help settlements. The immediate and major problem that hinders effective expansion of vocational training is shortage of

teachers in number as well as qualifications in the fields of industrial technology and vocational agriculture.

In addition to Government schools, there are also a large number of private schools which play an important role particularly in pre-primary and secondary education. For instance, in 1971, there were some 479,100 students in lower secondary education, of whom 221,000 or 46 per cent were attending private schools. In regard to upper secondary education, of the total of 65,000 students, nearly 25,700 or 40 per cent were in private schools. Some of these schools are subsidized by governmental funds because they substantially assist the Government in expanding educational services. The subsidies usually take the form of supplements to teachers' salaries and funds for the maintenance and expansion of physical facilities.

In order to meet the acute shortage of trained teachers, the Government has embarked on a vigorous programme of expanding facilities for teacher training throughout the country. The training for primary school teachers consists of seven years of primary and three years of lower secondary schooling to be followed by a two-year course in a teacher training institution or completion of the two-year upper secondary level. In addition there is a higher certificate course of two years duration, following the completion of the upper level of secondary education. Holders of the higher certificate teach grades 5 to 7 in the primary schools, but the majority is usually assigned to teach the lower secondary classes.

Higher education is provided in the universities and other institutions of higher learning. Most of the universities and institutes of higher studies are situated in Bangkok, but in recent years additional institutes of higher learning were set up in Chiang Mai (Northern Region), in Khon Kaen (Northeast) and in Songkla and Pattani (Southern). The universities mostly offer graduate programmes in arts, education, commerce and accounting, economics, political science, engineering and medicine. In recent years the Government has pursued an active policy of expanding and improving facilities for higher education. Priority is being given to subjects deemed most necessary, such as sciences, medicine, engineering, agriculture and education. There are also programmes for development of post-graduate studies in the fields of sciences, mathematics, economics and English to train more qualified instructors for various universities in the country.

B. SCHOOL ATTENDANCE

1. National trends

During the 1960s, Thailand experienced a tremendous increase in enrolments at all levels of education due, on the one hand, to the rapid population growth and, on the other, to an expansion in facilities made possible by increases in public resources. As is evident from table 114, the total enrolments in primary education increased from 4,093,000 in 1961 to 5,697,000 in 1971, the average annual growth rate being 3.9 per cent. The situation however varied greatly between lower and upper primary levels. In lower primary (i.e. the first four grades) the growth rate was only 2.7 per cent, slightly lower than the growth rate of the school-age population. This may be explained by the reduction both in the number of late entries and in the number of repeaters, principally in the first grade. In upper primary (i.e. grade 5 to grade 7), the growth of enrolments was much more rapid (16.1 per cent *per annum*), since the transition rate between lower and upper primary education increased significantly from 22.6 per cent in 1961 to 42.4 per cent in 1971. There have, however, been large regional discrepancies.

It will also be observed from table 114 that enrolment in lower academic secondary education grew at a relatively low rate during the first part of the 1960s but accelerated during the second half of the decade, reaching a rate of more than 10 per cent. Over the entire period, the rate of growth averaged 11.1 per cent. In upper academic secondary education, the increase in enrolments was more moderate and the development of vocational education at upper secondary level was much faster than that of general education. Whereas in 1961, the proportion of vocational enrolments at upper secondary level was only 32.8 per cent, in 1971 it has increased to 57.8 per cent.^{4/}

As noted in the preceding section, there are two basic levels of teacher training: a two-year certificate course after lower secondary school and a two-year diploma course after upper secondary school. It will be seen from table 114 that enrolments in certificate courses are about three times those of diploma courses. Over the past decade, enrolments in teacher training institutions grew at a very high rate of 21.8 per cent *per annum*.

^{4/} It should, however be noted that the duration of upper secondary vocational course is three years while that of the general academic course at this level is only two years.

Table 114. Growth of enrolments in the different levels of education 1961-1971

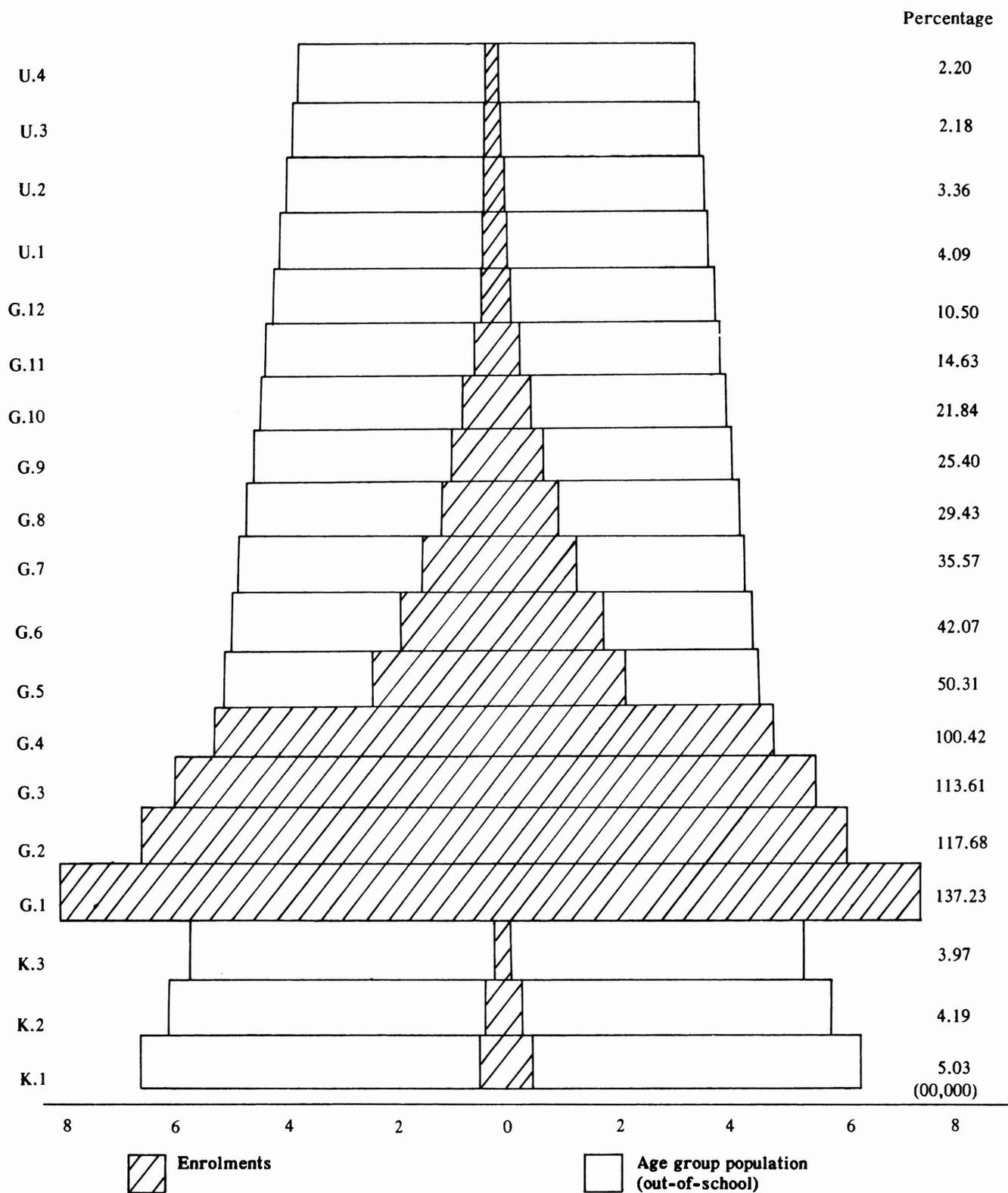
	1961	1965	1968	1970	1971	Percentage annual increase 1961-71
Primary education						
Lower primary	3,716,969	4,271,783	4,472,165	4,692,836	4,716,899	2.7
Upper primary	375,913	382,218	652,060	911,363	980,064	16.1
Sub-total	4,092,882	4,654,001	5,124,225	5,604,199	5,696,963	3.9
Secondary general						
Lower	236,080	270,985	345,615	445,815	506,872	11.5
Upper	34,512	48,116	50,401	59,713	64,903	8.8
Sub-total	270,592	319,101	396,016	505,528	571,775	11.1
Secondary vocational						
Lower	666	4,763	4,471	3,831	4,721	60.9
Upper	16,880	33,751	44,588	54,386	88,864	42.6
Sub-total	17,546	38,514	49,059	58,217	93,585	43.3
Teacher training						
Certificate Courses	10,906	13,993	18,301	26,211	32,054	19.4
Diploma courses	3,030	3,247	5,123	7,937	9,539	21.5
Primary school Teaching certificate	-	-	1,303	2,789	2,777	-
Sub-total	13,936	17,240	24,727	36,937	44,370	21.8
Higher education						
		38,659	39,899	41,154		
Overseas training						
University		3,293	4,414			
Others		9,083	8,833			

Source: Educational Planning Division, Office of Under-Secretary of State for Education, Ministry of Education, Bangkok.

Enrolments in higher education, however, recorded only a very moderate expansion. Since higher education facilities are limited in the country, and great prestige is attached to foreign training, an increasing number of students have gone to foreign countries to pursue their higher education.^{5/}

^{5/} For instance, in 1966 there were approximately 4,000 Thai students abroad, about 1,700 of whom were in the United States of America, while the majority of the rest studied in Canada, United Kingdom of Great Britain and Northern Ireland, France, the Federal Republic of Germany, Japan, Pakistan and Philippines.

Despite rapid growth in enrolments, it may be said that the structure of the Thai educational system has not changed much, as can be seen from the shape of the school pyramids in 1961 and 1973. The educational pyramid for 1973 given in figure 13 demonstrates a basic disparity in the structure of education. Although nearly all children are admitted to primary schools, the transition rate from lower to upper primary school is only about 40 per cent on average. In spite of the Government's efforts in working towards a less distorted structure, upper primary and secondary education continue to benefit



Source: Sams as table 114.

Figure 13. Educational pyramid showing percentage of enrolments to age group population 1973

primarily the children of urban families with high average incomes.

The trends of enrolment ratios in different levels of education by relating enrolment to school-age population are shown in table 115. These trends have to be interpreted with caution for two important reasons. In the first place, while a large number of pupils start schooling late, there are many children who enter the primary school system very early. Secondly, repetition of grades also results in a large number of over-age and under-age pupils. For instance, the data in the table only show the ratio of the number of primary school pupils to the numbers in the age groups from which the majority of primary school pupils are drawn. They do not show, the proportion of children aged 7 to 10 years who are in school. However, the trends shown by

or at the rate of 3.6 per cent *per annum*, a rate slightly higher than the rate of growth of the school-age population.

It is, however, not easy to measure the proportion of children who are admitted to school. Although the official age of entry into elementary school is 7 years, as noted earlier, the age range of children admitted for the first time to school is very wide. Some are admitted at the age of 5 but there are also many who are admitted after the age of 7 years. The distribution of new admissions by age for the years 1965 to 1968 is shown in table 116. It will be observed that although there is a slight tendency towards a reduction in the number of late entries, the age distribution of new admissions has not changed fundamentally in recent years. The modal age of admission is 7 and the great majority of children

Table 115. Percentage of students to age group population, 1969-1974

Level	Age	Percentage to age group population					
		1969	1970	1971	1972	1973	1974
Total	4-24	32.8	34.8	34.1	35.9	38.5	38.5
Pre-school	4-6	3.6	3.7	4.0	4.3	4.4	4.6
Low primary (Grades 1-4)	7-10	116.1	118.0	118.1	117.9	117.7	114.3
Upper primary (grades 5-7)	11-13	29.3	34.8	36.1	39.1	43.0	45.0
Lower secondary (grades 8-10)	14-16	16.6	18.5	20.4	23.2	25.7	28.1
Upper secondary (grades 11-12)	17-18	7.3	7.5	8.1	9.3	9.8	10.5
University ^{a/}	19-24	1.5	1.8	1.9	2.1	2.2	2.4

Source: Educational Planning Division, *Education Statistics, 1974*, (Bangkok, Ministry of Education,) (mimeo).

Note: a/ Graduate level included.

the data can be interpreted to mean that the proportion of children in school among those eligible for primary school education has risen slightly during the last few years.

Between 1960 and 1972, the growth rate of enrolments in grade 1 averaged 1.3 per cent *per annum*. This, however, does not give a true picture of the growth of new admissions since the repetition rate in grade 1 is very high.^{6/} In reality, new admissions increased from 804,600 in 1961 to 1,163,000 in 1971

(approximately 90 per cent) are admitted to school at ages 6, 7 or 8.

For the first time, the attendance at school by sex and age was recorded in the 1970 population and housing census. An analysis of these data given in table 117 and figure 14 shows that the school attendance rate is higher for males than for females for all age groups. However, the difference is greater for the children aged between 12 and 17 years. This means proportionately more girls than boys quit school after four years of primary education. For both sexes, the rate rises sharply from age 6 to reach a peak of 92 at age 9. After 10 years of age, the rate decreases sharply, which means that most

^{6/} The repetition rate in grade 1 was as high as 38.8 per cent in 1960-1961 but has now declined to around 22 per cent.

Table 116. Distribution by age of new admissions in primary education, 1965-1968

Age	Boys				Girls			
	1965	1966	1967	1968	1965	1966	1967	1968
5	26,322	24,638	29,309	30,820	24,263	22,177	26,792	27,084
6	148,052	160,199	164,683	175,627	136,698	154,535	158,406	162,397
7	255,334	257,131	271,498	273,066	242,026	244,050	256,668	257,347
8	77,639	75,761	77,414	80,947	70,980	67,603	69,853	72,443
9	17,959	16,526	16,027	16,895	14,854	13,579	13,091	13,829
10	6,005	4,990	4,787	5,433	4,734	3,880	3,767	4,199
11	2,808	2,032	1,891	2,117	1,933	1,562	1,303	1,564
12+	1,761	1,466	1,266	1,390	1,188	924	783	909
Total	535,880	542,743	566,875	586,295	496,676	508,310	530,663	539,772

Source: Same as table 114.

Table 117. 1970 school attendance rates of the population aged 6-11, 12-17 and 18-29 by sex (percentages)

Age group	Male	Female	Both sexes
6-11	69.8	67.2	68.5
12-17	29.3	20.9	25.1
18-29	4.0	2.7	3.3
Total	34.6	30.0	32.3

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 13.

of the children stop attending school after four years of schooling. Few children attend the upper primary level and even fewer attend the secondary school. After 18 years of age, the proportion of persons attending school is smaller than 10 per cent.

The actual proportion of children admitted to school could be obtained by following a cohort over the years and observing what proportion of that cohort is admitted to school at each successive year. In other words one has to add diagonally the specific age admission rates. These rates, which are obtained by relating new admissions at various ages to the population of relevant age, are shown for the years 1964 to 1968 in table 118. The rates relating to the cohort born in 1959 are underlined. An addition of these rates show that nearly all the boys are admitted to school either earlier or later than the official entry age, while for the girls the proportion is slightly lower but is around 95 per cent.

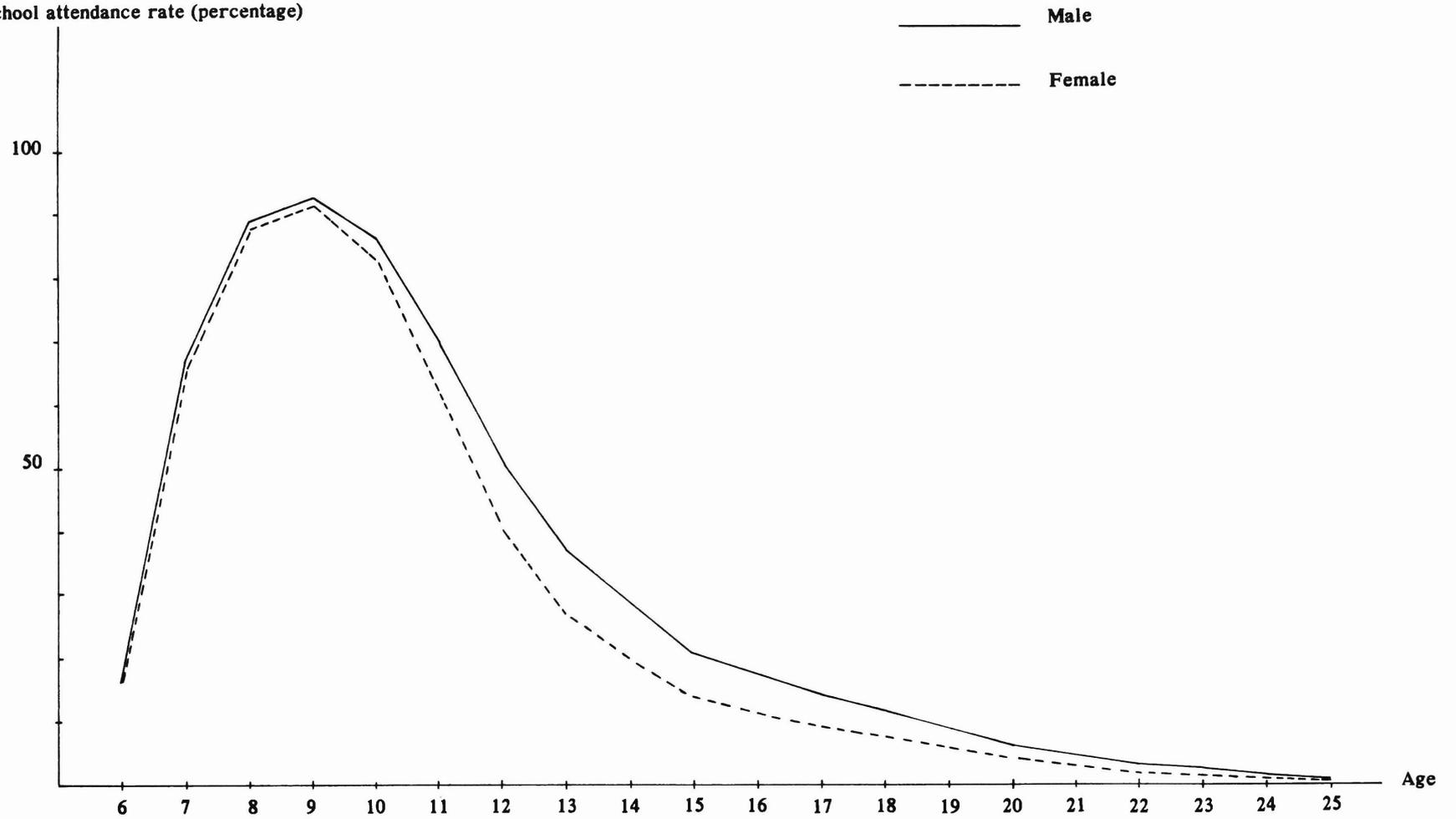
It has, however, to be noted that data on age distributions are not entirely reliable; the same is true in regard to data on ages of school children. Nevertheless, it may be stated that nearly total admission has been achieved in Thailand. Hence the growth of

Table 118. Age-specific admission rate, 1964-1968

Age	Boys					Girls				
	1964	1965	1966	1967	1968	1964	1965	1966	1967	1968
5	<u>5.3</u>	5.5	4.2	4.9	4.9	<u>4.6</u>	4.5	3.9	4.6	4.5
6	26.7	<u>27.7</u>	28.9	28.8	29.7	<u>26.9</u>	<u>26.7</u>	29.1	28.8	28.5
7	47.4	<u>49.3</u>	<u>48.0</u>	49.1	47.9	46.9	<u>48.6</u>	<u>47.4</u>	48.2	46.7
8	14.5	15.4	14.6	<u>14.5</u>	14.7	13.4	14.6	13.5	<u>13.5</u>	13.6
9	3.5	3.7	3.2	3.1	<u>3.2</u>	3.0	3.2	2.8	<u>2.6</u>	<u>2.6</u>
10	1.2	1.2	1.0	1.0	1.1	1.0	1.0	0.8	0.8	0.9
11	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3
12+	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2

Source: Same as table 114.

School attendance rate (percentage)



Source: Government of Thailand, 1970 Population and Housing Census.

Figure 14. Age-specific school attendance rates, 1970

new admissions in the future will depend only on population growth.

A comparison of the school attendance rates of the population aged 6 to 24 years in three selected ESCAP countries (see table 119) shows that in regard to over-all attendance rate, Thailand ranks next to the Republic of Korea. The age-specific school attendance rates given in figure 15 show that Thailand has a comparatively high enrolment at ages 7 to 10 which roughly corresponds to the first four school grades. However, at ages 11 and thereafter, Thailand has the lowest rates of enrolment among the countries included in the comparison.

Table 119. Comparison of the school attendance rates of the population aged 6 to 24 years in selected ESCAP countries

	Thailand (1970)	Indonesia (1971)	Republic of Korea (1970)
Both sexes	37.1	35.1	57.9
Males	39.6	39.0	61.4
Females	34.6	31.3	55.8

Sources: Indonesia, *1971 Population Census*, preliminary figures; Republic of Korea, *1970 Population and Housing Census Report*; Thailand, *1970 Population and Housing Census*.

2. Regional differences

Table 120 gives the attendance rates of the population aged 6-11 years and 12-24 years by region in 1970. It will be observed that while the school attendance rates of the population aged 6-11 years and 12-24 years for the country as a whole were 68.5 per cent and 16.1 per cent respectively, the corresponding rates for the Central Region were higher than the national averages. The lowest rates for both age groups are to be found in Northeast Region. The second highest attendance rates obtained in the Southern Region where the school attendance rate in respect of the 12-24 age group is higher than the corresponding national rate. With a view to narrowing these regional disparities, the policy of the Government is aimed at promoting "equality in education by improving and expanding education in regional areas. Also to provide education facilities meeting the special needs of each locality, in particular in those areas that present special conditions".^{2/}

^{2/} Government of Thailand, *The Third National Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board, 1971), p. 247.

Table 120. School attendance rates of the population aged 6-11 and 12-24 for regions, both sexes, 1970

Region	School attendance rates	
	6-11	12-14
Whole Kingdom	68.5	16.1
Central	73.9	24.1
Northeast	66.0	8.6
Northern	65.9	13.9
Southern	67.5	20.9

Source: Government of Thailand, *1970 Population and Housing Census*, Region Series (Bangkok, National Statistical Office, 1973).

C. EDUCATIONAL ATTAINMENT

1. National trends and differentials

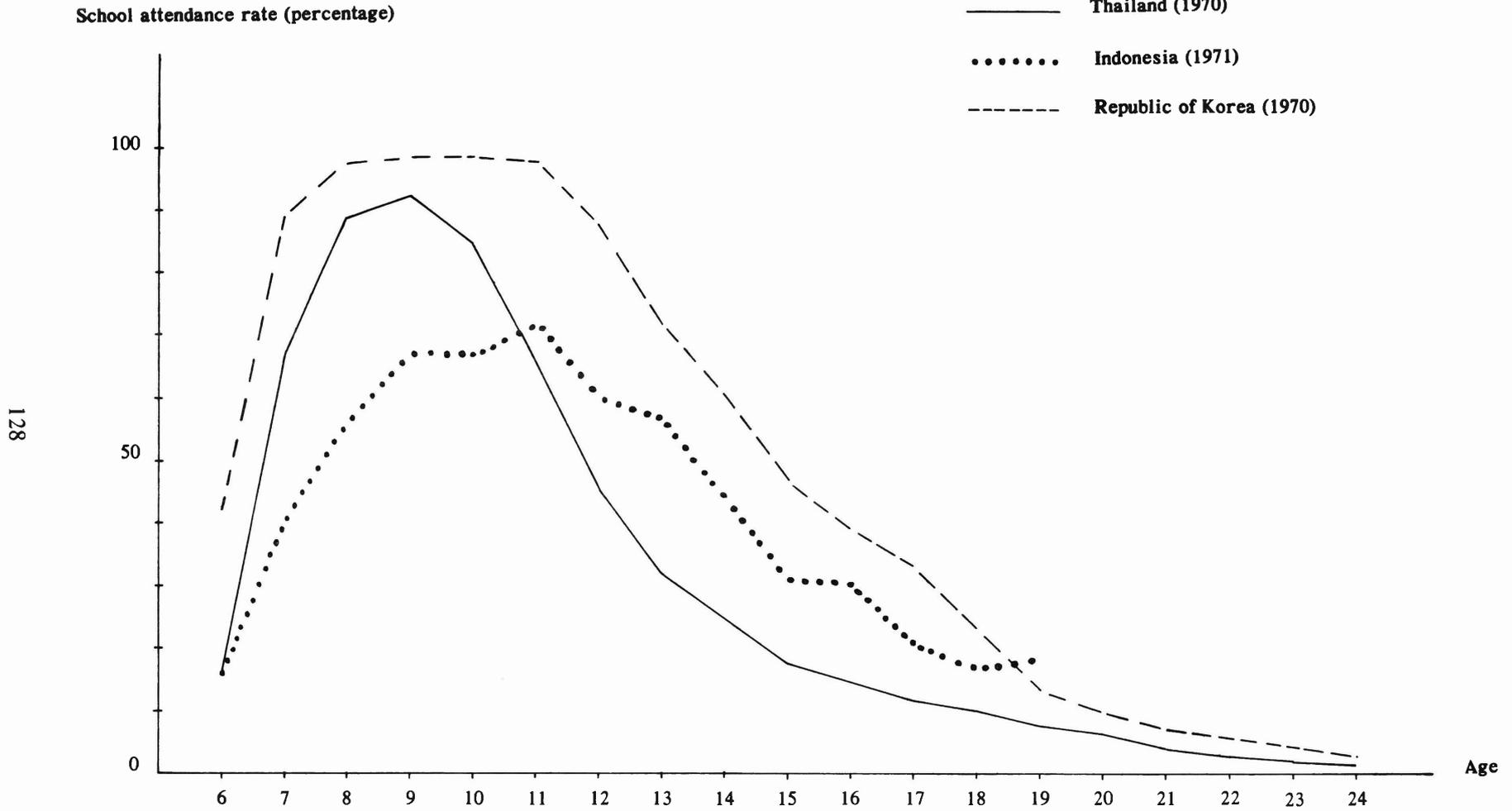
It will be seen from table 121 that in terms of absolute numbers as well as proportions, there has been an increase in the educational attainment of the population between 1960 and 1970. The proportion of the population aged 6 years and over who have some level of education or other, increased from 62.3 in 1960 to 74.1 in 1970, and correspondingly there has been a decline in the proportion of those with no education from 37.7 per cent to 25.9 per cent during this period. The increasing trends have been true for all levels of attainment and for both sexes. Though those completing higher education more than doubled in terms of absolute numbers, the proportionate increase was very small.

2. Urban-rural differentials

The urban-rural differentials in regard to educational attainments are indicated in table 122. It will be observed that both among males and females, those with no education were larger in the rural than in urban areas. In regard to those completing primary level, the proportions were higher in rural (74.4 for males and 74.0 for females) than in urban areas where the proportions were 67.1 for males and 72.6 for females. The proportions that have educational attainments at the secondary and higher levels were considerably higher in urban than in rural areas.

3. Regional differentials

For the Kingdom as a whole, in 1970, 79.0 per cent males and 69.3 per cent females aged 6 years and over had attained some level of education. However, these proportions varied from region to region as is evident from table 123. The averages for



Source: Same as table 119.

Figure 15. Age-specific school attendance rates

Table 121. Population aged 6 and over by educational attainment and sex, 1960 and 1970

Educational attainment	Population aged 6 and over (1000)		Percentage	
	1960	1970	1960	1970
Both sexes ^{a/}	21,148	27,596	100.0	100.0
No education	7,974	7,145	37.7	25.9
Completed school	13,174	20,450	62.3	74.1
Lower primary	11,549	17,185	54.6	62.3
Upper primary	685	1,190	3.2	4.3
Secondary	635	1,337	3.0	4.8
Higher	95	186	0.4	0.7
Other education and unknown	210	552	1.0	2.0
Males ^{a/}	10,579	13,683	100.0	100.0
No education	3,290	2,880	31.1	21.0
Completed school	7,289	10,803	68.9	79.0
Lower primary	6,158	8,790	58.2	64.2
Upper primary	457	716	4.3	5.2
Secondary	446	847	4.2	6.2
Higher	63	117	0.6	0.9
Other education and unknown	165	333	1.6	2.4
Females ^{a/}	10,569	13,913	100.0	100.0
No education	4,684	4,265	44.3	30.7
Completed school	5,885	9,647	55.7	69.3
Lower primary	5,391	8,395	51.0	60.3
Upper primary	228	474	2.2	3.4
Secondary	189	490	1.8	3.5
Higher	32	69	0.3	0.5
Other education and unknown	45	219	0.4	1.6

Sources: Government of Thailand, *1960 Thailand Population Census, Whole Kingdom* (Bangkok, 1962), table 11; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 15.

Note: ^{a/} Age unknown included.

the Northern and Southern Regions are lower, and those for the Central and the Northeast Regions higher than the national average. Both for males and females, the proportion with primary level of education, is highest in the Northeast Region and lowest in the Southern Region. In regard to proportions that have attained secondary and higher levels, the Central Region ranks first while the Southern Region ranks second. The Northeast had the lowest proportions of those who have attained secondary and higher levels of education, the proportion of educational attainment is higher among males than females.

D. TEACHER AND SCHOOL AVAILABILITY

1. National trends and differentials

The number of educational institutions, teachers and students in 1974 is shown in table 124. The total number of educational institutions in the country in 1974 was 34,246 as compared to 27,637 in 1964. In other words, during the 10-year period, 1964-1974, there has been a 24 per cent increase in the number of educational institutions. It is expected that with the increase in population of school-going age and the

Table 122. Educational attainment ratios of the population aged 9 to 29, by sex for urban-rural, 1970

Educational attainment	Whole Kingdom	Municipal areas	Non-municipal areas
		Male	
No education	17.7	11.6	18.6
Primary level	73.5	67.1	74.4
Secondary level	6.9	26.3	4.1
University level	0.5	2.7	0.2
		Female	
No education	19.9	14.1	20.8
Primary level	73.9	72.6	74.0
Secondary level	4.7	21.4	2.3
University level	0.5	2.7	0.1

Source: Computed from the print-out tables of the *1970 Population and Housing Census*, available at the National Statistical Office, Bangkok.

Table 123. Educational attainment ratios of the population aged 6 and over, by sex for regions, 1970

Region and educational attainment	Population		Number educated		Rates	
	Male	Female	Male	Female	Male	Female
Whole Kingdom	13,683,266	13,912,697				
Total			10,803,238	9,647,384	79.0	69.3
Primary level			9,506,313	8,869,457	69.5	63.8
Secondary level			846,631	490,023	6.2	3.5
University level			116,890	68,717	0.9	0.5
Central	4,300,975	4,422,329				
Total ^{a/}			3,542,734	3,202,105	82.4	72.4
Primary level			2,850,947	2,751,753	66.3	62.2
Secondary level			472,094	320,138	11.0	7.2
University level			77,660	51,356	1.8	1.2
Northeast	4,619,538	4,733,539				
Total ^{a/}			3,809,954	3,538,782	82.5	74.8
Primary level			3,547,183	3,401,150	76.8	71.9
Secondary level			156,813	72,088	3.4	1.5
University level			17,929	6,227	0.4	0.1
Northern	3,049,938	3,049,420				
Total ^{a/}			2,223,646	1,863,866	72.9	61.1
Primary level			2,028,129	1,756,614	66.5	57.6
Secondary level			119,782	63,042	3.9	2.1
University level			12,412	6,642	0.4	0.2
Southern	1,712,815	1,707,409				
Total ^{a/}			1,226,904	1,042,631	71.6	61.1
Primary level			1,080,054	959,940	63.1	56.2
Secondary level			97,942	52,755	5.7	3.1
University level			8,889	4,492	0.5	0.3

Source: Government of Thailand, *1970 Population and Housing Census, Region Series* (Bangkok, National Statistical Office, 1973), pp. 45-49.

Note: ^{a/} Includes educational attainment level unknown.

policy of the Government to expand educational facilities at all levels and regions, there will be an acceleration in the rate of increase of the number of educational institutions in coming years.

Table 125 gives the number of classrooms and the student/classroom ratio for all years from 1970-1973. It will be observed that the over-all ratio of students to classrooms has more or less remained constant but this ratio has increased in the case of kindergarten and secondary levels.

Table 126 shows the numerical and percentage

distribution of teachers by primary and secondary levels. It will be observed that the total number of teachers increased from 199,185 in 1970 to 250,388 in 1973 or by 25.7 per cent during the four years. The largest proportionate increase, 53.1 per cent, has been in respect of kindergarten teachers while the number of teachers in Government secondary schools increased by 50 per cent. The number of teachers in municipal primary schools increased by 38 per cent, reflecting perhaps an increase in enrolments due to migration. It will also be observed that more than 70 per cent of the teachers are in primary schools either under the Ministry of Education, or conducted by

Table 124. Number of institutions, teachers and students by regions and jurisdictions, 1974

	Institutions		Teachers		Students	
	Central	Regional	Central	Regional	Central	Regional
1. General Education Department	252	2,503	9,584	35,129	202,710	762,766
2. Vocational Education Department	24	139	2,236	4,345	34,450	60,115
3. Teacher Training Department	6	23	1,016	3,021	12,134	48,206
4. Fine Arts Department	2	1	212	38	1,890	374
5. Physical Education Department	-	4	-	82	-	1,307
6. Private Education Commission	989	1,635	23,365	30,603	499,566	711,857
7. Municipal	-	371	-	5,910	-	204,919
8. Provincial Authorities	-	27,767	-	163,348	-	5,128,845
9. Bangkok Metropolis	382	-	7,045	-	217,298	-
10. Border Police	-	116	-	364	-	10,579
11. Bureau of State Universities	23	9	8,750	2,511	118,136	14,260
Ministry of Education (1-6)	1,273	4,305	36,413	73,218	750,750	1,584,625
Non-Ministry of Education (7-11)	405	28,263	15,795	172,133	335,434	5,358,603
TOTAL	1,678	32,568	52,208	245,351	1,086,184	6,943,228
		34,246		297,559		8,029,412

Source: Same as table 115.

Table 125. Number of classrooms and student/classroom ratio by type of institution, 1970-1973

Type	Number of classrooms				Student/classroom ratio			
	1970	1971	1972	1973	1970	1971	1972	1973
Total	205,509	217,755	230,219	242,576	31	30	30	30
Kindergarten	1,036	1,206	1,325	1,484	30	30	32	34
Primary (Ministry of Education)	5,920	5,982	6,642	6,686	38	34	33	34
Primary (Provincial Authorities)	149,256	158,356	167,707	174,525	29	29	29	29
Municipal	7,745	7,997	8,485	11,311	36	36	36	36
Secondary (Government)	7,069	8,310	9,564	11,326	37	38	39	40
General Education (Private)	34,483	35,904	36,496	37,244	33	32	32	32

Source: Educational Planning Division, *1973 Final Report on Education Statistics* (Bangkok, Ministry of Education, 1974), p. 24.

Table 126. Number and percentage distribution of teachers by type of institution, 1970-1973

Type of Institution	Number				Percentage				Percentage change
	1970	1971	1972	1973	1970	1971	1972	1973	1970-1973
Total	199,185	211,515	229,946	250,388	100.0	100.0	100.0	100.0	25.7
Kindergarten	1,124	1,298	1,543	1,721	0.6	0.6	0.7	0.7	53.1
Primary (Ministry of Education)	8,401	8,501	8,915	8,988	4.2	4.0	3.9	3.6	7.0
Primary (Provincial)	122,899	131,872	144,624	158,235	61.7	62.3	62.9	63.2	28.8
Primary (Municipal)	8,857	9,129	9,348	12,233	4.4	4.3	4.1	4.9	38.1
Secondary (Public)	12,249	13,564	15,842	18,374	6.1	6.4	6.9	7.3	50.0
General Education (Private)	45,655	47,151	49,674	50,837	22.9	22.3	21.6	20.3	11.4

Source: Same as table 114.

changwat authorities and municipalities under the Ministry of Interior.

The student/teacher ratio by levels of education is given in table 127. The acute shortage of teachers is reflected in the higher student/teacher ratios, particularly in the primary schools administered by *changwat* and municipal authorities. Despite the increased number of teachers in recent years, shortages are still acute in remote areas where it is very difficult to recruit teaching staff because of low salaries, hard living conditions and security problems. This shortage has been further compounded by assignment of teachers to administrative posts at local and district educational centres. In fact, the basic problem which hampers the expansion and improvement of quality of education at all levels is the shortage of qualified teachers.

E. LITERACY

1. National trends and differentials

In the 1960 and 1970 censuses, literate persons were defined as persons 10 years of age and over who were able to read and write simple statements in any language. If a person could read but could not write, then that person was not considered literate.

According to the 1960 census, of a total of 18,026,404 persons aged 10 years and over, as many as 12,756,350 or 70.8 per cent were literate and the balance, 29.2 per cent, were illiterate. According to the 1970 census, the proportion literate had increased to 81.8 per cent and correspondingly there has been a decline in the proportion illiterate to 18.2 per cent. There were significant differences in the proportions among males and females. In 1960 while 80.6 per cent of males aged 10 years and over were literate, the proportion for female was only 61.0 per cent—a difference of 20 percentage points. In 1970, this difference

had narrowed to about 14 percentage points as is evident from table 128.

Table 127. Student/teacher ratio by type of institution 1970-1973

Type of Institution	Student/teacher ratio			
	1970	1971	1972	1973
Total	31.4	31.4	30.3	29.2
Kindergarten	27.8	28.4	27.8	29.0
Primary (Ministry of Education)	23.8	23.9	24.9	25.1
Primary (Provincial)	35.6	35.2	33.5	31.5
Primary (Municipal)	31.5	31.8	32.8	32.9
Secondary (Public)	21.7	23.6	23.8	24.8
General Education (Private)	24.6	24.5	23.7	23.7

Source: Educational Planning Division, *1973 Final Report on Education Statistics* (Bangkok, Ministry of Education, 1974), p. 27.

Table 128. Literacy of population aged 10 years and over by sex, 1960 and 1970

	Both sexes	Male	Female
1960:			
Total population	18,026,404	9,004,412	9,021,992
Literate population	12,756,350	7,253,590	5,502,760
Per cent literate	70.8	80.6	61.0
1970:			
Total population	23,453,313	11,581,756	11,871,557
Literate population	19,187,889	10,299,876	8,888,013
Per cent literate	81.8	88.9	74.8

Sources: Government of Thailand, *1960 Population Census* (Bangkok, Central Statistical Office, 1962); *ibid.*, *1970 Population and Housing Census* (Bangkok, National Statistical Office, 1973).

The age-specific literacy rates given in table 129 indicate that proportion literate both among males and females decreases with increasing age. In the case of males, the proportion literate was as high as 96 per cent for those aged 10-14 years and this proportion gradually declined to 87.5 in respect of those aged 40-44 years. After 45 years, there is an increase in the rate of decline and the proportion literate among males aged 65 years and over is 55.2 per cent. In regard to females, the proportion literate among those aged 10-14 years was 94.1 per cent, and this proportion gradually declined to 77.5 in the 35-39 age group. After 40 years the decline is very rapid reaching a level of 9.1 for those aged 65 years and over. The gap in proportions literate for males and females

becomes larger as the age increases, for males as well as for females.

3. Regional differentials

Literacy rates vary according to the region and to the sex. Table 131 shows that the Central and the Northeast Regions are above the average for the Kingdom, the Northern and Southern Regions are below the average. Since the literacy level of a population is generally related to the level of economic development of the region, it is surprising that the literacy rate of the Northeast is so close to that of the Central Region. It may also be noted that, the literacy rate for males is higher in the Central Region than in the Northeast, while the rate for females is higher in the Northeast than in the Central Region.

Table 129. Age-specific literacy rates by sex, 1960 and 1970

Age group	Male		Female	
	1960	1970	1960	1970
Total	80.6	88.9	61.0	74.8
10-14	86.6	95.9	84.8	94.1
15-19	91.0	95.8	85.8	92.9
20-24	88.6	95.1	79.4	90.7
25-29	85.7	93.2	75.0	86.1
30-34	86.0	90.3	70.3	80.1
35-39	80.3	88.4	51.3	77.5
40-44	73.5	87.5	33.5	68.6
45-49	69.7	82.1	25.8	49.6
50-54	62.8	75.0	13.0	32.8
55-59	56.8	72.1	9.1	25.7
60-64	52.4	63.6	7.4	13.2
65 and over	46.1	55.2	6.2	9.1

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 10; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 12.

widens with increasing age. It will also be noted from table 129 that the literacy rates of males and females increased for each age group between 1960 and 1970 (see figure 16).

2. Urban-rural differentials

Table 130 shows that the rural-urban differences in literacy are large. The literacy rate of the male population aged 10 and over is 94.5 per cent in urban areas while it is 88.0 per cent in rural areas. In the female population the literacy rate is 84.4 per cent in urban areas while it is 73.2 per cent in rural areas. For each sex, the rates are higher in urban areas for all age groups. It will also be noticed that the gap

Table 130. Age-specific literacy rates, urban-rural, 1970

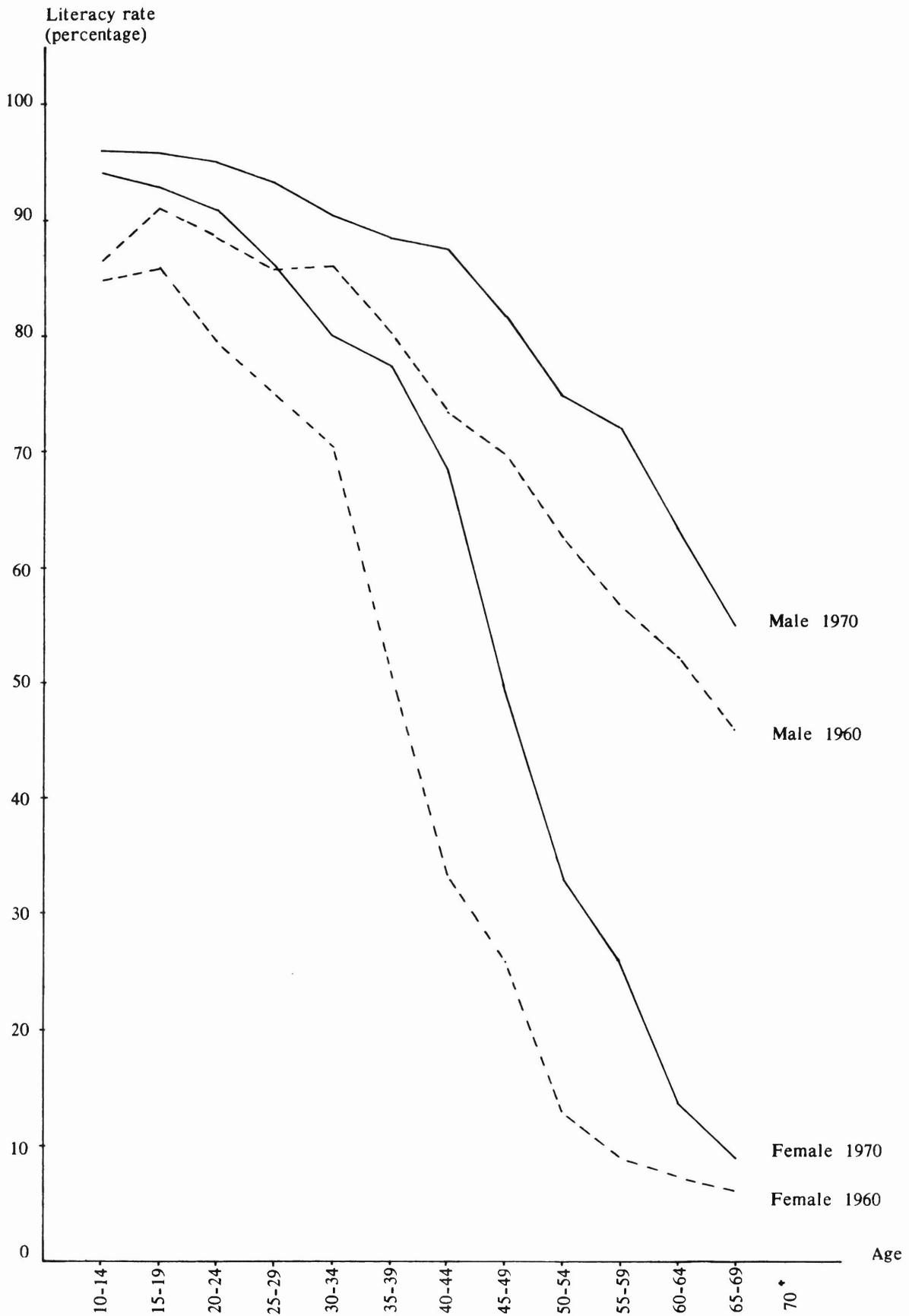
Age group	Male		Female	
	Urban	Rural	Urban	Rural
Total	94.5	88.0	84.4	73.2
10-14	98.1	95.6	96.6	93.8
15-19	98.4	95.3	96.4	92.2
20-24	98.3	94.5	95.6	89.7
25-29	97.4	92.5	92.9	84.9
30-34	95.6	89.5	87.1	78.9
35-39	94.0	87.6	84.8	76.4
40-44	93.0	86.7	81.5	66.7
45-49	90.9	80.9	71.4	46.4
50-54	86.2	73.2	56.1	29.2
55-59	83.0	70.5	47.9	22.4
60-64	77.6	61.7	36.4	9.8
65-69	73.6	57.3	31.4	7.4
70 and over	67.8	49.5	25.4	5.4

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 12.

Table 131. Literacy rates of population aged 10 years and over by sex and by region, 1970

Region	Male	Female
Whole Kingdom	88.9	74.8
Central	93.0	78.2
Northeast	91.3	80.4
Northern	82.5	65.7
Southern	83.5	67.1

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom and Region Series* (Bangkok, National Statistical Office, 1973).



Source: Table 129.

Figure 16. Age-specific literacy rates by sex, 1960 and 1970

Chapter IX

ECONOMIC ACTIVITY OF THE POPULATION

A. INTRODUCTION

Historical data on the economically active population in Thailand are generally lacking, but several efforts have been made during the last 30 to 40 years to collect such data mainly as part of the national censuses. In the 1937 census, the first attempt at collecting data on the economically active population was made by recording the activities of persons aged 11 years and over, with special reference to employment characteristics. The results were not particularly good because it was the first attempt and the definitions were not clear. The second attempt was made in the 1947 census by interviewing persons aged 15 years and over about their activities, but using more detailed questions than the 1937 census. The results were better than the first attempt. The economically active population was classified by occupation but not by age group; it was not defined on the basis of the standard classification of the International Labor Office.

The sample Economic and Demographic Survey of Thailand conducted in 1954 represents the third attempt at collecting information regarding the economic activity of the population. Information regarding economic activity was collected in respect of those aged 15 years and over. The occupational distribution of the labour force as obtained in the survey was not classified by age group.

The 1960 and 1970 censuses obtained data on the economic activities of persons aged 11 years and over; such data were classified by occupation and age. The 1970 census presented more information on work status of employed persons by major occupation and industry. In addition, the National Statistical Office has conducted labour force surveys for the whole Kingdom. But since these surveys have covered different populations and adopted different definitions, analysis of the economic activity of the population for purposes of this study is mainly based on the data of the 1960 and 1970 censuses.

The definitions used in this chapter are as follows:^{1/}

^{1/} Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), pp. xvi and xvii.

(a) **Economically active population:** All persons 11 years of age and over who were employed on the census date, or who had worked on any day during the seven days preceding the census date as well as experienced workers who were looking for work and those waiting for the farm seasons were counted as the economically active population;

(b) **Work status:** Work status refers to the status of an economically active person with respect to his employment. Work status is classified as follows:

(i) **Employer:** A person who operates his own economic enterprise or engages independently in a profession or trade and hires one or more employees;

(ii) **Employee:** A person who works for a public or private employer and receives remuneration in wages, salary, commission, tips, piece-rates or pay in kind. Employees are classified as government or private employees;

(iii) **Own-account worker:** A person who operates his own economic enterprise or engages independently in a profession or trade, and hires no employees;

(iv) **Unpaid family worker:** A person who works without pay, in an economic enterprise or farm operated by a related person living in the same household;

(c) **Occupation:** Occupation refers to the kind of work done during the reference period or performed previously by experienced unemployed persons;

(d) **Industry:** Industry refers to the activity of the establishment in which the economically active person worked during the reference period.

B. ECONOMICALLY ACTIVE POPULATION

1. Over-all growth trends

The economically active population as recorded at the various inquiries from 1937 to 1970, the crude activity rates and the labour force participation rates are given in table 132. It has, however, to be borne in mind that the data presented in this table for various years are not strictly comparable

Table 132. Economically active population of Thailand, the crude activity rates and labour force participation rate by sex, 1937, 1947, 1954, 1960 and 1970

Sources of data	Total population	Population aged 11 or 15 years and over	Economically active population	Crude activity rates	Labour force participation rates
1937 Census ^{a/}					
Both sexes	14,464,105	9,640,851	6,823,556	47.2	70.8
Males	7,313,584	4,877,002	3,598,247	49.2	73.8
Females	7,150,521	4,763,849	3,225,309	45.1	67.7
1947 Census ^{b/}					
Both sexes	17,442,689	11,860,968	8,992,098	51.6	75.8
Males	8,722,155	5,910,495	4,682,293	53.7	79.2
Females	8,720,534	5,950,473	4,309,805	49.4	72.4
1954 Survey ^{b/}					
Both sexes	20,095,139	11,937,028	10,249,085	51.0	85.9
Males	10,021,805	5,852,734	5,243,188	52.3	89.6
Females	10,073,334	6,084,294	5,005,897	49.7	82.3
1960 Census ^{a/}					
Both sexes	26,257,860	17,311,096	13,836,984	52.7	79.9
Males	13,154,121	8,641,766	7,144,796	54.3	82.7
Females	13,103,739	8,669,330	6,692,188	51.1	77.2
1970 Census ^{a/}					
Both sexes	34,397,374	22,461,602	16,850,136	49.0	75.0
Males	17,123,862	11,080,013	8,910,760	52.0	80.4
Females	17,273,512	11,381,589	7,939,376	46.0	69.8

Sources: Population censuses for 1937, 1947, 1960 and 1970; Government of Thailand, *Demographic and Economic Survey 1954* (Bangkok, National Economic Development Board, 1955).

Notes: ^{a/} Age 11 years and over,
^{b/} Age 15 years and over.

in view of the differences in the definition of economically active population. Nevertheless it will be observed that the number of economically active persons increased from 6.8 million in 1937 to about 16.9 million in 1970 or by about 147 per cent during the 33 years. This increase has been due on the one hand to an increase in the population and on the other to increasing participation in economic activity resulting from the social and economic development of the country.^{2/}

The crude activity rate, or the percentage of economically active persons to total population increased from 47.2 per cent in 1937 to 52.7 per cent in 1960, thereafter declining to 49.0 per cent in 1970. The labour force participation rate, that is the propor-

tion of the economically active to population of working age (11 years and over or 15 years and over) also recorded an increase from 70.8 in 1937 to 85.9 in 1954 and thereafter declined to 75.0 per cent in 1970. Since 1937, the participation rate of women in economic activity has also shown an increase, with fluctuations, from 67.7 per cent in 1937 to 69.8 per cent in 1970.

The over-all picture is one of relatively high participation rates, particularly for females, as compared with many countries in the ESCAP region.^{3/} The high rate of participation for Thai women could partly be explained by liberal definition which includes the unpaid family worker in the category of

^{2/} J. Rachapaetayakom, "Demographic and Labour Force Growth in Thailand," unpublished M.A. thesis, Brown University, 1972.

^{3/} For a comparative analysis of participation rates in countries of the region, see John Durand, "Population growth and changing structure of economic activity", in *Interrelation Between Population and Manpower Problems*, Asian Population Studies Series No. 7 (Bangkok, ECAFE, 1971).

Table 133. Economically active population and participation rates by age and sex, 1960 and 1970

Age group	Economically active (in thousands)			Participation rate (percentage)	
	1960	1970	Increment 1960-1970	1960	1970
Both sexes	13,837.0	16,850.2	3,013.2	52.7	49.0
-15	1,079.5	1,688.3	608.8	9.5	10.9
15-19	2,017.1	2,874.3	857.2	80.7	77.3
20-24	2,112.4	2,253.7	141.3	87.4	84.0
25-29	1,873.2	1,944.6	71.4	90.4	86.8
30-49	4,822.4	5,958.3	1,135.9	92.1	88.0
50-59	1,282.2	1,414.9	132.7	87.7	80.8
60+	618.6	710.8	92.2	51.2	42.3
Unknown	31.6	5.3	-26.3	68.6	12.2
Males	7,144.8	8,910.8	1,766.0	54.3	52.0
-15	486.3	790.8	304.5	8.5	10.1
15-19	970.5	1,418.8	448.3	76.9	77.4
20-24	1,069.2	1,178.3	109.1	88.2	89.2
25-29	984.1	1,047.7	63.6	96.0	95.4
30-49	2,575.4	3,252.7	677.3	97.6	96.4
50-59	683.7	788.3	104.6	94.5	91.6
60+	357.2	431.3	74.1	64.4	56.4
Unknown	18.5	2.9	-15.6	72.1	13.4
Females	6,692.2	7,939.4	1,247.2	51.1	46.0
-15	593.2	897.5	304.3	10.6	11.7
15-19	1,046.6	1,455.5	408.9	84.7	77.2
20-24	1,043.2	1,075.4	32.2	86.6	79.0
25-29	889.1	896.9	7.8	85.0	78.4
30-49	2,247.0	2,705.6	458.6	86.5	79.6
50-59	598.5	626.6	28.1	80.9	70.3
60+	261.4	279.5	18.1	40.0	30.5
Unknown	13.1	2.4	-10.7	64.2	11.0

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962); *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973).

the economically active persons. In a country like Thailand where nearly 78 per cent of the employed persons are engaged in agriculture and where large number of females help on the family farm, it is not surprising that the number of economically active females is over-estimated.^{4/}

As noted earlier, the crude activity rate and the participation rate declined between 1960 and 1970 and this could be attributed to a number of factors. In the first instance, there was a decline in the proportion of the working age population (11 years and over) to

total population from about 53 per cent in 1960 to about 49 per cent in 1970 and this in itself would have had the effect of depressing the participation rate. Secondly, during the period of the Second Five-Year Plan (1967-1971) particularly, vigorous efforts were made to develop and expand educational services throughout the country resulting in increased school enrolments.^{5/} Increasing enrolments at the secon-

^{5/} In some parts of the country education was expanded from fourth to seventh grade. Further, it has been observed that in Thailand the prestige of university education plays an important role in attracting Thai students into secondary education. See H. Freeman, *The Role of Agricultural Education in the Economic Development of Thailand* (Stanford, Stanford University Press, 1964), pp. 43-81.

^{4/} Even when a more restricted definition is used, the female participation in rural areas is still very high.

dary and higher education levels resulted in lowering of participation rates in the appropriate age groups.^{6/} Children now tend to stay in school longer and enter the labour market later than before. Thirdly, in developing countries like Thailand, where employment does not grow as fast as the population of working age, the labour force participation rates tend to be lower than those in countries where jobs are plentiful.

2. Age-sex participation

The age-sex participation rates for 1960 and 1970 are shown in table 133. It will be observed that for both males and females, the participation rate rises precipitously from a low of around 10 per cent for the under 10 year age group to around 77 in the 15-19 age group, thereafter increasing gradually to a peak at ages 30-49 years and declining thereafter. The peak rate for males is around 97 per cent while for females this rate is about 80 per cent.

It will also be noted that in the case of males, between 1960 and 1970 there was a slight increase in the rates for ages below 15 years, no real change for ages 15 to 50, a slight drop in the rate for the 50-59 age group and a more pronounced drop in the rates for the age group 60 and over. The over-all picture is one of a slight fall in male participation rates for all ages due presumably to a growing practice of slightly earlier retirements.

For females, the participation rates declined more sharply between 1960 and 1970 in respect of all age groups except the under 15 group, which like the male rate for this age group, increased slightly. The greatest percentage reduction in the rates occurred for age groups 15-19 and 50-59, reflecting presumably a growing tendency among young females to prolong their schooling and earlier retirement for women at the upper end of the age schedule. It may also be pointed out that the subtle difference in the definitions employed in the two censuses

^{6/} The age-specific participation rate for the 15-19 age group declined from 90.7 in 1960, to 77.3 in 1970 and that for the age group 20-24 from 87.4 to 84.0. This fall has been more marked in the case of females.

might explain part of the apparent decline in female economic activity though there is no firm evidence of any such bias.

3. Structure of the economically active population

(a) Employment status

A classification of the economically active population by status, that is, employer, own-account worker, employee and unpaid family workers, is given in table 134. Of the total economically active population, the largest proportion, 57.7 per cent in 1960 and 53.0 per cent in 1970, were unpaid family workers, while nearly 30 per cent were self-employed or own-account workers. Employees formed only about 15 per cent of all economically active persons.

The picture, however, is very different when males and females are considered separately. In 1970, while a large proportion of males (about 45 per cent) were own-account workers, a very large proportion of females (76 per cent) were unpaid family workers. Paid employees formed nearly 20 per cent of all economically active males in 1970, while the corresponding proportion for females was only about 10 per cent. Of a total of 8,934,983 unpaid family workers in 1970 as many as 6,031,589 or about 68 per cent were females. The largest proportion of the total own-account workers and paid employees were males.

There has also been changes in the relative share of the various status categories between 1960 and 1970. For males, the share of paid employees increased while that of own-account workers and unpaid family workers declined during the 10 years. For females, there was a significant decline in the share of unpaid family workers and a corresponding increase in the proportion of paid employees.

It will also be noted that for both sexes together, the largest percentage increase, 59.1 per cent, between 1960 and 1970 has been in regard to employees and the smallest percentage increase has been in regard to unpaid family workers. This reflects the creation of paid employment resulting from increasing developmental activities.

Table 134. Economically active population by work status and sex, 1960 and 1970

Status	1960		1970	
	Number	Percentage	Number	Percentage
Both sexes				
Employer	43,600	0.3	60,758	0.4
Own-account worker	4,084,792	29.5	4,935,205	29.3
Employee	1,632,686	11.8	2,597,870	15.4
Unpaid family worker	7,982,836	57.7	8,934,983	53.0
Unknown status	93,070	0.7	321,316	1.9
All statuses	13,836,984	100.0	16,850,132	100.0
Males				
Employer	36,362	0.5	50,307	0.6
Own-account worker	3,341,963	46.8	3,994,157	44.8
Employee	1,198,412	16.8	1,770,734	19.9
Unpaid family worker	2,512,667	35.2	2,903,394	32.6
Unknown status	55,392	0.8	192,165	2.2
All statuses	7,144,796	100.0	8,910,757	100.0
Females				
Employer	7,238	0.1	10,451	0.1
Own-account worker	742,829	11.1	941,048	11.9
Employee	434,274	6.5	827,136	10.4
Unpaid family worker	5,470,169	81.7	6,031,589	76.0
Unknown status	37,678	0.6	129,151	1.6
All statuses	6,692,188	100.0	7,939,375	100.0

Source: Same as table 133.

(b) Industrial and occupational structure

The distribution of the economically active population by industry or branch of economic activity is shown in table 135. In 1970, nearly 78 per cent of the employed persons were engaged in agriculture and allied industry, this proportion being higher for females than males. The second largest proportion of males were employed in services while in the case of females, commerce was the second important source of employment.

The share of those engaged in agriculture and related occupations recorded a decline between 1960 and 1970 both in the case of males as well as of females, while there was a significant increase in the proportion of those engaged in services from 4.7 per cent in 1960 to 7.0 per cent in 1970. The "traditional" economic sectors — agriculture, services and trade — together accounted for 90.5 per cent of all economically active population in 1970 compared

to 92.3 per cent in 1960. The proportion engaged in construction activities more than doubled during the 10 years while there was only a slight increase in the proportion engaged in manufacturing.

A similar picture emerges in regard to the distribution of the economically active population by occupational groups shown in table 136. For both sexes, the occupations of farmers, fishermen, hunters, loggers and related workers (corresponding roughly to agriculture, forestry, hunting and forestry industrial group) constituted 78.4 per cent of the employed persons, the proportion being higher among females than males. For both sexes combined, only 4.3 per cent of the economically active were classified as "white collar" — professional, technical, administrative, executive, managerial or clerical — this proportion having increased significantly from 2.6 per cent in 1960. For females, as would be expected, the comparable "white collar" share of the employed was lower than for males — 2.5 per cent as against 5.9 per cent in 1970.

Table 135. Economically active population classified by industry and sex, 1960 and 1970

Industry (branch of economic activity)	Number		Percentage of total	
	1960	1970	1960	1970
Both sexes	13,836,984	16,850,136	100.0	100.0
Agriculture, forestry, hunting and fishing	11,334,382	13,201,901	82.0	78.3
Mining and quarrying	29,568	86,647	0.2	0.5
Manufacturing	471,027	682,640	3.4	4.1
Construction	68,813	181,477	0.5	1.1
Electricity, gas, water and sanitary services	15,535	25,287	0.1	0.2
Commerce	779,904	875,798	5.6	5.2
Transport, storage and communication	165,939	268,398	1.2	1.6
Services	655,271	1,184,207	4.7	7.0
Activities not adequately described	251,665	145,912	1.8	0.9
Persons seeking work for the first time	64,880	197,869	0.5	1.2
Males	7,144,796	8,910,760	100.0	100.0
Agriculture, forestry, hunting and fishing	5,576,062	6,636,046	78.1	74.5
Mining and quarrying	22,114	63,503	0.3	0.7
Manufacturing	293,820	391,430	4.1	4.4
Construction	62,499	155,567	0.9	1.7
Electricity, gas, water and sanitary services	14,741	22,075	0.2	0.2
Commerce	363,303	403,211	5.1	4.5
Transport, storage and communication	156,833	252,447	2.2	2.8
Services	458,260	753,852	6.4	8.5
Activities not adequately described	158,980	106,673	2.2	1.2
Persons seeking work for the first time	38,184	125,956	0.5	1.4
Females	6,692,188	7,939,376	100.0	100.0
Agriculture, forestry, hunting and fishing	5,758,320	6,565,855	86.1	82.7
Mining and quarrying	7,454	23,144	0.1	0.3
Manufacturing	177,207	291,210	2.7	3.7
Construction	6,314	25,910	0.1	0.3
Electricity, gas, water and sanitary services	794	3,212	0.0	0.0
Commerce	416,601	472,587	6.2	6.0
Transport, storage and communication	9,106	15,951	0.1	0.2
Services	197,011	430,355	2.9	5.4
Activities not adequately described or unknown	92,685	39,239	1.4	0.5
Persons seeking work for the first time	26,696	71,913	0.4	0.9

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 19; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 21.

Table 136. Economically active population classified by major occupational group and sex, 1960 and 1970

Occupational group	Number		Percentage of total	
	1960	1970	1960	1970
Both sexes	13,836,984	16,850,136	100.0	100.0
Professional, technical and related workers	173,960	284,104	1.3	1.7
Administrative, executive and managerial workers	26,191	246,591	0.2	1.5
Clerical workers	154,303	190,238	1.1	1.1
Sales workers	735,457	833,607	5.3	4.9
Farmers, fishermen, hunters, loggers and related workers	11,332,489	13,217,416	81.9	78.4
Miners, quarrymen and related workers	26,255	42,605	0.2	0.3
Workers in transport and communication occupations	144,610	225,204	1.0	1.3
Craftsmen production-process workers and labourers not elsewhere classified	806,205	1,109,943	5.8	6.6
Service, sport and recreation workers	273,375	471,999	2.0	2.8
Workers not classifiable by occupation	99,259	30,560	0.7	0.2
Persons seeking work for the first time	64,880	197,869	0.5	1.2
Males	7,144,796	8,910,760	100.0	100.0
Professional, technical and related workers	114,941	166,916	1.6	1.9
Administrative, executive and managerial workers	23,643	228,976	0.3	2.6
Clerical and related workers	133,716	127,842	1.9	1.4
Sales workers	325,254	372,815	4.6	4.2
Farmers, fishermen, hunters, loggers and related workers	5,574,571	6,645,322	78.0	74.6
Miners, quarrymen and related workers	19,347	32,232	0.3	0.4
Workers in transport and communication occupations	138,145	218,180	1.9	2.4
Craftsmen, production-process workers and labourers not elsewhere classified	539,837	730,503	7.6	8.2
Service, sport and recreation workers	152,310	241,318	2.1	2.7
Workers not classifiable by occupation	84,848	20,700	1.2	0.2
Persons seeking work for the first time	38,184	125,956	0.5	1.4
Females	6,692,188	7,939,376	100.0	100.0
Professional, technical and related workers	59,019	117,188	0.9	1.5
Administrative, executive, managerial workers and government official n.e.c.	2,548	17,615	0.0	0.2
Clerical and related workers	20,587	62,396	0.3	0.8
Sales workers	410,203	460,792	6.1	5.8
Agriculture, animal husbandry and forest workers, fishermen and hunters	5,757,918	6,572,094	86.0	82.8
Miners, quarrymen, well drillers and related workers	6,908	10,373	0.1	0.1
Transport equipment operators and related workers	6,465	7,024	0.1	0.1
Craftsmen, production-process workers	266,368	379,440	4.0	4.8
Service workers	121,065	230,681	1.8	2.9
Workers not classifiable by occupation or unknown	14,411	9,860	0.2	0.1
Persons seeking work for the first time	26,696	71,913	0.4	0.9

Sources: Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 16; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), table 17.

C. PERSONS EMPLOYED IN AGRICULTURE

1. Growth trends

Thailand is a developing country and its population is predominantly rural and consequently agrarian. As noted earlier, about 78 per cent of the employed persons are engaged in agriculture. This particularly high percentage reflects the relative level of the economic development achieved so far in Thailand.

Table 137 shows the percentages of rural popula-

Table 137. Proportion of rural population in total population and of agricultural employment in total employment, 1960 and 1970

	1960	1970
Rural population		
Both sexes	87.5	86.8
Males	87.3	86.8
Females	87.7	86.7
Agriculturally employed persons		
Both sexes	81.9	78.4
Males	78.0	74.6
Females	86.0	82.8

Source: Same as table 133.

tion and of those engaged in agricultural employment in 1960 and 1970. It will be seen that rural population or non-municipal area population decreased very slightly from 87.5 per cent in 1960 to 86.7 per cent in 1970. As is to be expected, in rural areas most employed persons are in farming, though proportionally less males than females are engaged in this occupation. It is noticed that there has been a shift in the occupational composition from agricultural occupation to non-agricultural occupations, because the share of those engaged in agriculture has fallen from 81.9 per cent in 1960 to 78.4 per cent in 1970.

2. Demographic characteristics

The age-sex composition of persons engaged in farming and related occupations is given in table 138. It will be seen that for both males and females, the highest percentage of those engaged in farming occupations in 1960 and 1970 occurred in the 15-19 age group. The proportion in this age group has recorded an increase between 1960 and 1970 for both males and females. The relatively high percentage observed in the younger ages could largely be explained by the fact that in rural areas, children and youth, on completion of their compulsory education, help their parents on the farm. Females in the child-bearing age, 15-49 years, play an important part in agriculture largely as unpaid family workers.

Table 138. Agriculturally employed persons by age and sex in 1960 and 1970

Age group	1960				1970			
	Male		Female		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Total	5,573,416	100.0	5,756,868	100.0	6,645,322	100.0	6,572,094	100.0
11-14	450,749	8.1	539,435	9.4	714,424	10.8	806,086	12.3
15-19	836,909	15.0	910,422	15.8	1,146,911	17.3	1,209,155	18.4
20-24	780,923	14.0	879,801	15.3	792,397	11.9	852,211	13.0
25-29	728,627	13.1	755,446	13.1	718,896	10.8	716,732	10.9
30-34	634,656	11.4	629,201	10.9	694,049	10.4	683,193	10.4
35-39	501,707	9.0	501,307	8.7	651,684	9.8	627,112	9.5
40-49	786,767	14.1	784,801	13.6	962,670	14.5	904,899	13.8
50-59	543,975	9.8	519,695	9.0	607,598	9.1	534,419	8.1
60 and over	297,229	5.3	226,530	3.9	355,340	5.4	237,008	3.6
Unknown	11,874	0.2	10,230	0.2	1,353	0.0	1,279	0.0

Source: Same as table 136.

Note: Excludes workers not classifiable by occupation.

3. Work status

The distribution of the employed population in agriculture by employment status is given in table 139. It is evident from this table that for both sexes combined, the majority are unpaid family workers while the second largest proportion is employers and own-account workers. But the analysis of the data for the two sexes separately indicate that in the case of males, the majority (53 per cent) are employers and own-account workers while in the case of females, nearly 87 per cent, are unpaid family workers. In fact, 67 per cent of all unpaid family workers in agriculture are females. It is also evident from the table that there were no significant changes in the proportionate share of the various status groups between 1960 and 1970.

4. Educational attainment

The 1960 and 1970 censuses did not provide data on the labour force cross-tabulated by age, education and occupation. However, such information is available from the 1971 labour force survey. The distribution of employed persons in agriculture by level of educational attainment is shown in table 140. It will be observed that agriculturally employed persons in urban areas have more education than those in rural areas. Females engaged in agriculture have less education than males. Approximately 12.1 per cent of males and one fifth of females employed in agriculture had no education. It can be seen that about 87.0 per cent of male and 79.6 per cent of female agriculturally employed persons had completed only elementary and kindergarten education (4 or less years of schooling). The percentages of male and female peasants who had completed education beyond grade 4 are very small, particularly in rural areas.

D. NON-AGRICULTURAL EMPLOYMENT

1. Growth trends

Table 141 shows the proportion of urban population and of those engaged in non-agricultural occupations. As noted in chapter I, the level of urbanization in Thailand is very low, about 13.2 per cent of the country's population living in areas defined as urban in 1970 as compared to 12.5 per cent in 1960. While changes in the proportion of urban population has not been very significant, the changes in the proportion of non-agricultural employment has been significant, increasing from 16.9 per cent in 1960 to 20.2 per cent in 1970. This increase is equally true of males as well as of females. The occupational shift that has taken place is the result of a combina-

tion of factors such as rapid population growth in the rural as well as urban areas and changing levels of social and economic development in the country.^{7/}

2. Demographic characteristics

The basic demographic characteristics of the persons employed in non-agricultural occupations in 1960 and 1970 are shown in table 142. In 1960, about 1.4 million or 20.3 per cent of male workers and 0.9 million or 13.3 per cent of all female workers were engaged in non-agricultural occupations. In 1970, nearly 2.7 million or 23.8 per cent of all male workers and 1.7 million or 16.2 per cent of all female workers were in non-agricultural occupations.

The table also shows that for males, there were increases between 1960 and 1970 in the percentages in age groups 15-19, 20-24 and 35-39 and a moderate drop in respect of the other age groups. For females, increases in proportions during this period were noticed in the 15-19, 30-34 and 35-39 age groups. The highest proportion of males engaged in non-agricultural occupations occurred in the 25-29 age group in 1960 and 20-24 age group in 1970. But for females the highest percentage in 1960 was in the 20-24 age group and in 1970 for the 15-19 age group.

3. Work status

Table 143 gives the distribution of persons employed in non-agricultural occupations by employment status. For both sexes together, the majority of non-agricultural workers are salaried workers and wage earners or paid employees. However, the proportion of paid employees among males is significantly higher than that for females. For both males and females, this proportion has recorded significant increases between 1960 and 1970. The unpaid family workers, however, had recorded a decline in terms of absolute numbers during this period both for males and females. Whereas in 1960 nearly 7 per cent of males and 37 per cent of females engaged in non-agricultural occupations were unpaid family workers, the corresponding proportions in 1970 were 5.5 and 24.1 per cent respectively. There has also been a decline in the proportion of employers and own-account workers during this period.

^{7/} J. Rachapaetayakom, "Shifts in Occupational Composition of the Workforce in Thailand", papers submitted to the Demographic Training and Research Centre, Bombay, India, 1968, p. 21.

4. Occupational distribution

Table 144 gives the distribution of the employed population in non-agricultural occupations by occupation. In 1960 there were 2.3 million of persons employed in non-agricultural occupations. This number increased to 3.4 million in 1970. It is also evident from table 144 that between 1960 and 1970 for both sexes combined, white collar (professional, technical, administrative, executive, managerial) and service workers increased slightly; miners and transport workers remained more or less constant;

clerical, sales persons and craftsmen have fallen slightly as a percentage of total non-agricultural works.

The major occupations of males in non-agriculture in descending order of importance are crafts, sales work and services, while those of females are sales work, crafts and services. More males work in the occupation classified as "white collar" than females. Among females, transportation category contains less than 1 per cent of the total non-agricultural sectors.

Table 139. Distribution of agriculturally employed persons ^{a/} by work status and sex, 1960 and 1970

Work status ^{b/}	1960		1970	
	Number	Percentage	Number	Percentage
Both sexes				
Employers and workers on own-account	3,454,779	30.5	4,108,918	31.1
Salaried employees and wage earners	351,829	3.1	552,459	4.2
Unpaid family workers	7,525,770	66.4	8,508,940	64.4
Other and status unknown	111	0.0	47,099	0.4
Total	11,332,489	100.0	13,217,416	100.0
Males				
Employers and workers on own-account	2,958,350	53.1	3,510,760	52.8
Salaried employees and wage earners	228,947	4.1	325,800	4.9
Unpaid family workers	2,387,213	42.8	2,787,392	41.9
Other and status unknown	61	0.0	21,370	0.3
Total	5,574,571	100.0	6,645,322	100.0
Females				
Employers and workers on own-account	496,429	8.6	598,158	9.1
Salaried employees and wage earners	122,882	2.1	226,659	3.4
Unpaid family workers	5,138,557	89.2	5,721,548	87.1
Other and status unknown	50	0.0	25,729	0.4
Total	5,757,918	100.0	6,572,094	100.0

Source: Same as table 136.

Notes: ^{a/} Age 11 and over.

^{b/} Excludes workers not classifiable by occupation or unknown, and persons seeking work for the first time categories.

Table 140. Agriculturally employed persons ^{a/} by level of educational attainment, sex, urban and rural areas, 1971

(in percentages)

Education	Total		Urban		Rural	
	Male	Female	Male	Female	Male	Female
None ^{b/}	12.1	20.2	16.5	27.4	12.1	20.2
Primary and kindergarten ^{c/}						
Secondary and pre-university ^{d/} or equivalent	86.9	79.5	78.1	71.5	87.0	79.6
— Academic	0.9	0.2	4.7	0.6	0.9	0.2
— Lower vocational ^{e/}	—	0.0	—	—	—	0.0
— Upper and higher vocational ^{f/}	0.0	0.0	0.1	0.2	—	—
University						
— Academic ^{g/}	0.0	—	0.1	—	—	—
— Technical vocational	0.0	—	—	—	0.0	—
Teacher training ^{h/}	0.0	0.0	0.1	—	0.0	0.0
Short-course vocational ^{i/}	—	0.0	0.1	—	—	0.0
Other ^{j/}	—	—	—	0.1	—	—
Unknown	—	0.0	0.3	0.2	—	0.0
Total in number	6,374,660	5,994,730	66,580	45,060	6,308,080	5,949,670

Source: Labour Force Survey, 1971.

Notes: ^{a/} Excludes workers not classifiable by occupation.

^{b/} None: Never attended school or have attended but have not completed any grade.

^{c/} Primary and kindergarten: Completed the kindergarten grade and completed grade 1 or more (grades 1-7).

^{d/} Secondary and pre-university: Completed one or more grades of the secondary level (3 grades) or one or more grades of the pre-university level (2 grades).

^{e/} Lower vocational:

(i) Completed grade 4 and then completed one or more grades of the 3-year lower vocational course, or.

(ii) Completed grade 7 and then completed one or more grades of the 3-year vocational course.

^{f/} Upper and higher vocational: Upper vocational, higher vocational and higher technical education.

^{g/} University: Completed one or more years of undergraduate or graduate study at a university.

^{h/} Teacher training: Completed at least one year of study at a school or institute under the Teacher Training

Department.

^{i/} Short-course vocational: Completed a vocational course of not less than 12 months.

^{j/} Other: Type of education not classifiable above.

Table 141. Percentage of urban population in total population and of non-agricultural employment in total employment, Thailand, 1960 and 1970

	1960	1970
Urban population		
Both sexes	12.5	13.2
Males	12.7	13.2
Females	12.3	13.3
Persons employed in "non-agriculture"		
Both sexes	16.9	20.2
Males	20.3	23.8
Females	13.3	16.2

Source: Same as table 133.

Table 142. Persons ^{a/} employed in non-agricultural occupations by age and sex, 1960 and 1970

Age group	1960				1970			
	Male		Female		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Total	1,444,805	100.0	891,934	100.0	2,118,782	100.0	1,285,509	100.0
11-14	29,033	2.0	47,008	5.3	43,881	2.1	69,122	5.4
15-19	117,930	8.2	124,759	14.0	211,455	10.0	214,527	16.7
20-24	210,793	14.6	153,487	17.2	361,394	17.1	208,998	16.3
25-29	246,017	17.0	128,969	14.5	319,025	15.1	174,981	13.6
30-34	221,853	15.4	108,998	12.2	310,431	14.7	162,131	12.6
35-39	171,882	11.9	85,681	9.6	264,218	12.5	137,657	10.7
40-49	245,471	17.0	129,065	14.5	354,143	16.7	184,024	14.3
50-59	137,136	9.5	77,204	8.7	177,782	8.4	91,052	7.1
60+	58,759	4.1	34,166	3.8	74,996	3.5	41,999	3.3
Unknown	5,931	0.4	2,597	0.3	1,457	0.1	1,018	0.1

Sources: Government of Thailand, *1960 Thailand Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 17; *ibid.*, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), table 19.

Note : ^{a/} Excludes workers not classifiable by occupation.

Table 143. Distribution of non-agriculturally employed persons ^{a/} by work status and sex, 1960 and 1970

Work status ^{b/}	1960		1970	
	Number	Percentage	Number	Percentage
Both sexes				
Employers and workers on own-account	672,341	28.7	887,045	26.1
Salaried employees and wage earners	1,211,362	51.8	2,045,411	60.1
Family workers	455,930	19.5	426,043	12.5
Other and status unknown	723	0.0	45,792	1.3
Total	2,340,356	100.0	3,404,291	100.0
Males				
Employers and workers on own-account	419,477	29.0	533,704	25.2
Salaried employees and wage earners	902,067	62.3	1,444,934	68.2
Family workers	125,172	8.6	116,002	5.5
Other and status unknown	477	0.0	24,142	1.1
Total	1,447,193	100.0	2,118,782	100.0
Females				
Employers and workers on own-account	252,864	28.3	353,341	27.5
Salaried employees and wage earners	309,295	34.7	600,477	46.7
Family workers	330,758	37.0	310,041	24.1
Other and status unknown	246	0.0	21,650	1.7
Total	893,163	100.0	1,285,509	100.0

Source: Same as table 142.

Notes: ^{a/} Age 11 and over.

^{b/} Excludes workers not classifiable by occupation or unknown; and persons seeking for the first time categories.

Table 144. Percentage distribution of the non-agriculturally employed persons ^{a/} by occupation ^{b/} and sex, 1960 and 1970

Occupation	1960			1970		
	Total	Male	Female	Total	Male	Female
Professional, technical and related workers	7.4	7.9	6.6	8.3	7.9	9.1
Administrative, executive and managerial workers	1.1	1.6	0.3	7.2	10.8	1.4
Clerical workers	6.6	9.2	2.3	5.6	6.0	4.9
Sales workers	31.4	22.5	45.9	24.5	17.6	35.8
Miners, quarrymen and related workers	1.1	1.3	0.8	1.3	1.5	0.8
Workers in transport and communication occupations	6.2	9.6	0.7	6.6	10.3	0.6
Craftsmen production-process workers and labourers not elsewhere classified	34.4	37.3	29.8	32.6	34.5	29.5
Service, sport and recreation	11.7	10.5	13.6	13.9	11.4	17.9
Total in number	2,340,356	1,447,193	893,163	3,404,291	2,118,782	1,285,509

Source: Same as table 133.

Notes: ^{a/} Age 11 and over.

^{b/} Excludes workers not classifiable by occupation; persons seeking work for the first time.

5. Industrial classification

The percentage distribution of persons engaged in non-agriculture by industries is shown in table 145. As will be observed, there is a heavy concentration of both male and female workers in commerce, services and manufacturing, though this proportion has declined from about 36 per cent for both sexes combined in 1960 to about 27 per cent in 1970. In 1960 and 1970, a greater proportion of females than males were engaged in commerce. The second highest proportion of workers were in the services industry where the proportions for males as well as females increased during the decade, the proportion of males engaged in this industry being higher than that of females. In 1960 as well as in 1970, the third largest proportion of males and females was engaged

in manufacturing industry, the proportion of females being higher than that of males. In fact the proportion of females engaged in manufacturing increased between 1960 and 1970 while that of males showed a slight decline. The proportion engaged in electricity, mining and construction industries is comparatively very low.

6. Educational attainment

As stated earlier, the 1960 and 1970 censuses of Thailand did not provide data on education cross-tabulated by economic activity; the data on educational attainment of the employed persons used in this study were derived from the 1971 labour force survey. Table 146 suggests that most of the work force in

Table 145. Percentage distribution of non-agricultural employment by industry and sex, 1960 and 1970^{a/}

Industry ^{b/}	1960			1970		
	Total	Male	Female	Total	Male	Female
Mining and quarrying	1.4	1.6	0.9	2.6	3.1	1.8
Manufacturing	21.5	21.4	21.8	20.7	19.2	23.1
Construction	3.1	4.6	0.8	5.5	7.6	2.1
Electricity, gas, water and sanitary services	0.7	1.1	0.1	0.8	1.1	0.3
Commerce	35.7	26.5	51.1	26.5	19.7	37.4
Transport, storage and communication	7.6	11.4	1.1	8.1	12.4	1.3
Services	30.0	33.4	24.2	35.8	36.9	34.1
Total in number	2,186,057	1,371,570	814,487	3,304,454	2,042,085	1,262,369

Source: Same as table 133.

Notes: a/ Age 11 and over.

b/ Excludes activities not adequately described; and persons seeking work for the first time categories.

non-agricultural activities had completed only primary school, only 2.1 per cent of the males and 1.7 per cent of the females had completed higher education. About 10.7 per cent of male and 16.7 per cent of female workers had no education. The educational attainment of Thai females in non-agricultural employment also lags behind that of Thai males, especially in the rural areas. The sharp difference in the educational attainment between the urban and the rural work force might be due to the inadequacy of school and educational facilities in the rural areas. Further, most rural people cannot afford to have their children educated in the city because of poor economic conditions.

E. UNEMPLOYMENT

1. Introduction

Two sources of data are available for measuring the extent of unemployment and the characteristics of unemployed persons in Thailand: the census of population and the labour force survey.^{8/} The 1960 census of population obtained information regarding economic activities of all persons aged 11 years and over. "All persons 11 years of age and over who worked on the census day or any day during the 7

days preceding the census date are counted as employed - persons who did not work were asked whether they were looking for work, and if they were looking for work they were classified as experienced workers or, if they had never worked, as new workers."^{9/} Similar definitions of employed and unemployed persons were adopted in the 1970 population and housing census.

The definitions of "unemployed persons" adopted in the labour force survey is slightly different from that used in the 1960 and 1970 censuses. According to the 1963/1964 labour force survey, persons who did not work during the survey week but thought of looking for work, were considered as unemployed, while in the census, only persons who were actively looking for work were counted as unemployed. In the surveys since 1965, only those actively seeking employment were included as unemployed. It is not possible, however, to measure the extent of difference in unemployment rate arising from the difference in definitions adopted. The 1960 census of population did not tabulate its results by municipal and non-municipal areas. The geographical coverage of the labour force survey during the 1960s, except the one conducted during July-September 1969, was confined to the municipal areas.

One notable feature of Thai unemployment data,

^{8/} For detailed discussions, see S. Selvaratnam, "Sources of labour force data in Thailand" (Bangkok, ILO, ARTEP, 1974) (mimeo).

^{9/} Government of Thailand, *1960 Population Census, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), p. iv.

Table 146. Non-agricultural employed persons by level of educational attainment, sex, urban and rural areas, 1971
(percentages)

Occupation ^{a/}	Total		Urban		Rural	
	Male	Female	Male	Female	Male	Female
None ^{b/}	10.7	16.7	12.3	16.3	9.6	16.9
Elementary and kindergarten ^{c/}	68.5	71.2	56.5	59.4	76.7	77.9
Secondary and pre-university ^{d/} or equivalent						
- Academic	14.9	7.1	21.2	13.8	10.5	3.3
- Lower vocational ^{e/}	0.0	0.0	0.0	0.1	-	-
- Upper and higher vocational ^{f/}	1.4	1.1	3.0	2.9	0.3	0.1
University ^{g/}						
- Academic	1.6	1.1	3.8	2.8	0.1	0.1
- Technical vocational	0.5	0.6	1.0	1.1	0.2	0.3
Teacher training ^{h/}	1.8	1.7	1.4	3.0	2.2	1.0
Short-course vocational ^{i/}	0.2	0.2	0.1	0.3	0.3	0.1
Other ^{j/}	0.2	0.0	0.2	0.1	0.2	-
Unknown	0.2	0.3	0.4	0.3	-	0.2
Total in number	2,489,820	1,725,090	1,011,450	628,110	1,478,370	1,096,980

Source: Labour Force Survey, 1971.

Notes: ^{a/} Excludes workers not classifiable by occupation.

^{b/} None: Never attended school or have attended but have not completed any grade.

^{c/} Primary and kindergarten: Completed the kindergarten grade and completed grade 1 or more (grade 1-7).

^{d/} Secondary and pre-university: Completed one or more grade of the secondary level (3 grades) or one more grades of the pre-university level (2 grades).

^{e/} Lower vocational:

(i) Completed grade 4 and the completed one or more grades of the 3 year lower vocational course, or

(ii) Completed grade 7 and then completed one or more grade of the 3 year vocational course.

^{f/} Upper and higher vocational: Upper vocational, higher vocational and higher technical education.

^{g/} University: Completed one or more years of undergraduate or graduate study at a university.

^{h/} Teacher training: Completed at least one year of study at a school or institute under the Teacher Training Department.

^{i/} Short-course vocational: Completed a vocational course of not less than 12 months.

^{j/} Other: Types of education not classifiable above.

however, is that the rate of unemployment (the ratio of number of unemployed persons to the number of persons in the labour force) based on the data of the population census as well as of the labour force survey is relatively low. This may be due primarily to the utilization of the labour force approach, a concept which is more appropriate to a developed economy. The unemployment rates for Thailand in the 1960 and 1970 census years were 0.6 and 1.3 per cent respectively. Corresponding rates according to the

labour force survey of January-March of 1971, 1972 and 1973 were even lower. Despite these defects, the data from censuses and surveys will be used in the analysis of characteristics of unemployed persons.

2. Basic demographic composition of unemployed persons

Among 88,254 persons classified as "unemployed" in the 1960 census of population, approximately 53,000

Table 147. Unemployed persons by age, sex, and working experience: 1960 and 1970

Age group and working experience	1960						1970					
	Both sexes		Male		Female		Both sexes		Male		Female	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
All ages	88,254	100.0	52,757	100.0	35,497	100.0	226,482	100.0	148,084	100.0	78,398	100.0
11-14	12,033	13.6	5,914	11.2	6,119	17.2	51,127	22.6	30,026	20.3	21,101	26.9
15-19	24,536	27.8	14,513	27.5	10,023	28.2	78,430	34.6	50,410	34.0	28,020	35.7
20-24	22,624	25.6	14,221	27.0	8,403	23.7	42,255	18.7	27,480	18.6	14,775	18.8
25-29	9,362	10.6	5,779	11.0	3,583	10.1	17,686	7.8	12,215	8.2	5,471	7.0
30-34	5,727	6.5	3,602	6.8	2,125	6.0	10,955	4.8	8,132	5.5	2,823	3.6
35-39	3,882	4.4	2,410	4.6	1,472	4.1	8,201	3.6	6,250	4.2	1,951	2.5
40-49	5,502	6.2	3,427	6.5	2,075	5.8	10,397	4.6	7,961	5.4	2,436	3.1
50-59	3,127	3.5	2,003	3.8	1,124	3.2	5,410	2.4	4,122	2.8	1,288	1.6
60 and over	1,086	1.2	673	1.3	413	1.2	1,943	0.9	1,442	1.0	501	0.6
Unknown	375	0.4	215	0.4	160	0.5	78	0.0	46	0.0	32	0.0
Experienced workers	23,374	26.5	14,573	27.6	8,801	24.8	28,613	12.6	22,128	14.9	6,485	8.3
New workers	64,880	73.5	38,184	72.4	26,696	75.2	197,869	87.4	125,956	85.1	71,913	91.7

Source: Same as table 133.

Table 148. Unemployment rates by age group and sex

Age group	1960			1970		
	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.64	0.74	0.53	1.34	1.66	0.99
11-14	1.11	1.22	1.03	3.03	3.80	2.35
15-19	1.22	1.50	0.96	2.73	3.55	1.93
20-24	1.07	1.33	0.81	1.87	2.33	1.37
25-29	0.50	0.59	0.40	0.91	1.17	0.61
30-34	0.36	0.42	0.29	0.59	0.80	0.33
35-39	0.31	0.36	0.25	0.49	0.68	0.25
40-49	0.28	0.33	0.23	0.43	0.60	0.22
50-59	0.24	0.29	0.19	0.38	0.52	0.21
60 and over	0.18	0.19	0.16	0.27	0.33	0.18

Source: Same as table 133.

Table 149. Unemployment rates by age group, sex and municipal and non-municipal areas: 1970- 1973

Sex and age group	1970			1971			1972			1973		
	Whole Kingdom	Municipal areas	Non-municipal areas	Whole Kingdom	Municipal areas	Non-municipal areas	Whole Kingdom	Municipal areas	Non-municipal areas	Whole Kingdom	Municipal areas	Non-municipal areas
Males												
All ages	1.7	4.5	1.3	0.2	1.0	0.1	0.8	1.8	0.6	0.6	1.6	0.5
11-14	3.8	24.5	3.1	0.1	2.7	-	0.1	2.2	-	0.1	1.9	-
15-19	3.6	14.4	2.5	0.3	3.0	0.2	1.5	5.0	1.1	1.0	3.0	0.8
20-24	2.3	7.0	1.6	1.0	2.5	0.8	2.1	3.5	1.9	1.1	3.3	0.7
25-29	1.2	2.8	0.9	0.3	1.0	0.1	0.3	1.4	a/	0.9	1.9	0.7
30-34	0.8	1.4	0.7	0.1	0.4	-	0.5	0.9	0.5	0.3	1.1	0.2
35-39	0.7	1.1	0.6	0.1	0.4	-	0.8	1.0	0.7	0.6	1.0	0.6
40-49	0.6	1.1	0.5	a/	0.2	-	0.2	0.8	0.1	0.2	0.6	0.2
50-59	0.5	1.0	0.5	a/	0.1	-	0.2	0.4	0.2	0.3	0.6	0.2
60 and over	0.3	0.7	0.3	-	-	-	a/	0.4	-	a/	0.4	-
Females												
All ages	1.0	3.9	0.7	0.1	0.7	a/	0.2	1.1	0.1	0.2	0.8	0.1
11-14	2.4	12.5	2.0	-	-	-	0.3	0.8	0.2	a/	8.7	-
15-19	1.9	8.9	1.3	0.1	0.8	-	0.2	1.8	-	0.3	1.4	0.2
20-24	1.4	6.4	0.8	0.5	2.3	0.2	0.6	2.8	0.2	0.3	1.8	-
25-29	0.6	2.5	0.4	0.1	0.9	-	0.1	1.1	-	0.4	0.9	0.4
30-34	0.3	1.2	0.2	a/	0.1	-	0.1	0.4	a/	0.3	0.5	0.3
35-39	0.3	0.8	0.2	a/	0.1	-	a/	0.3	-	a/	0.1	-
40-49	0.2	0.6	0.2	a/	0.1	-	0.1	0.3	0.1	-	-	-
50-59	0.2	0.5	0.2	-	-	-	-	-	-	a/	0.1	-
60 and over	0.2	0.4	0.2	a/	0.3	-	a/	0.3	-	-	-	-

Source: For 1970 data, same source as table 133; for 1971-73 data: *Reports of the Labour Force Survey, Whole Kingdom (Round 1) January-March, 1971, 1972 and 1973* (Bangkok, National Statistical Office).

Note: a/ Less than 0.1 per cent.

persons or 59.8 per cent were males. The proportion of unemployed who were males was even higher in the 1970 census of population, being approximately 65.4 per cent. As for the age composition of unemployed persons, young workers, i.e. persons under 25 years of age comprised approximately two-thirds of all unemployed persons in 1960 and about three-fourths in 1970. This is true for both males and females, though the proportion of young unemployed females is slightly higher than that of males. One factor which contributes to the high proportion of unemployed persons in the younger age groups was the high proportion of new workers among unemployed persons. New workers constituted about 73.5 and 87.4 per cent of all unemployed persons in 1960 and 1970 respectively (see table 147).

It will also be observed from table 147 that rates for male workers were higher than those for females in both 1960 and 1970. In terms of age, workers in the younger age groups also had rates of unemployment substantially higher than workers in the older age groups. Rates of unemployment for both males and females in the age group 25-29 years for example, were only half or less of the corresponding rates for males and females in the age group 20-24 years. Thus, younger workers not only constitute a higher proportion of unemployed persons but also had higher rates of unemployment (see table 148).

Table 149 shows that the unemployment rate for persons residing in municipal areas was much higher than for those residing in non-municipal areas. The

difference in unemployment rate in urban and rural areas partly reflects the difference in the economic structure of these two areas. The unemployment rate is inevitably lower in the agricultural sector of rural areas, where approximately 83 per cent of employed persons are "own-account workers" and "unpaid family workers". Underemployment, however, is much more severe in rural areas. According to the 1970 census of population, about 42 per cent of economically active males and 54 per cent of economically active females in rural areas were reported as "waiting for farm season", the corresponding percentages in urban areas being 1.4 and 2.6 per cent respectively.

Age and sex patterns of unemployment in urban and rural areas are, however, very similar. Rates of unemployment for males were higher than those for females and younger workers of both sexes had higher rates of unemployment than older workers.

3. Educational attainment of unemployed persons

The distribution of unemployed persons by level of educational attainment (see table 150) indicates that for the whole Kingdom about 70 per cent of unemployed males had received secondary or higher education and that the corresponding percentage for unemployed females was about 89. This seems to be true for both urban and rural areas. In urban areas, less than half of unemployed males had no education or had received only elementary education, while the

Table 150. Unemployed persons by level of educational attainment, sex, municipal and non-municipal areas, 1971

Educational level	Whole Kingdom		Municipal areas		Non-municipal areas	
	Male	Female	Male	Female	Male	Female
None	1.5	0.9	3.0	1.2	-	-
Elementary and kindergarten	28.9	10.6	43.4	14.9	14.2	-
Secondary, pre-university or equivalent	49.9	57.5	45.9	60.6	53.8	50.0
Academic	44.8	38.8	35.8	34.2	53.8	50.0
Vocational (lower & upper)	5.1	18.7	10.1	26.4	-	-
University	7.8	10.0	4.9	14.1	10.7	-
Academic	1.8	4.3	3.7	6.0	-	-
Higher and technical vocational	5.9	5.8	1.2	8.1	10.7	-
Teacher training	11.7	19.2	2.1	6.6	21.2	50.0
Short-course vocational	-	-	-	-	-	-
Other	0.3	1.8	0.6	2.5	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0
Number	21,700	6,780	10,870	4,820	10,830	1,960

Source: Report of the Labour Force Survey, Whole Kingdom (Round 1), January-March, 1971 (Bangkok, National Statistical Office, 1972), tables 16A and B.

Table 151. Rate of unemployment by level of educational attainment, sex, municipal and non-municipal areas, 1971

Educational level	Whole Kingdom		Municipal areas		Non-municipal areas	
	Male	Female	Male	Female	Male	Female
Total	0.2	0.1	1.0	0.7	0.1	a/
None	0.0	a/	0.2	0.1	-	-
Elementary and kindergarten	0.1	0.0	0.8	0.2	0.0	-
Secondary, pre-university or equivalent	2.3	2.5	2.0	2.7	2.6	2.0
Academic	2.2	1.9	1.7	1.9	2.7	2.1
Vocational	3.1	5.6	3.4	6.4	-	-
University	3.0	2.3	1.1	2.7	15.6	-
Academic	1.0	1.5	1.0	1.6	-	-
Higher and technical vocational	7.7	3.9	1.3	1.5	18.5	-
Teacher training	5.1	4.0	1.6	1.7	6.4	7.3
Short-course vocational	-	-	-	-	-	-
Other	0.8	1.7	1.1	4.6	-	-

Source: Same as table 150.

Note: Less than 0.1.

Table 152. Labour force ^{a/} participation rates by geographic region and sex, 1960 and 1970

Region	Participation rates					
	1960			1970		
	Total	Male	Female	Total	Male	Female
Whole Kingdom	79.9	82.7	77.2	75.0	80.4	69.8
Central	73.7	79.2	68.2	67.2	75.3	59.5
Northeast	85.5	85.6	85.3	83.7	85.8	81.6
Northern	80.9	83.5	78.3	75.4	81.1	69.9
Southern	79.2	82.4	75.9	71.0	78.1	63.9

Sources: 1960: J. Rachapaetayakom, *Demographic and Labour Force Growth in Thailand*, unpublished M.A. Thesis, Brown University, 1972; 1970: Government of Thailand, *Population and Housing Census, 1970, Region Series* (Bangkok, National Statistical Office, 1972).

Note: a/ Age 11 and over.

corresponding proportion for unemployed females was about one-sixth. In rural areas, the proportion of unemployed males who had received no education or only elementary education was only about one-seventh. Female workers tended to have a higher rate of unemployment than males with the same level of educational attainment. This is more so in urban than in rural areas (see table 151).

F. GEOGRAPHICAL DIFFERENTIALS IN ECONOMIC ACTIVITY

1. Labour force participation rates

Table 152 shows the labour force participation

rates of the population in the four regions in 1960 and 1970. For the country as a whole, the participation rate of the total population declined from 79.9 in 1960 to 75.0 in 1970, the decline in the female rate being very sharp. The rates for the various regions indicate a sharp drop in participation rate for the Southern Region from 79.2 in 1960 to 71.0 in 1970 and slight decreases in regard to the Central, the Northern and the Northeast Regions. It will also be observed that the participation rate for males in the Northeast Region has remained more or less constant during the 10-year period. The female participation rate is lower in the Central than in other regions.

Table 153. Distribution of employed persons by selected occupations, region and sex, 1960 and 1970

(percentage)

Region	Professional		Farmers		Craftsmen		Service workers	
	1960	1970	1960	1970	1960	1970	1960	1970
Males								
Whole Kingdom	1.7	1.9	78.0	74.6	8.0	8.2	2.2	2.7
Central	2.2	2.7	57.7	51.8	15.6	17.7	4.1	5.1
Northeast	1.6	1.5	90.3	89.2	2.8	3.0	0.9	1.4
Northern	1.4	1.6	84.1	83.6	6.2	5.7	1.5	1.8
Southern	1.6	1.9	81.4	78.8	5.7	6.3	2.3	2.6
Females								
Whole Kingdom	1.0	1.5	86.1	82.8	4.1	4.8	1.8	2.9
Central	1.8	3.0	71.1	62.8	9.1	12.2	4.2	7.1
Northeast	0.5	0.6	95.4	94.5	1.1	1.1	0.3	1.0
Northern	0.7	1.1	81.9	87.9	11.0	3.4	0.1	1.7
Southern	0.9	1.6	88.5	86.6	2.5	2.7	1.5	1.9

Source: Same as table 152.

2. Occupational pattern of the work force

The distribution of employed persons by selected occupations for each region and sex in 1960 and 1970 is given in table 153. Although an overwhelming proportion of the work force in the country as a whole are farmers, the proportion varies from region to region. There are also differences among these regions in regard to the occupation of workers outside the agricultural sector.

The occupational composition of the Central Region is different from that of the other three regions being greatly influenced by a higher degree of urbanization and economic development. Though farming is the most important occupation, the proportion of farmers in this region is smaller than in the other regions. The second largest proportion of the male and female workers in the Central Region were craftsmen because of the large amount of construction work, while services was the third most important occupation. In 1970, only 2.7 per cent of male and 3.0 per cent of female workers were in professional occupations.

The occupational pattern of the Northeast indicates that in 1970, nearly 89 per cent of the employed males and 95 per cent of the employed females were farmers. The proportion of craftsmen was slightly higher than the proportion engaged in professional and service occupations. In the Northern and Southern Regions, while farming constitutes the most important occupation, the proportion of workers who are craftsmen is higher than in the Northeast.

3. Child-and-youth labour force participation^{8/}

The high level of fertility in Thailand is eventually reflected in the larger number of young persons in the population. According to the 1970 census data, about 45.2 per cent of Thailand's population is under 15 years of age. Since most Thai children, particularly those in rural areas, start to work at an early age, the percentage of persons aged 11-19 years who are economically active is very high, about 63 per cent in 1970.

The census data on child-and-youth labour force participation rates given in table 154 indicate that the

Table 154. Child and youth^{a/}labour by region, 1960 and 1970

(percentage)

Region	1960	1970
Whole Kingdom	63.6	62.6
Central	55.9	51.3
Northeast	72.2	75.9
Northern	63.8	63.9
Southern	56.9	50.9

Source: Same as table 152.

Note: a/ Age 11-19 years.

highest concentration of work force aged 11-19 is in the Northeast, 72.2 in 1960 and 75.9 in 1970. It will also be noted that the proportion of child-and-youth labour in the Central, the Northern and the Southern Regions has declined between 1960 and 1970.

8/ Child-and-youth labour force is defined as the population aged 11-19 years that is either employed or in search of employment during the period seven days preceding the census.

Chapter X

POPULATION GROWTH, FAMILIES, HOUSEHOLDS AND HOUSING DEVELOPMENT

A. DATA SOURCE

The major source of information on families and households used in this study is the first round of the National Longitudinal Study of Social, Economic and Demographic Change in Thailand. The rural phase of the survey was conducted in April-May 1969 and the urban phase in April-May 1970. This makes it possible to dichotomize family households into rural and urban categories and study them comparatively. In addition to these survey data, the study also makes use of the relevant data collected in the population censuses of 1960 and 1970. The use of census data, however, is limited to the available tabulated information.

Although the definitions of a "household" in both the National Longitudinal Study and the Population Census of 1960 differ in some details, they are somewhat similar. According to the Longitudinal Study, a household is composed of individuals residing in the same house and taking meals together, regardless of which family each individual belongs to. There may be several families in one household. The survey excludes from its coverage the institutional households such as hotels, hospitals and prisons.

As defined by the census, a private household includes one person living alone or two or more persons, related or unrelated, who have combined to occupy in whole or in part a housing unit (or units) as well as to provide themselves with food or other essentials of living. A private household may contain one family, two or more families, or one or more families and other unrelated individuals such as lodgers, employees etc. An institutional household includes monks living together in a temple, students living in dormitories and inmates of prisons, mental hospitals and the like. A household in which six or more boarders reside is treated as an institutional household. Persons usually residing in a hotel constitute an institutional household. Households are further classified as agricultural households or as non-agricultural households. In the 1960 census, an agricultural household was defined as one which operated two or more *rai*, sold agricultural products valued at Bht 2,400 (\$US200) or more, or had live-

stock valued at Bht 2,400 or more. In the 1970 Census, private households were classified as agricultural households if agriculture was the occupation of the head of the household, regardless of whether his status was own-account worker or employer. Although the census includes the institutional households in its definition, the tabulation separates the non-institutional from the institutional. Thus, the exclusion of the institutional households from the analysis makes the census data comparable with the survey data.

The family is defined as one of the most basic and universal institutions, consisting of a group of two or more persons related by blood, marriage or adoption and residing together in the same household. A household may contain one family or more. There are, generally, three basic family types, namely, the nuclear, the extended and the joint. A nuclear family typically consists of a husband and a wife and their children. An extended family includes the father, his wife, his sons and their wives and their children. The extended family may involve joint households or separate domiciles clustered together to form a large family household. The joint family household includes several related nuclear or extended families in the same household.

For the purpose of analysis, the rural extended families are divided into four types. The first type refers to the family households extended through a married son (patri-local). The second type is an extended family through a married daughter (matri-local). The third type is extended through married children of both sexes. The fourth category includes other types of the extended family through other members of the households related to the household head by blood or marriage. The other types of families such as the joint family households are classified as "other".

The head of the family household refers to the person, either male or female, who is responsible for the well-being of the household. Generally he is the major income-earner of the household. A household may have one family or more but there is still only one head who oversees the general well-being of the household.

B. HOUSEHOLDS AND FAMILIES

1. Household size

The number of households enumerated at the 1960 and 1970 censuses by type and size of household is shown in table 155. It will be seen that the total number of households increased from 4,616,654 in 1960 to 5,939,896 in 1970 or by 28.7 per cent. In both years, the private households constituted about 99.5 per cent of the total households. Between 1960 and 1970, while the number of households increased by 28.7 per cent, the population of these households increased by 31.0 per cent. Consequently, there has been an increase in the average household size from 5.7 in 1960 to 5.8 in 1970. The increase in the average size of institutional households has been more marked because while the number of such households increased by 9.1 per cent, the population living in these households increased by 34.9 per cent.

Though the average size of the private households remained more or less the same in 1970 as in 1960, the pattern of household distribution by size changed slightly during these years as is evident from table 156 and figure 17. In 1970, the proportions of households with two, three, four, five and six persons were less than in 1960. On the other hand,

the proportions of households with seven or more persons had increased between 1960 and 1970. It may also be noted that there was a significant increase in the proportion of one-person households from 2.5 per cent in 1960 to 3.2 per cent in 1970 due perhaps to the migration of single persons to urban areas in search of employment or better employment.

The distribution of the population in private households by size of household is given in table 157. The mode was 6 in 1960 as well as in 1970. While 50.4 per cent of the population was living in households of 7 persons or more in 1960, this proportion increased to 53.8 per cent in 1970.

It is also evident from table 158 that the average size of households tended to be larger in the Northeast where there was a higher proportion of households with five persons and over and a lower proportion of households with less than five persons. In the other three regions, the percentage distributions were almost similar. In the Northern, Northeast and Southern Regions, the households were predominantly agricultural, the highest proportion of agricultural households, 79 per cent, being found in the Northeast Region. The proportion of agricultural households to total households was lowest in the Central Region where this proportion declined from 55 per cent in 1960 to 40 per cent in 1970.

Table 155. Number and average size of households by type, 1960 and 1970

Type of household	Number		Increase 1960-1970	
	1960	1970	Number	Percentage
A. Number of households				
Private household	4,587,865	5,908,473	1,320,608	28.8
Institutional household	28,789	31,423	2,634	9.1
Total	4,616,654	5,939,896	1,323,242	28.7
B. Population				
Population in private households	25,869,039	33,872,577	8,003,538	30.9
Population in institutional households	388,877	524,797	135,920	35.0
Total	26,257,916	34,397,374	8,139,458	31.0
C. Average household size				
Private households	5.6	5.7	-	-
Institutional households	13.5	16.7	-	-
Total	5.7	5.8	-	-

Sources: Government of Thailand, *Population Census 1960, Whole Kingdom* (Bangkok, Central Statistical Office, 1962), table 13; *ibid.*, *Population and Housing Census 1970, Whole Kingdom* (Bangkok, National Statistical Office, 1973), population table 2.

Table 156. Private households, by size, 1960 and 1970

Household size (persons)	1960		1970	
	Number	Percentage	Number	Percentage
1	113,836	2.5	188,659	3.2
2	334,578	7.3	408,895	6.9
3	557,125	12.1	648,869	11.0
4	687,074	15.0	814,572	13.8
5	721,772	15.7	876,744	14.8
6	665,598	14.5	848,734	14.4
7	547,579	11.9	725,795	12.3
8	396,680	8.6	547,217	9.3
9	253,910	5.5	366,161	6.2
10	145,371	3.2	221,456	3.7
11	77,670	1.7	121,676	2.1
12	39,232	0.9	68,743	1.2
13 and over	47,440	1.0	70,952	1.2
Total	4,587,865	100.0	5,908,473	100.0

Source: Same as table 155.

Table 157. Population in private households, by size of household, 1960 and 1970

Household size (persons)	1960		1970	
	Number	Percentage	Number	Percentage
1	113,836	0.4	188,659	0.6
2	671,156	2.6	817,790	2.4
3	1,671,375	6.5	1,946,607	5.8
4	2,748,296	10.6	3,258,288	9.6
5	3,608,860	14.0	4,383,720	13.0
6	3,993,588	15.4	5,092,404	15.0
7	3,833,053	14.8	5,080,565	15.0
8	3,173,440	12.3	4,377,736	12.9
9	2,286,090	8.8	3,295,449	9.7
10	1,453,710	5.6	2,214,560	6.5
11	854,370	3.3	1,338,436	4.0
12	470,784	1.8	824,916	2.4
13+	990,481	3.8	1,053,447	3.1
Total	25,869,039	100.0	33,872,577	100.0

Source: Same as table 155.

Table 158. Percentage distribution of private households by size and by region, 1970

Region	Size of the household					Total	Number of household (000)	Average size	Percentage of agricultural households
	1-2	3-4	5-6	7-8	9+				
Northern	10.7	27.7	30.6	20.3	10.7	100.0	1,363	5.4	70
Central	12.5	24.3	27.6	20.4	15.2	100.0	1,822	5.7	40
Northeast	6.6	22.4	29.9	24.2	16.9	100.0	1,953	6.1	79
Southern	12.4	26.6	28.9	19.7	12.5	100.0	771	5.5	63
Total	10.1	24.8	29.2	21.5	14.4	100.0	5,908	5.7	63

Source: Government of Thailand, 1970 Population and Housing Census, Whole Kingdom (Bangkok, National Statistical Office, 1973).

Table 159. Percentage distribution of rural family households by type

	Type of family households				Number
	Nuclear	Extended	Other	Total	
Total	58.0	40.4	1.6	100.0	1,474

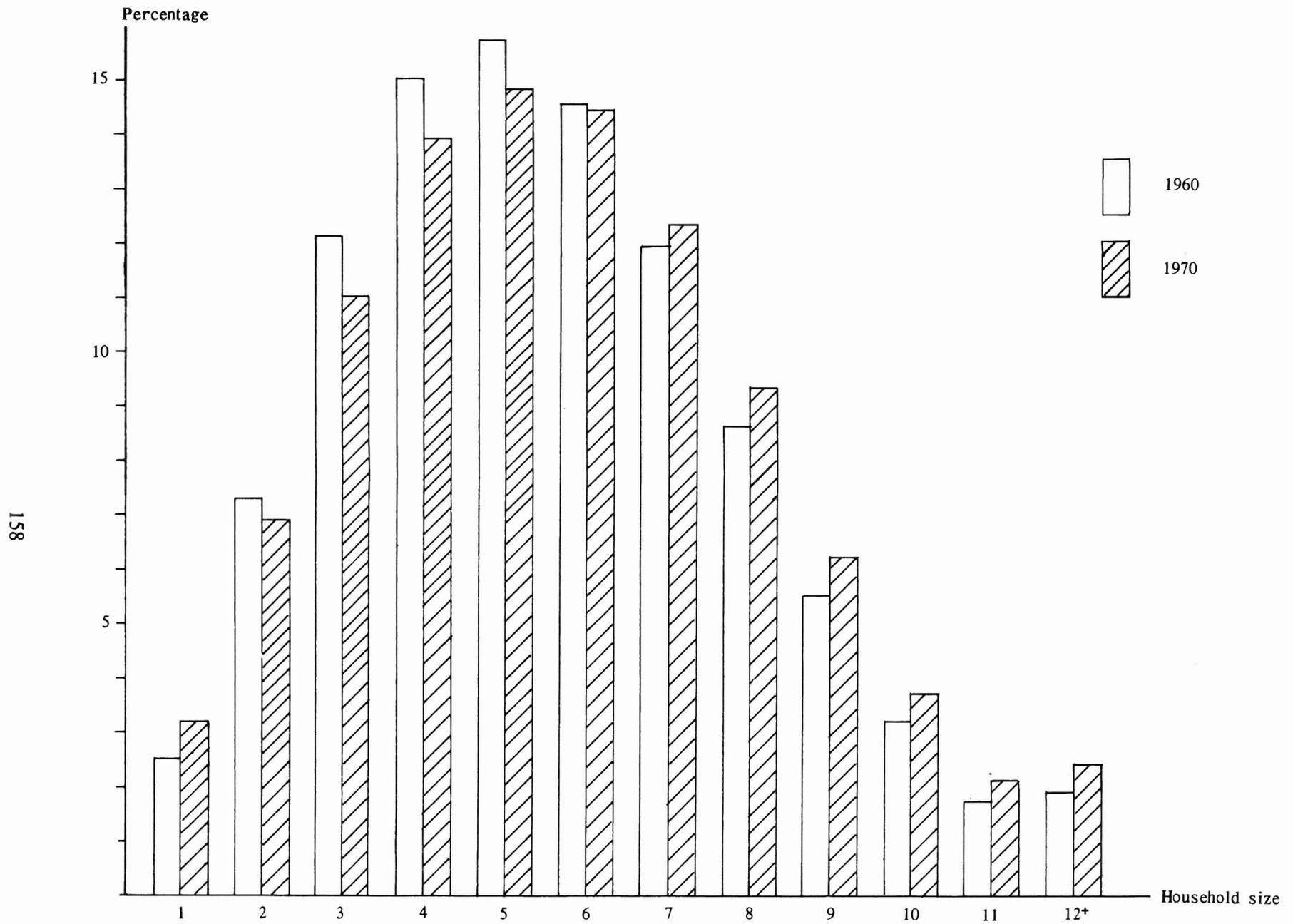
Source: Longitudinal Study of Social, Economic and Demographic Change in Thailand, (First round-rural phase), 1969.

2. Characteristics of the rural households

The two major types of the family households in the rural areas of Thailand are nuclear and extended

as will be seen from table 159. About 58 per cent of rural households are nuclear, 40.4 per cent are extended and 1.6 per cent are classified otherwise.

The percentage distribution of rural households by number of household members and age of household head is shown in table 160. It will be noted that the size of the household increases with the age of the household head up to ages 40-44 and decreases thereafter. This pattern appears to be consistent with the development cycle of the household family. A larger average family size in the early age groups is probably due to an increase in the number of children born in the family as well as additions through marriage. As the family heads grow older, the married children and their families move out and set up their own separate households; the household size therefore becomes smaller.



Source: Table 156.

Figure 17 Distribution of private households by size, 1960 and 1970

Table 160. Percentage distribution of rural households by number of household members and age of household head

Age of household head	Number of the household members					Total	Number of cases	Average household size	Standard deviation
	1-2	3-4	5-6	7-8	9+				
20-24	16.4	41.7	14.6	16.4	10.9	100.0	55	4.9	2.4
25-29	4.4	38.1	41.5	7.0	8.7	100.0	115	5.1	1.8
30-34	3.1	21.7	39.0	29.0	7.2	100.0	193	5.9	1.8
35-39	2.9	10.7	30.8	33.2	22.5	100.0	244	6.8	2.0
40-44	1.5	11.3	20.5	33.3	33.3	100.0	195	7.5	2.1
45-49	1.5	15.0	19.7	26.4	37.5	100.0	208	7.4	2.3
50-54	1.2	10.4	29.9	28.7	29.9	100.0	164	7.1	2.1
55-59	11.5	25.4	28.4	21.5	13.0	100.0	130	5.6	2.5
60+	18.9	32.3	24.4	12.8	11.6	100.0	164	4.9	2.5
Total	5.5	19.8	28.1	25.2	21.3	100.0	1,476	6.4	2.7

Source: Same as table 159.

It is also possible to ascertain the variations in household size among various socio-economic status groups by cross-tabulating the number of household members by the level of education attained by the head of the household or by his occupation. Table 161 gives the percentage distribution of the rural households by number of household members and education level of the household head. It will be seen from this table that generally education is positively associated with family size. In other words, those who are better educated will have a higher income and will therefore tend to have a larger household size because of their economic ability to maintain

more household members. The better educated who get relatively higher incomes can afford to employ servants or maids to do the household work or admit their relatives to stay with them while the less educated or the poor may even have to send their children out to work as maids or servants. Thus, even though the less educated may have higher fertility, they still have smaller household size. The percentage distribution of rural households by number of household members and occupation of household head given in table 162 indicates that in rural areas, the occupation of the household head has no relationship to the average household size.

Table 161. Percentage distribution of rural households by number of household members and educational level of household head

Education of household head	Number of household members					Total	Number of cases	Percent-age	Average household size	Standard deviation
	0-2	3-4	5-6	7-8	9+					
None	10.6	25.3	27.6	20.7	15.8	100.0	348	23.9	5.7	2.4
Under primary	2.1	16.5	31.6	26.9	22.9	100.0	231	15.8	6.6	2.1
Primary and over	4.5	18.8	27.3	26.4	23.1	100.0	879	60.3	6.6	2.4

Source: Same as table 159.

Table 162. Percentage distribution of rural households by number of household members and occupation of household head

Occupation of household head	Number of household members					Total	Number of cases	Average household size	Standard deviation
	1-2	3-4	5-6	7-8	9+				
Agricultural	3.6	19.2	29.5	26.2	21.4	100.0	1,126	6.5	2.3
Non-agricultural	6.3	16.6	27.8	25.2	23.7	100.0	270	6.5	2.5

Source: Same as table 159.

3. Characteristics of the urban households

Preliminary analysis of the National Longitudinal Study in the urban areas indicates that an average family household contains about 6 persons, as shown in table 163. The size of the family households varies with the age of the head of household. The pattern of variation is similar to that of the rural households presented in table 160. However, at each age group, the size of the urban household is consistently lower than that of the rural household.

An analysis of average household size by the educational level of the household head is given in table 164. The analysis shows that the size of

household varies very little with level of education. There was no significant difference in the average size of those households where the educational levels attained by the head were below primary, primary or secondary. In regard to those who had completed education beyond the secondary level, the average household size was slightly smaller. This pattern is in contrast to the positive relationship between household size and educational attainment of household heads observed in respect of the rural areas and is probably due to two factors: first, higher fertility among the less educated tends to increase average family size; secondly, there is the economic ability of the more educated to employ servants or take in relatives and thus maintain a larger household size.

Table 163. Percentage distribution of the urban households by the number of household members and age of the household head

Age of household head	1-2	3-4	5-6	7-8	9+	Total	Number of cases	Average household size
15-19	28.5	50.1	14.3	7.1	-	100.0	14	3.4
20-24	27.7	37.9	20.2	6.7	7.5	100.0	119	4.0
25-29	9.8	40.2	27.3	12.4	10.2	100.0	226	5.0
30-34	10.5	25.4	30.9	18.7	14.2	100.0	342	5.7
35-39	7.0	19.2	23.9	27.6	22.3	100.0	368	7.1
40-44	6.8	13.6	27.3	25.1	27.2	100.0	310	6.9
45-49	9.1	13.9	20.8	26.4	29.8	100.0	231	6.9
50-54	8.3	16.6	21.3	21.3	32.5	100.0	193	7.0
55-59	12.8	20.0	21.8	23.0	22.4	100.0	165	6.2
60+	23.3	24.8	25.7	15.0	11.2	100.0	206	4.9
Total	11.4	22.7	25.0	20.7	20.2	100.0	2,174	6.1

Source: The Longitudinal Study of Social, Economic and Demographic Change in Thailand, (First round - Urban phase), 1970.

Table 164. Percentage distribution of the urban households by number of household members and level of educational attainment of household head

Educational level of household head	Number of household members						Number of cases	Average household size	Standard deviation
	1-2	3-4	5-6	7-8	9+	Total			
Under-primary (0-3)	14.5	19.6	21.3	22.7	21.9	100.0	530	6.1	3.1
Primary (4)	11.7	23.8	25.2	19.3	20.0	100.0	706	6.0	3.0
Secondary (5-10)	10.8	21.1	27.4	21.7	19.0	100.0	517	6.1	2.9
Beyond secondary (11+)	10.2	27.7	28.7	16.8	16.6	100.0	303	5.7	2.9
Total	12.0	22.6	25.3	20.3	19.8	100.0	2,056	6.1	3.0

Source: Same as table 163.

In regard to the occupational distribution in urban areas, the heterogeneity of the occupations of the household heads necessitates a more detailed classification than for rural households, although at the expense of comparability of the urban with the rural households. In most occupational groups, the average household size is about 6.4 persons (see table 165). The households that are of less than average size are those in which the heads are employed in the civil and military services, crafts service industries and recreation. It is also found that those household heads who were engaged in agricultural occupations in the urban areas had a slightly smaller average household size than their rural counterparts.

C. CONSUMPTION AND LIVING STANDARDS

1. Family consumption

Thailand has traditionally been a food exporting country. During the last three decades, while its population grew at an annual rate of 3 per cent, the average annual rate of growth of food production was

slightly over 4 per cent. Consequently, every year, Thailand has been exporting a fourth of its rice production. The surplus of staple food, however, does not necessarily imply that the nutritional level of Thai people is satisfactory. As attested by data from the 1962/63 Household Expenditure Survey presented in table 166, rice and cereals accounted for over 70 per cent of the bulk intake of all food consumed *per capita* per year. There existed, however, substantial differences in sources of calorie and protein supplies among the population in urban and rural areas. Foods of animal origin, i.e. meat, poultry, fish and eggs, constituted more than 20 per cent of annual food consumption of population in Bangkok Metropolis. Corresponding percentages for population in other urban areas and in the rural areas were 15.8 and 8.2 per cent respectively. In terms of quantity, the urban population consumed twice as much food animal origin than the rural population, although quantities of rice and cereals consumed by urban and rural populations were more or less the same. Rice and cereals, therefore, were the important sources of protein for the rural population.

Table 165. Percentage distribution of the urban households by number of household members and occupation of household head

Occupation of household head	Number of the household member					Total	Number of cases	Average household size	Standard deviation
	1-2	3-4	5-6	7-8	9+				
Professional, technical administrative and executive	9.1	22.5	25.5	18.8	24.1	100.0	165	6.5	3.2
Clerical worker	10.0	15.0	30.0	23.8	21.2	100.0	80	6.4	2.8
Sales worker	9.0	20.4	21.7	25.8	23.1	100.0	588	6.4	3.1
Farmer, fisherman, hunter and related worker	10.4	24.6	21.7	17.0	26.3	100.0	106	6.3	3.0
Worker in transport and communication	8.0	19.2	30.0	17.2	25.6	100.0	150	6.5	3.1
Craftsman, production process and labourer	10.9	26.2	24.7	20.2	18.0	100.0	461	5.9	2.9
Service, sport and recreation worker	19.6	25.6	20.2	18.5	16.1	100.0	168	5.3	3.0
Civil service and military	10.2	23.8	29.7	23.3	13.0	100.0	176	5.8	2.6
Looking for work and not looking for work	7.1	28.6	28.7	7.1	28.5	100.0	14	6.4	1.1

Source: Same as table 163.

2. Living standards

Though several indicators may be used to measure the living standards of families, the most commonly used indicator is the average income per family, or better still, the average income per

family member. Information relating to family incomes are available from the 1962/63 Household Expenditure Survey and from the Socio-Economic Survey conducted during 1968/69. The percentage distribution of families by income class for urban and rural areas is presented in table 167.

Table 166. Annual per capita consumption of food: 1962/63

Food group	Quantity (kilograms)				Percentage			
	Whole Kingdom	Bangkok Metropolis	Towns	Villages	Whole Kingdom	Bangkok Metropolis	Towns	Villages
Rice and cereals	167.2	99.1	134.5	177.8	72.5	51.3	62.2	75.4
Meat	8.2	16.4	16.0	6.3	3.6	8.5	7.4	2.7
Poultry	3.0	5.4	3.2	2.8	1.3	2.8	1.5	1.2
Fish	9.3	15.8	10.8	8.5	4.0	8.2	5.0	3.6
Eggs ^{a/}	2.3	5.7	3.7	1.7	1.0	3.0	1.7	0.7
Vegetables	19.7	36.4	27.0	17.2	8.5	18.8	12.5	7.3
Fruits	14.4	7.8	15.2	14.9	6.2	4.0	7.0	6.3
Oils and fats	1.0	2.5	1.6	0.8	0.4	1.3	0.7	0.3
Sugar and sweet	2.4	3.2	2.4	2.4	1.0	1.7	1.1	1.0
Salt, spices etc.	3.1	0.9	2.0	3.4	1.3	0.5	0.9	1.4
Total	230.6	193.2	216.4	235.8	100.0	100.0	100.0	100.0

Source: Government of Thailand, *Advance Report: Household Expenditure Survey, B.E. 2506 (1963)* (Bangkok, National Statistical Office), table F.

Note: ^{a/} Estimated at 55 grams per egg.

Table 167. Percentage distribution of families by income class, 1962/63 and 1968/69

Income class ^{a/} (baht)	1962/63				1968/69			
	Whole Kingdom	Bangkok Metropolis	Towns	Villages	Whole Kingdom	Bangkok Metropolis	Towns	Villages
Under 3,000	48.4	4.8	17.7	56.7	23.4	0.5	0.9	26.7
3,000 - 5,999	20.8	15.0	18.7	21.6	23.4	1.2	3.7	26.3
6,000 - 11,999	19.5	31.7	34.2	16.2	26.1	13.3	18.1	27.3
12,000 - 17,999	5.7	17.4	14.7	3.4	11.7	20.0	21.1	10.3
18,000 - 29,999	3.4	15.8	8.5	1.5	8.6	32.0	29.5	5.5
30,000 and over	2.2	15.3	6.2	0.6	6.9	33.0	26.7	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Annual income (baht)	8,232	18,690	13,090	6,609	10,844	33,193	23,153	8,235

Source: Government of Thailand, *Advance Report Household Expenditure Survey B.E. 2506 (1963)* (Bangkok, National Statistical Office), table 6; *ibid., Socio Economic Survey B.E. 2511-12 (1968-1969)* (Bangkok, National Statistical Office), table 1.

Note: ^{a/} Includes cash income only.

It is evident that there existed a substantial difference between families residing in the Bangkok Metropolis, in other urban areas and in rural areas. On the average, families in the Bangkok Metropolis and other urban areas had an annual income about 3 and 2 times higher, respectively, than those of families in rural areas.^{1/} Moreover, the distribution of families by income class also indicated that while nearly 95 per cent of rural families had an annual income less than 12,000 baht in 1962/63, only 52 per cent of families in the Bangkok Metropolis and about 71 per cent of families in other urban areas were in this category. Although in 1968/69, percentages of families having an annual income less than 12,000 baht had changed, i.e. 80 per cent in rural areas, 15 per cent in the Bangkok Metropolis and 23 per cent in other urban areas, the relative difference between families in these three types of area had not changed noticeably recognizing the fact that family income in this year did not include income in kind.

It is also clear from table 168 that the bigger the size of the family, the higher the amount of family income. This is due mainly to the fact that bigger families also had more earners. The higher income of bigger families, however, did not result in a higher income per family member. In fact, the size of family and *per capita* income of family members are inversely related, that is, the bigger the size of family the lower the income per family member.

D. HOUSING CONDITIONS

1. Source of data

The chief source of data on housing conditions in Thailand is the 1970 housing census taken concurrently with the population census of that year. Strictly speaking, the housing census was not an inventory of housing units, but rather an enumeration of households by their housing characteristics.^{2/} In the municipal areas, all households were asked the housing questions, while in the non-municipal areas, only 25 per cent of all households were interviewed on housing. The reason for this was the homogeneity of housing in non-municipal areas.

1/ Since the data for 1968/69 did not include income in kind which constituted approximately one fourth of rural family's income, the difference seemed to be larger than it should be.

2/ The extensive pre-tests held before the 1970 census revealed that, in most cases, one household resided in one housing unit, although there was not always a one-to-one correspondence, particularly in the more densely populated areas within municipalities. Since the counting of the relatively small number of multihousehold housing units in such areas would appreciably increase the complexity of enumeration, it was decided to opt for a more accurate enumeration of households.

The housing census used the concept of living quarter which was defined as "any place that is used for habitation and may include houses, row-houses, apartments, rooms, boats or any mobile units and other types of structures". The census defined a detached house as one which is separated on all sides from other structures. A detached house may include one or more detached units occupied by one household and also include house rafts. A row-house was defined as any house that is at ground level or raised with 2 rooms or more with at least one common wall. An apartment meant a suite of rooms with a building which is occupied by one household with kitchen, bathroom and entrance separate from other households. Room referred to one room or suite of rooms that are occupied by one household with or without independent kitchen, bathroom and entrance. Boats, rafts and mobile units which were used as living quarters as of the census data were also included in the enumeration, although other characteristics of such living quarters were not asked.

The number of private households by type of living quarters is given in table 169. It will be noted from this table that of the 762,000 private households, containing 4.4 million population, residing in municipal or urban areas, throughout the kingdom, 54 per cent lived in detached houses, about 40 per cent in row houses, 4 per cent in rented rooms, 1.5 per cent lived in apartments and the remaining 1 per cent lived in boats or "other" types of housing. In the non-municipal or rural areas, the distribution of private households by type of living quarters was quite different. Of the 5.1 million households, 94 per cent lived in detached houses, about 5 per cent in row houses and the remaining lived in apartments, rented rooms, boats or "other" types of housing.

In the Bangkok-Thon Buri municipal area, almost half of the private households lived in detached houses, while about 41 per cent lived in row houses. The proportion of households living in apartments and rented rooms was relatively higher in Bangkok-Thon Buri than in other parts of the country.

The distribution of private households by type of construction materials of living quarters is shown in table 170. Of the 754,000 private households in urban areas living in other than boats or "other" types of living quarters, about 69 per cent lived in houses constructed of wood, 15 per cent in houses of cement or brick, and 8 per cent in houses built of wood and cement or brick. About 7 per cent of all households in the urban areas lived in substandard housing constructed of local or re-used materials.

Table 168. Average monthly income per family and per family member by size of family, 1962/63

(baht)

Size of family	Whole Kingdom		Bangkok Metropolis		Towns		Villages	
	Income per family	Income per member	Income per family	Income per member	Income per family	Income per member	Income per family	Income per member
1 person	294	294	542	542	433	433	251	251
2 and 3 persons	418	161	1,082	433	689	265	320	123
4 and 5 persons	528	117	1,440	320	951	211	386	86
6 and 7 persons	620	95	1,659	255	1,229	189	439	68
8 persons and over	777	84	2,267	227	1,488	152	543	60
All sizes	621	113	1,519	276	1,048	198	480	86

Source: Government of Thailand, *Advance Report Household Expenditure Survey B.E. 2506 (1963)* (Bangkok, National Statistical Office), tables 9.0 and 9.1.

In the rural areas, about 63 per cent of the private households lived in wood houses, 1.2 per cent in half wood and half cement or brick structures and only 0.4 per cent had houses constructed entirely of cement or brick. About one third of the households lived in quarters constructed of local or re-used materials. If housing of local or re-used materials is an indication of substandard housing, the rural areas of the Southern Region had the highest percentage of substandard housing, 41 per cent, followed by the rural Northern Region with 34 per cent and approximately 30 per cent each in the rural Central and Northeast Regions of Thailand.

The distribution of private households by type of tenure of living quarters is shown in table 171. It will be seen that about 47 per cent of all private households in the urban areas owned their homes or were buying on installment, 40 per cent rented their homes, and 14 per cent occupied their homes on a rent-free basis. Of these, about 3 per cent were provided housing rent-free as payment in kind.

In the Bangkok-Thon Buri municipal area, about the same proportions of households owned or rented their houses, i.e. 43 per cent and 44 per cent, respectively, while 14 per cent had rent-free occupancy. Of the rented and rent-free households, about 74 per cent reported that their homes were owned by the private sector and less than 20 per cent were Government housing.

In the rural areas, however, almost all, or 91

per cent of the households owned their homes, only 3 per cent rented their homes and 5 per cent had rent-free occupancy.

It is also evident from table 172 that about 74 per cent of the households in urban areas had piped water, either inside or outside the house, while about 19 per cent had access to either a public or private well for their source of water supply. In the rural areas, however, only 3.4 per cent of all private households had piped water. The majority of households in the rural areas, 72 per cent, had to obtain their water supply from either public or private wells. As for lighting, while 86 per cent of households in urban areas had electric lighting, the figure was only 9 per cent in rural areas.

The percentage of households with piped water is lowest in the Southern Region where only about one third of the households in urban areas and only 1.6 per cent of the households in rural areas have access to piped water. The Southern Region also has the lowest percentage of households in urban areas with electricity, only 74 per cent, while for rural areas, the Northeast is lowest with only 4.8 per cent of households with electricity. In Bangkok-Thon Buri municipality, 92 per cent of all households have running water and about 95 per cent have electricity.

The situation regarding sanitary facilities is still more unsatisfactory in the rural areas where only 23 per cent of the private households have flush toilets

Table 169. Private households by type of living quarters, 1970

Type of living quarters	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
Detached house	2,433,315	411,241	1,220,931	113,931	1,107,000	55.1	54.0	94.1	78.6	96.1
Row house	1,778,005	302,459	66,755	29,023	37,732	40.2	39.7	5.1	20.0	3.3
Apartment	52,168	11,189	1,200	254	946	1.2	1.5	0.1	0.2	0.1
Room	116,641	29,582	3,203	837	2,366	2.6	3.9	0.2	0.6	0.2
Boat	11,948	2,469	959	244	715	0.3	0.3	0.1	0.2	0.1
Other	5,320	1,258	746	95	651	0.1	0.2	0.1	0.1	0.1
Unknown	20,859	3,883	3,500	589	2,911	0.5	0.5	0.3	0.4	0.3
Total	4,418,256	762,081	1,297,294	144,973	1,152,321	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, 1970 Population and Housing Census, Whole Kingdom (Bangkok, National Statistical Office, 1973), housing table 1.

Note: ^{a/}The household counts for non-municipal areas shown in this table are the result of a 25 per cent sample enumeration. The number of households in non-municipal areas from the complete count is 5,146,392 of which 574,352 households are located within sanitary districts and 4,572,040 are located in villages outside of sanitary districts.

Table 170. Private households by type of construction materials of living quarters

Construction material	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
Cement or brick	734,497	116,364	7,738	3,210	4,528	16.8	15.4	0.6	2.2	0.4
Wood and cement or brick	374,070	60,053	18,727	5,094	13,633	8.5	8.0	1.4	3.5	1.2
Wood	2,950,444	517,729	831,888	107,897	723,991	67.4	68.6	64.4	74.9	63.1
Local materials	209,855	39,066	374,799	23,918	350,881	4.8	5.2	29.0	16.6	30.6
Re-used materials	81,477	15,836	46,446	2,704	43,742	1.9	2.1	3.6	1.9	3.8
Unknown	29,786	5,423	12,491	1,222	11,269	0.7	0.7	1.0	0.8	1.0
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), housing table 2.

Note: ^{a/} The household counts for non-municipal areas shown in this table are the result of a 25 per cent enumeration. The estimated number of households in non-municipal areas is 5,095,000 of which 568,616 households are located within sanitary districts and 4,526,384 are located in villages outside sanitary districts. The total population and number of households are exclusive of these types of living quarters listed in table 169, i.e., boat, other and unknown.

Table 171. Private households by type of tenure of living quarters, 1970

Tenure of living quarter	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
Owner or hire purchaser	2,227,511	352,068	1,174,552	110,606	1,063,946	50.9	46.7	90.9	76.8	92.7
Renter	1,647,326	296,243	44,009	21,100	22,909	37.6	39.3	3.4	14.6	2.0
Rent free occupancy	499,645	105,129	68,341	11,795	56,546	11.4	13.9	5.3	8.2	4.9
Housing provided as payment in kind	101,114	21,886	9,716	1,918	7,798	2.3	2.9	0.8	1.3	0.7
Other rent free	398,531	83,243	58,625	9,877	48,748	9.1	11.0	4.5	6.9	4.2
Unknown	5,647	1,031	5,187	544	4,643	0.1	0.1	0.4	0.4	0.4
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), housing table 3.

Note: Same as table 170, note ^{a/}.

Table 172. Private households by type of water supply and lighting, 1970

Type of water supply and lighting	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
	Sources of water supply									
Piped, inside	2,500,122	412,975	23,702	10,561	13,141	57.1	54.7	1.8	7.3	1.1
Piped, outside	794,208	145,629	20,556	7,618	12,938	18.1	19.3	1.6	5.3	1.1
Public well	229,294	42,345	451,023	34,068	416,955	5.2	5.6	34.9	23.7	36.3
Private well	552,715	99,845	484,225	50,498	433,727	12.6	13.2	37.5	35.1	37.8
Other	293,772	51,697	304,477	40,441	264,036	6.8	6.9	23.5	28.0	23.0
Unknown	10,018	1,980	8,106	859	7,247	0.2	0.3	0.6	0.6	0.6
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0
	Lighting									
Electric lighting	3,817,819	649,937	116,696	59,482	57,214	87.2	86.1	9.0	41.3	5.0
Other	562,310	104,534	1,175,393	84,563	1,090,830	12.8	13.9	91.0	58.7	95.0
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, *1970 Population and Housing Census, Whole Kingdom* (Bangkok, National Statistical Office, 1973), table 9.

Note: ^{a/} Same as in table 170, note ^{a/}

Table 173. Private households by type of toilet facilities, 1970

Type of toilet facilities	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
Flush, exclusive	228,790	36,925	4,545	1,053	3,492	5.2	4.9	0.4	0.7	0.3
Flush, shared	26,732	5,255	1,480	342	1,138	0.6	0.7	0.1	0.2	0.1
Moulded bucket Latrine, exclusive	3,221,807	533,201	244,087	68,610	175,477	73.6	70.7	18.9	47.6	15.3
Moulded bucket Latrine, shared	463,284	100,202	43,218	12,165	31,053	10.6	13.3	3.3	8.4	2.7
Other	389,301	69,719	969,844	57,420	912,424	8.8	9.3	75.0	39.9	79.5
Unknown	50,215	9,169	28,915	4,455	24,460	1.1	1.2	2.2	3.1	2.1
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, 1970 Population and Housing Census, Whole Kingdom (Bangkok, National Statistical Office, 1973), housing table 10.
 Note: Same as table 170, note ^{a/}.

Table 174. Private households by years (prior to census) of construction of structure

Number of years built (Prior to census)	Number					Percentage				
	Municipal areas		Non-municipal areas ^{a/}			Municipal areas		Non-municipal areas ^{a/}		
	Population	Households	Total households	Sanitary district households	Village households	Population	Households	Total households	Sanitary district households	Village households
Less than 1	138,318	27,721	49,044	4,821	44,223	3.2	3.7	3.8	3.3	3.9
1 - 1.9	183,307	35,829	81,510	8,033	73,477	4.2	4.7	6.3	5.6	6.4
2 - 2.9	247,960	45,826	97,590	9,568	88,022	5.7	6.1	7.6	6.6	7.7
3 - 3.9	248,091	45,476	109,083	10,634	98,449	5.7	6.0	8.4	7.4	8.6
4 - 4.9	213,745	38,857	90,037	8,898	81,139	4.9	5.2	7.0	6.2	7.1
5 - 9.9	830,559	142,861	264,698	29,701	234,997	19.0	18.9	20.5	20.6	20.5
10 - 14.9	826,031	136,699	214,502	25,475	189,027	18.8	18.1	16.6	17.7	16.5
15 - 19.9	399,807	64,178	103,082	12,488	90,594	9.1	8.5	8.0	8.7	7.9
20 & over	1,028,035	165,584	259,312	31,066	228,246	23.5	21.9	20.1	21.6	19.9
Unknown	264,276	51,440	23,231	3,361	19,870	6.0	6.8	1.8	2.3	1.7
Total	4,380,129	754,471	1,292,089	144,045	1,148,044	100.0	100.0	100.0	100.0	100.0

Source: Government of Thailand, 1970 Population and Housing Census, Whole Kingdom (Bangkok, National Statistical Office, 1973), housing table 7.
 Note: Same as table 170, note ^{a/}.

or latrines, either for their own use or shared, compared to about 90 per cent in the urban areas (see table 173).

The distribution of private households by their ages is shown in table 174. Nearly 54 per cent of the rural households and 45 per cent of the urban households have been constructed within the 10 years prior to the 1970 census. Thus the majority of the urban houses are older than the rural ones.

While the results of the census indicate that there is still a great deal to be done regarding improvement of housing quality, development of public utilities and improvement of sanitary standards, it can generally be said that housing problems, both in terms of quality and quantity, are most acutely felt in the Bangkok-Thon Buri municipal area, where the rate of growth has been very high, about 5.5 per cent per annum, and the lack of legal enforcement of land use has resulted in a number of problems in the field of housing. This has led to the development of slums and squatter settlements.

lopment Plan estimated that there was a shortage of 100,000 housing units in the Bangkok Metropolis in 1971 and that if the prevailing trends of public and private housing construction were to continue, this shortage would increase to 170,000 units by 1982.^{4/} A more up-to-date projection by the National Housing Authority indicates that the housing shortage of 104,300 units in 1974 would increase to 191,200 units by 1986.^{5/} These estimates were made on the assumptions that the population of the Bangkok Metropolis area will be 6.3 million by 1986, that the average household size will decrease from 5.9 persons in 1974 to 5.5 in 1986 and that the depletion in the existing stock of houses through obsolescence and other means would be at a rate of 2 per cent *per annum*.

The total housing needs by 1986 of 191,200 dwellings were assumed to be distributed evenly amongst the population according to the proportion of the various income groups, as shown in table 175. It will be seen that the requirement of the low income group will constitute only about 35 per cent of the total

Table 175. Distribution of housing needs by income group

Year	Income group			Total
	35 per cent low (baht) 0-2,000	51 per cent medium (baht) 2,000-5,000	14 per cent high (baht) 5,000-above	
1974	36,500	53,200	14,600	104,300
1980	47,800	69,700	19,200	136,700
1986	66,900	97,500	26,800	191,200

Source: National Housing Authority of Thailand, *Draft Policy Plan* (Bangkok, 1974).

E. HOUSING DEVELOPMENT

1. Urban housing

As noted in the preceding section, the problem of housing, both in quantitative and qualitative terms, is very acute in the urban areas, particularly the Bangkok Metropolis. "The rapid expansion of the Bangkok Metropolitan area and the lack of legal enforcement of land has resulted in a number of problems in the field of housing. There are shortages of accommodation and lack of construction and sanitary standards. This creates slums and squatter settlements".^{3/}

The Third National Economic and Social Deve-

requirements in 1986. It is, however, suspected that the housing requirements of the low and medium income group would be much higher than the figures indicated in table 175. Since housing production is mostly generated by the private sector, it is unrealistic to assume that the low income and lower-middle income groups could compete for the limited housing stock on equal terms with the middle and higher income groups. In fact, it is most likely that the total number of housing needs in 1986 would mostly be attributed to the low income group as they are not able economically to obtain a standardized^{6/} dwelling. Left to their own

^{4/} *Ibid.*

^{5/} National Housing Authority of Thailand, *Draft Policy Plan* (Bangkok, 1974).

^{6/} This means that it is a *legal* dwelling, i.e., it is registered and conforms to building codes, and there is legal tenure of the land.

^{3/} Government of Thailand, *The Third National Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board, 1971), p. 206.

means, the population in the low income groups would resort to overcrowding in the existing built-up environment or to put up their own housing which inevitably means building shanties on other people's lands, and creating adverse physical and social environments all over the Metropolis. It was estimated that in 1974 approximately 1,200 acres (48 hectares) of the Metropolis were occupied by 'slums' and contained up to 15 or 20 per cent of the Metropolis's population.^{7/}

In regard to other urban areas, the extent of the housing problem and the pattern of housing demand has so far not been properly assessed. Since its inception in 1973, however, the National Housing Authority has carried out social surveys in certain regional urban centres as an initial step in articulating housing policies and programmes for its eventual participation in the urban housing development of those towns and cities.

An important constraint to housing development in the urban areas is the scarcity of land. The problem is very serious in the Bangkok Metropolis where industrial, commercial and residential interests compete for the limited buildable land. This is partly due to the fact that although Thailand has had a Town and Country Planning Law since 1936, it was never seriously developed into an effective intervention and guiding mechanism in land utilization. Further, lands located relatively near the urban centres are in most instances not utilized owing to lack of adequate road networks. This, together with the lack of adequate property tax laws, has resulted in land hoarding, since owners could keep valuable land unused without being penalized.

In the past, the administration of the Government housing programme was divided among four agencies. The lack of co-ordination and the low level of operational efficiency of these agencies were the prime reasons for the very slow rate of construction of public housing in the past. Government assistance to the private sector in the field of housing was also not adequate. Hence in 1972, the Government set up the National Housing Authority to:

(a) Provide housing for rent, hire-purchase, or sale;

(b) Provide financial assistance for home seekers or housing developers;

(c) Engage in real estate operations;

(d) Clear slums and develop new housing;

(e) Raise loans from domestic or international sources;

(f) Co-operate or incorporate itself with other organizations, including participation with limited partnerships and limited companies or juristic entities, to sell or purchase land and provide housing or financial resource or guarantees for loans;

(g) Engage in other activities which are related or support its goals.

The programme of the National Housing Authority during the first 10 years envisages, *inter alia*, the building of 170,000 housing units in the Bangkok Metropolis as specified in the Third National Development Plan, and the development of communities by building housing in regional urban centres to prevent the spread of slum areas as well as reduce the volume of Bangkok bound migration. The National Housing Authority will also encourage and promote private sector investment and participation in housing development in accordance with rural, town and city development plans.

2. Rural housing

In Thailand, as in most developing countries, housing conditions in rural areas are very poor. As noted earlier (see table 170), only about 2 per cent of rural houses are constructed with cement and brick while the balance, 98 per cent, are constructed with either wood, or local material or re-used material. Nevertheless, the most serious drawback in rural housing is not so much the dwelling itself but the lack of services and facilities such as a regular water supply, electricity,^{8/} transportation linkages with the towns and cities, health centres and educational institutions.

Rural housing has not been considered as a priority area in any of the three established national development plans. However, the development of piped water supply for the villages throughout the country had been considered as a priority programme since

^{7/} C. Sakornpan, *South East Asian Low Cost Housing Study: Country Monograph of Thailand* (Ottawa, International Research Centre of Canada, 1974), p. 7.

^{8/} The 1970 Population and Housing Census data show that only 3.4 per cent of the total rural households have access to piped water supply compared with 74.0 of the urban households and that over 9.0 per cent of rural households, compared with 86.1 per cent of urban households, have access to electricity. The data also shows that 75 per cent of rural households as against 9 per cent of urban households do not have proper toilet facilities. See tables 172 and 173.

the Second Plan period (1966-1970). Up to 1971, of the 50,000 villages in the country, 15,000 had been provided with piped potable water supply. The Third Plan specified that during 1972 to 1976, 20,000 more villages would be provided with piped water. Other development programmes which would improve the

well being of the rural population such as the Accelerated Rural Development Projects will concentrate on providing transportation linkages to the rural areas and improving their agricultural productivity, educational opportunities, public health standard and so on.

Chapter XI

SOCIO-ECONOMIC IMPLICATIONS OF POPULATION GROWTH

A. INTRODUCTION

The growth of Thailand's population, its distribution and composition has been discussed in the earlier chapters. The picture that emerges clearly indicates that rapid population growth is a recent phenomenon in Thailand. Despite net immigration, Thailand's population grew comparatively slowly in the past because high birth rates were largely offset by high death rates. In recent years, however, the drastic reductions in the country's death rates without compensatory declines in the birth rates have resulted in population growth rates which rank among the highest in the world.

The recent demographic experience of Thailand, as of most developing countries, is completely different from that of the already developed countries in the initial stages of their development. Population growth rates in most developed countries during their pre-modernization phase averaged about 1 per cent *per annum* compared with annual average rates of about 3 per cent now obtaining in Thailand. Further, in the now developed countries, the whole process of declining mortality and the consequent increase in population growth extended over a period of 50 to 100 years and was dependent in the early stages on successful development and the rising levels of living. By contrast, the sharp reduction in mortality in Thailand was accomplished within a very short period of time and was due to the impact of modern preventive and curative medicine. This decline was not brought about by any radical alterations in the economic structure of the country.

The critical aspect of the high growth rate of Thailand's population is that of timing. Rapid increase in population is taking place at a time when the country is trying to achieve a satisfactory level of social and economic progress. The relation of population growth to socio-economic development is apparent and has been recognized by the Government. The Third National Development Plan has clearly stated that "the high birth rate is an obstacle to economic and social development. It increases the Government's financial burden for the provision of education, public health and public utilities. The high birth rate also affects the living conditions of the poor and the quality of manpower".^{1/} The Plan

further asserted that, "as the population growth rate declines, the Government can afford to reduce certain expenditures and will be able to use the funds so saved more productively by, for example, improving the educational system for an eventual rise in the quality of future human resources"^{2/}

An attempt is, therefore, made in this chapter to examine some of the implications of alternate rates of population increase for the social and economic development of the country.

B. DEPENDENCY BURDEN

As mentioned in chapter III, a very significant aspect of the recent rapid population growth in Thailand is the resultant problem of heavy dependency burden. Continuing high fertility and declining mortality has resulted in a large proportion of young persons in the total population.

For the Kingdom as a whole, the number of children below 15 years of age per 100 persons in the working age was 87 in 1970 compared with 32 in Sweden, 35 in Japan, 38 in the United Kingdom, 70 in Sri Lanka and 77 in the Republic of Korea. Thus, the child dependency ratio for Thailand is among the highest in the world. In other words, in Thailand about 100 persons in the working age group have to support about 87 dependent children, while in most other countries this burden is comparatively less.

Apart from increasing the burden of dependency, the disproportionately large number of children in the total population tends to promote spending for immediate consumption, to restrict both private and public saving and hence to inhibit productive investment. By and large, children below 15 years are economically dependent; they have to be fed, clothed, educated and provided with health and recreation. The increased burden of children on the economically active sector of the population means that a large proportion of the country's limited capital resources has to be diverted to provide various facilities for the children and very little will be available for investment in economic development.

The projections of the population prepared by ESCAP and discussed in chapter VII show that the proportion of children under 15 years will decline year after year but the extent of this decline will de-

^{1/} Government of Thailand, *The Third National Economic and Social Development Plan (1972-1976)* (Bangkok, National Economic and Social Development Board, 1971), p. 42.

^{2/} *Ibid.*, p. 102.

Table 176. Proportion of population aged 0-14 years in the total population and child dependency ratios ^{a/} according to three projections, Thailand, 1975-2000

Projections	1975	1980	1985	1990	1995	2000
	Percentage aged 0-14 years in total population					
High fertility	43.7	42.3	41.7	40.5	39.9	39.1
Medium fertility	43.7	41.7	39.4	37.4	35.5	33.5
Low fertility	43.7	41.1	37.3	33.4	30.3	27.8
	Child-dependency ratio ^{a/}					
High fertility	82.1	77.7	75.9	72.6	70.9	68.7
Medium fertility	82.1	75.9	68.9	63.5	58.7	54.0
Low fertility	82.1	73.9	63.2	53.5	46.4	41.3

Source: National Statistical Office and others "Population projection for Thailand 1970-2010", (mimeo).

Note: ^{a/} Number of children aged 0-14 years per 100 persons aged 15-64 years.

pend on the speed of the assumed declines in fertility. According to table 110, the proportion of children under 15 years estimated at 44.9 in 1970 will decline to 38.7 by 2000 if fertility declines slowly and to 27.3 if there were to be a very rapid decline in fertility. The child dependency ratio will also decline from 87 in 1970 to about 67 according to assumption of slow fertility decline and to about 40 if fertility were to decline very rapidly. A similar trend is also indicated by the projections prepared by the National Statistical Office and others as is evident from table 176.

C. EDUCATIONAL NEEDS

An almost immediate consequence of rapid population growth is the expansion in the population of school-going age. In Thailand, the very high rates of population growth experienced during the last two decades or more has resulted in an equally high rate of increase in the population of school-going age, viz., 5-14 years and 15-19 years which correspond roughly to the first and second level school enrolments. According to the population censuses, the population aged 5-14 years increased from 7.1 million in 1960 to 9.8 million in 1970 or by nearly 39 per cent. During the same period, the population aged 15-19 years increased from 2.5 million to 3.7 million or by about 49 per cent.

During the 1960s, Thailand has implemented two National Educational Development Plan, both integral parts of its Socio-economic Development Plans. Both Educational Plans had as their major objectives the expansion of enrolments at all levels to accommodate not only the tremendous growth of school-age population but also to cope with the rising

social demand for education. With a view to achieving this commitment and the national goals for educational development, the Government has built and expanded an increasing number of primary schools throughout the country. Consequently, there has been a rapid expansion in school-enrolments at all levels. Enrolment at the primary level increased from 3.9 million in 1960 to 5.7 million in 1970, an increase of 43.6 per cent; expansion at the secondary level, from 302,655 to 590,307, an increase of 95 per cent, has been still more rapid.

However, the expanding school enrolments between 1960 and 1970 did not bring about a corresponding increase in school enrolment ratios. In 1960, about 81 per cent of the age group 7-13 were in school; in 1966, at the end of the First Development Plan, this enrolment ratio was 77 per cent; and in 1970, at the end of the Second Plan period, 79 per cent in the 7-13 age group were enrolled in schools. The situation in regard to enrolments at the lower primary (grades 1-4) and upper primary (grades 5-7) has, however, been different. While practically all eligible children were enrolled in the lower primary grades in 1970, only 32 per cent of the eligible children were enrolled in the upper primary grades. Thus, though Thailand was perhaps the first Asian country to adopt the objective of universal seven-year primary education as a social goal, most children in Thailand complete only four years or less of primary education. In 1971, only about 32 per cent of the pupils enrolled in grade 4 proceeded to grade 5.

In regard to education at the secondary level, the total enrolment which was 302,655 or 11.1 per

cent of the 14-18 age group in 1960 increased to 392,193 or 11.4 per cent of the relevant age group in 1966 and to 590,307 or 12.3 per cent in 1970. Though the increase in total enrolment between 1960

goals and targets of the Government. The growth in the school-age population between 1975 and 2000 according to three different assumptions of fertility is indicated in table 177.

Table 177. Projected growth of the population of school-going age (5-19) according to three fertility assumptions: Thailand, 1975-2000

Age group	1975	1980	1985	1990	1995	2000
High fertility						
5-14	11,540	12,716	14,033	15,980	18,105	20,317
15-19	4,502	5,304	6,076	6,384	7,394	8,429
5-19	16,042	18,020	20,109	22,364	25,499	28,746
Medium fertility						
5-14	11,540	12,716	13,504	14,482	15,383	16,129
15-19	4,502	5,304	6,076	6,484	6,932	7,409
5-19	16,042	18,020	19,199	20,966	22,315	23,538
Low fertility						
5-14	11,540	12,716	13,061	12,743	12,352	12,183
15-19	4,502	5,304	6,076	6,484	6,435	6,185
5-19	16,042	18,020	19,137	19,227	18,787	18,368

Source: Same as table 176.

and 1970 was about 95 per cent, there has not been any significant improvement in the enrolment ratio at the second level of education.

The Third Five-Year Plan (1972-1976) also has as its main objective the expansion of "lower primary education in order to supply education to the increasing number of school-age children" and to "improve and expand compulsory education at the upper primary level." It is estimated that at the end of the Plan period, enrolment at lower primary level will be approximately 5,730,500, or 930,900 (19 per cent) more than at the end of the Second Plan period, and that enrolments at upper primary level will increase to 1,555,000 or 68 per cent more. The target thus is to increase enrolments at upper primary level from about 34 per cent in 1971 to almost 50 per cent by the end of 1976. The Third Plan also aims at increasing enrolment at the lower secondary level by 264,900 or 102 per cent more and expand enrolments at the upper secondary level by 78,100 or by 99 per cent.^{3/}

In addition to the existing backlog in enrolments, the anticipated increase in the population of school-going age over the next two decades or more will render difficult the attainment of the educational

Between 1975 and 1980, the school-age population (5-19) is estimated to increase by approximately 396,000 *per annum*. During the decade of the 1980s, the effect of the assumed decline in fertility would be felt in these age groups. Between 1980 and 1990, the school-age population will increase by 4.344 million according to assumptions of high fertility and by only 1.2 million if the low projection is followed. The difference is particularly noticeable in respect of the 5-14 age group where, between 1980 and 1990, numbers hardly increase in the low projection, but increase by 3.3 million in the high projection. Thus, during the 1980s, "the task of increasing the school facilities to keep pace with the swelling school-age population will grow more manageable if a rapid fertility decline sets in during the 1970s; if the decline in fertility is as modest as in the high projection, the task will continue to be formidable".^{4/}

The task of providing adequate educational facilities to the rapidly increasing school-age population is further complicated by the fact that wastage of various forms exists at all levels. Large numbers of students either drop-out, or repeat or fail in their

^{3/} *Ibid.*, p. 252.

^{4/} Gavin Jones, *Population Growth and Educational Planning in Developing Nations* (New York, Irvington Publisher, Inc., 1975), p. 99.

examinations. The highest ratios of failure are at the lower primary and the upper secondary levels. "Because of repetition and drop-out, 4.7 years of education need to be invested to produce one Pratom 4 leaver, and of these Pratom 4 leavers only 57 per cent can be considered functionally literate"^{5/}. The problem is how to reduce this wastage and improve the quality of education while at the same time cater for rapidly increasing enrolments.

Another serious problem that encounters the educational planners in Thailand is the acute shortage of teachers, especially in the rural and remote areas. The shortage in some specialized fields, particularly vocational education, is especially crucial. In addition, a considerable number of newly qualified teachers are absorbed into the private sector upon completing their education. Attempts are, however, being made to expand teacher education at a rapid rate, as well as to improve the utilization and distribution of teachers in the remote rural areas by offering incentives such as housing facilities, transportation allowance and opportunities for further education for teachers in these areas. These measures will increase further the cost of providing education facilities in the country.

It has also to be noted that at present, the social demand for education at all levels is rising rapidly while financial resources for education remain very limited. It will be seen from table 178 that slightly

more than 3 per cent of the gross domestic product is spent by the Government on education. The aim of broadening Thailand's educational base will bring about enormous increases in enrolments as well as requirements for teachers and for class-rooms. Thus one of the principal problems facing the Government is how to provide enough schools and teachers to cater to the needs of the increasing number of school-age children while at the same time meeting the demands of the other competing sectors of the economy with limited financial resources.

Given the level of commitment of the Government toward quantitative expansion and qualitative improvement of education in the country, progress in achieving these goals would be more rapid if Thailand's population would over the next few decades, grow at a much slower rate. This has been very clearly brought out in a recent study which seeks to measure the effects of alternative population trends on the achievement of educational goals and targets in the country.^{6/} The educational targets contrasted in this study are maintaining the *status quo* in terms of coverage and quality of the educational system, that is static expansion which leaves enrolment rates unchanged over the years; and effecting certain improvements in coverage and quality or improving the enrolment rates. The method used was to apply to population projections based on three different assumptions regarding the future course of fertility and two different sets of assumptions about

Table 178. Gross domestic product, national budget and total budget for education
(\$ US million)

Fiscal year	Gross domestic product (GDP)	National budget	Budget for education		
			Amount	As percentage of GDP	As percentage of the National budget
1960	2,754.4	390.5	68.2	2.5	17.5
1961	2,917.6	333.0	75.8	2.6	22.8
1962	3,183.0	444.0	81.3	2.5	18.3
1964	3,723.4	571.5	98.9	2.6	17.3
1966	5,029.7	757.0	125.2	2.5	16.5
1967	5,334.9	924.0	149.7	2.8	16.2
1968	5,806.5	1,063.1	171.4	2.9	16.1
1969	6,467.1	1,213.4	202.8	3.1	16.7
1970	7,194.1	1,364.9	239.3	3.3	17.5
1971	7,875.3	1,432.3	257.5	3.3	18.0

Source: "Educational development in Thailand, 1960-1970" in *Education in Asia*, Bulletin of the UNESCO Regional Office for Education in Asia, Special Number, vol. VI, No. 2, March 1972, p. 198.

^{5/} *Ibid.*, p. 94.

^{6/} Gavin Jones, *op.cit.*

Table 179. Index of growth of school enrolments: Thailand, 1970-2000

	1970 ^{a/}	1975	1980	1990	2000
Constant enrolment rates					
High projection					
Lower primary	100	122	139	173	210
Upper primary	100	170	219	287	369
Secondary	100	147	183	246	318
Vocational secondary	100	133	157	212	273
University education	100	141	171	237	310
Medium projection					
Lower primary	100	122	140	157	159
Upper primary	100	170	218	277	304
Secondary	100	147	183	246	280
Vocational secondary	100	133	157	212	242
University education	100	141	171	237	293
Low projection					
Lower primary	100	122	132	133	141
Upper primary	100	170	220	232	264
Secondary	100	147	183	222	239
Vocational secondary	100	133	157	193	207
University education	100	141	171	232	244
Improving enrolment rates					
High projection					
Lower primary	100	122	139	173	210
Upper Primary	100	170	274	541	733
Secondary	100	147	211	370	534
Vocational secondary	100	133	182	322	470
University education	100	141	198	376	634
Medium projection					
Lower primary	100	122	140	157	159
Upper primary	100	170	274	521	604
Secondary	100	147	211	370	469
Vocational secondary	100	133	182	322	417
University education	100	141	198	376	598
Low projection					
Lower primary	100	122	132	133	141
Upper primary	100	170	275	435	523
Secondary	100	147	212	334	401
Vocational secondary	100	133	182	293	355
University education	100	141	198	371	500

Source: Gavin Jones, *Population Growth and Educational Planning in Developing Nations* (New York, Irvington Publisher, Inc., 1975), table 6.4.

Note: ^{a/} 1970 = 100. 1970 enrolment base (numbers in '000); lower primary, 4,690; upper primary, 791; secondary, 498; vocational secondary, 60; university (including graduate students), 41.

Table 180. Percentage increase in projected school enrolments Thailand, 1970-2000

	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
Constant enrolment rates						
High projection						
Lower primary	22	15	12	11	11	9
Upper primary	70	29	15	14	14	13
Secondary	47	24	17	15	14	14
Medium projection						
Lower primary	22	15	8	4	2	-1
Upper primary	70	28	16	9	5	4
Secondary	47	24	17	15	8	5
Lower projection						
Lower primary	22	8	-2	3	4	2
Upper primary	70	29	7	-2	4	6
Secondary	47	24	15	5	0	7
Improving enrolment rates						
High projection						
Lower primary	22	15	12	11	11	9
Upper primary	70	61	44	37	17	16
Secondary	47	43	34	30	20	20
Medium projection						
Lower primary	22	15	8	4	2	-1
Upper primary	70	61	46	31	8	7
Secondary	47	43	35	30	14	11
Low projection						
Lower primary	22	8	-3	3	4	2
Upper primary	70	62	34	18	10	9
Secondary	47	44	33	19	6	13

Source: Gavin Jones, *Population Growth and Educational Planning in Developing Nations* (New York, Irvington Publisher, Inc., 1975), table 6.5.

enrolment rates at the school-going age.^{7/} The increase in enrolments according to the two assumptions are shown in tables 179 and 180.

It will be seen that between 1970 and 1975 there was a sharp increase in enrolments, particularly at upper primary and secondary levels because of the

^{7/} The first set of assumptions regarding future enrolment rates is that the enrolment rates would be held constant at the levels for 1976 implicit in the enrolment targets of the Third Five-Year Plan except for the lower primary level where a decrease of the enrolment rate has been assumed after 1975. In the second set it has been assumed that (a) the goal of extending compulsory education from four to seven years will be reached by 1990; (b) at the secondary level, the rate would double from its 1976 level of 12.5 per cent before 1990; (c) in regard to vocational secondary education, the rate would double before 2000; (d) the vocational technical enrolment rates would have trebled by 2000 because of the very heavy demand for these graduates; (e) enrolment rates for teacher training and universities would double by 1990.

emphasis given to these two levels in the Third Five-Year Plan. According to the assumption of constant enrolment rate, after 1980, enrolments at the secondary level will grow only slightly faster than primary enrolments if fertility follows the high projection. However, if there were to be a rapid decline in fertility, primary enrolments will increase much more slowly than secondary enrolments because the primary school-age cohorts are the first to be affected by the fall in birth rate. Although according to the assumption of constant enrolment rates there will be no change in the rates after 1980, "the increase in enrollments due to population increase alone is very substantial. Indeed, enrollments at all levels above the primary grow by at least three-quarters in the twenty years from 1980-2000 if the high population projection is followed. This period is not long enough to illustrate the full effects of a decline in fertility, because numbers at the upper levels of education only start to be affected in the 1990s. Nevertheless,

the importance of a fertility decline is evident early enough at the primary level. In the decade of the 1980s, primary enrolments must increase by 26 per cent in the high projections, but by only 2 per cent if fertility declines rapidly”^{8/}

It is also clear from tables 179 and 180, that under assumptions of improving enrolment rate, there will be an enormous increase in enrolments at the upper primary level and that these enrolments will be doubling almost every seven years during the 1970s and will double again in 10 years during the 1980s. In other words, the upper primary enrolments will increase six-fold in the 24 years following 1970. If, however, there were to be a rapid decline in fertility, it would take about 24 years after 1980 for the enrolments to double while the increase during the 24-year period following 1970 will be only two and a half times. In regard to enrolments at the secondary level, there will be a doubling in about 11 years following 1975 according to the high projection. According to the low projection, a doubling would still not have occurred during the 25 years 1975-2000, and in the decade of 1990s, enrolments at secondary level will increase by only 20 per cent despite the rise in enrolment ratios.

high population projection, nearly 21 per cent of upper primary enrolments is attributable to population growth alone, whereas 34 per cent is attributable to higher enrolment rates alone; a further 45 per cent is caused by the interaction of both factors. By contrast, according to the low projections, less than 16 per cent of the increase in enrolments will be the result of population growth, while 51 per cent of this increase will be due to rising enrolment rate. At the secondary level population growth alone accounts for 30 per cent of the increased enrolments according to high projections and to 24 per cent if the low projections hold. However, in regard to enrolments at the lower primary level where universal education has been attained, population growth is entirely responsible for the increase in enrolments.

In estimating the cost implications of the various projections, the study projected the recurrent expenditure and capital expenditure separately and the total cost was expressed as a percentage of the projected gross national product (GNP) for various years. It will be seen from table 181 that the share of the GNP required to maintain constant enrolment rates falls steadily after 1975 in all projections on account of the effect of lowered fertility rates. Under conditions of “improving enrolment rate”

Table 181. Projected total expenditure on education as a percentage of GNP, Thailand, 1970-2000

	Constant enrolment rates			Improving enrolment rates		
	High Projection	Medium projection	Low projection	High projection	Medium projection	Low projection
1970	3.5	3.5	3.5	3.5	3.5	3.5
1975	3.8	3.8	3.8	3.8	3.8	3.8
1980	3.4	3.4	3.1	3.9	3.9	3.7
1985	3.3	3.1	2.7	4.1	3.9	3.5
1990	3.1	2.9	2.5	4.1	3.8	3.3
1995	3.0	2.6	2.3	4.1	3.5	3.1
2000	2.9	2.3	2.1	4.1	3.3	3.1

Source: Gavin Jones, *Population Growth and Educational Planning in Developing Nations* - (New York, Irvington Publisher, Inc., 1975), table 6.10.

Note: a/ Total expenditure includes capital and recurrent expenditures; capital expenditure includes both expenditures necessitated by growing numbers of students and replacement expenditures.

The Jones study has also demonstrated through standardization procedures^{9/} that in terms of the

the share of the GNP needed for educational expenditure continues to increase upto 1985, and in the case of the high projection it levels off thereafter, whereas, in the medium projection it starts to decline. This share shows a decline throughout the period after 1975 in the low projection. “Clearly, the ambitious increases in educational coverage could be realized without undue financial projection; the same increases would create some financial difficulties in the first two decades,

^{8/} Gavin Jones, *op.cit.*, p. 101.

^{9/} That is, holding population size constant to determine how many extra enrolments are attributable to enrolment rate trends alone, and holding enrolment rates constant to see how many extra enrolments are attributable to population trends alone.

if population grows according to the medium projection, and if the high projection holds, such increases would require a high degree of commitment by the government to education, whose share in the national budget would probably have to be steadily increased until the 1990s. By the latter part of the 1990s, a full 1 per cent of the GNP would be saved *annually* in reaching the improving enrolment rate target, if fertility followed the low rather than the high projection. The public sector share of this saving would probably amount to almost 4 per cent of the total government budget” ^{10/}

D. HEALTH CARE

Health is another field where public expenditure would almost certainly increase in response to rapid population growth. Though considerable progress has been made in recent years in the matter of providing medical and sanitary services, yet in Thailand, as in most developing countries, the levels of health services *per capita* remain very low. Compared with developed countries, the infant and maternal mortality rates are very high. The ratio of doctors and paramedical personnel to total population is very unsatisfactory with 1 doctor per 6,500 of the population and 1 nurse per 2,100 of the population. There is also a wide disparity in the availability of health services between urban and rural areas.

Public health policy, according to the First Plan, aimed in the first instance at improving medical care by increasing the supply of health manpower, number of hospital beds and equipment and, secondly, towards expansion of health services available in remote rural areas and locations which lacked easy access to hospitals. These policy objectives were retained in the Second Plan as well. However, the programmes envisaged in the First and Second Plan could not be fully implemented due to various administrative and technical problems. The Third Plan therefore, had as its policy the encouragement and support of public health activities and expansion of these activities in conjunction with the over-all expansion of the economy. This was to be achieved by improving the efficiency and scope of the existing programmes throughout the Kingdom in order to enable the whole population, and in particular the people living in remote areas to benefit to the utmost from the services available.^{11/}

As noted earlier, an important obstacle to public

health development in Thailand is the shortage of trained personnel, especially doctors and nurses. “In 1970, the nation had one physician for each 8,000 persons, one nurse for each 4,000, one nurse or midwife for each 2,500 and one hospital bed for each 1,100. As satisfactory health-care standards call for one doctor for every 1,000 persons, one nurse for every 400 and one bed for 100, the severity of the need for more health manpower, and facilities is obvious. To meet modern standards by 1990, Thailand needs to train 3,200 new M.D.s every year —more than 10 times the present production of 300 M.D.s annually. The present annual production of 800 new nurses is also inadequate to raise the nurse-to-population ratio to an acceptable level. If these present increments of health personnel and hospital beds persist while the current rate of population growth remains unchanged, then those already-inadequate ratios will not improve and may even deteriorate.”^{12/}

In Thailand, as in most countries, attention should be given to the possibility of narrowing the gap between rural and urban areas in the availability of health services. For instance, while in the Bangkok Metropolis, the doctor-population ratio is 1:1,400, it is 1:10,000 in rural areas. There is a tendency for doctors, particularly private practitioners to be concentrated in the towns and hence the lack of medical care in rural and remote areas is acute. The current wide discrepancy in availability of health services as well as the growth of urban areas makes it absolutely essential that health services be planned separately for urban and rural areas. The objective of simply holding health service ratios constant in the country as a whole will mean a decline in health service ratios in urban areas, or in rural areas or in both.

In order to obtain a comprehensive picture of the health service requirements, it will be necessary to examine the regional distribution of population as well as the effects of changing population composition on health needs. Different age and sex groups in the population have widely different probabilities of sickness and recourse to medical attention. For instance, in both developed and developing countries, infants and the aged are those with the highest incidence of sickness and hospitalization. In developing countries like Thailand, where the proportion of children in the total population is high, illness among young children constitutes a very significant proportion of the total health service demand. The age-sex patterns of health service requirements will vary with different population trends. For instance, a decline in fertility will im-

^{10/} Gavin Jones, *op.cit.*, p. 114.

^{11/} Government of Thailand, *op.cit.*, p. 227

^{12/} Ralph Thomlinson, *Thailand's Population-Facts, Trends, Problems and Policies* (Bangkok, Chulalongkorn University, 1971), pp. 87 and 88.

mediately slow the increase in numbers of infants and children and, after about 15 years or so, will begin to affect the numbers in the reproductive age groups.

The points discussed above were taken into consideration in recent study^{13/} which analyses the implication of alternative population growth trends for the development of health care services in Thailand. In this study, personnel and budgetary requirements of the nation's public health services were estimated under four different sets of population projections. Four different assumptions as to the desired service ratios (that is, ratios of doctors, nurses, hospital beds and so forth per 100,000 population) were made for each of the four population projections. In none of them are service ratios in Bangkok assumed to rise. It was only in respect of 'the rest of Thailand' where service ratios are very low that a trebling of these ratios between 1970 and the year 2000 are assumed.

the long run.^{14/} Table 182 shows the number of medical personnel and hospital beds that would be required under four different fertility assumptions in the year 2000 if service ratios were trebled. The growth over the 30-year period is spectacular: if fertility remains constant, almost a sixfold increase in the number of doctors and nurses, a sixfold increase in hospital beds and a sevenfold increase in midwives and practical nurses would be needed. According to the more realistic medium population projection, the required increase would still be 4.5-fold in the case of physicians, about fivefold in regard to practical nurses and beds and about sixfold in respect of midwives. The training requirements during the period would be even larger because of attrition. Whether these substantial requirements can be successfully met will depend on both the capacity of the training institutions to produce sufficient trained personnel quickly enough and the cost of training and employing such large numbers of health personnel.

Table 182. Number of health personnel and hospital beds required with trebling of service ratios outside Bangkok: Thailand 1970 and 2000

(in thousands)

Personnel and facilities	1970	2000								
		Constant fertility (C)	High (H)	Medium (M)	Low (L)	Ratio of				
						L/C	M/C	L/M	M/H	L/H
Physicians	3.23	18.58	16.31	14.38	13.49	.73	.77	.93	.88	.83
Registered nurses	7.31	43.70	38.35	33.83	31.74	.73	.77	.93	.88	.83
Practical nurses	4.48	30.82	27.04	23.85	22.38	.73	.77	.93	.88	.83
Health workers	2.40	17.58	15.43	13.60	12.77	.73	.77	.93	.88	.83
Midwives	3.19	23.68	20.78	18.33	17.20	.73	.77	.93	.88	.83
Dentists	0.36	2.45	1.86	1.63	1.54	.73	.77	.93	.88	.83
Hospital beds	33.01	216.38	189.89	167.47	157.15	.73	.77	.93	.88	.83

Source: Gavin W. Jones and Chet Boonpratuang, *The Effect of Population Growth and Urbanization on the Attainment of Public Health Goals in Thailand* (Bangkok, National Economic Development Board, 1973).

However, since the assumptions of constant service ratios over the years is not a realistic one, a comparison of the results of the projections based on improved ratios is made to illustrate the effect of alternate population trends on the development of health services in the country. A trebling of service ratios (excluding Bangkok) might be considered a reasonable set of objectives for Thailand to pursue over

The trends in health costs according to assumptions of improving service ratios are indicated in table 183. The increase in costs between 1970 and 2000 are spectacular, the total costs increase by over 13 times in the high projection, a little less than 12 times in the medium projection and by 11 times in the low projections. In the year 2000, the total health costs based on assumption of improved service ratios

^{13/} Gavin W. Jones and Chet Boonpratuang, *The Effect of Population Growth and Urbanization on the Attainment of Public Health Goals in Thailand* (Bangkok, National Economic Development Board, 1973).

^{14/} It may be argued that a trebling of health service ratios outside of Bangkok in 30 years is not enough, given the existing low ratios. Nevertheless it does represent a substantial improvement over the present situation and the cost implications are of special interest.

Table 183. Costs ^{a/} of health services with trebling of service ratios outside Bangkok: Thailand, 1965-2000
(in thousand bahts)

Five-year period to	High projection			Medium projection			Low projection		
	Investment	Operating	Total	Investment	Operating	Total	Investment	Operating	Total
1965	1,080	1,972	3,052	1,089	1,972	3,052	1,080	1,972	3,052
1970	1,840	3,469	5,309	1,840	3,469	5,309	1,840	3,469	5,309
1975	2,721	5,807	8,528	2,721	5,807	8,528	2,603	5,734	8,337
1980	4,312	9,327	13,639	4,214	9,267	13,481	3,873	8,920	12,792
1985	6,835	14,959	21,794	6,436	14,596	21,032	6,000	13,821	19,821
1990	9,491	23,011	32,502	8,596	21,890	30,485	8,051	20,617	28,668
1995	14,029	34,435	48,464	12,168	31,751	43,919	11,454	29,876	41,329
2000	20,438	51,136	71,574	17,183	45,639	62,822	16,053	42,870	58,923

Source: Same as table 182.

Note: ^{a/} All costs are in 1962 prices: one baht = \$US0.0481.

will be about 21 per cent more if population trends were to conform to the high instead of the low projections,

The crucial question, however, is how likely is it that the projected total health cost increases can be sustained? In other words, how heavy a burden do they imply when compared with trends in GDP and Government budgets? The trends in costs are compared with growth of the GDP during the period 1970-2000 in table 184.^{15/} The assumption that Thailand's GDP will grow at a rate of 6 per cent *per annum* appears to be reasonable. In such a case it will be seen that even under the assumption of constant service ratios, the share of total health costs in GDP will remain more or less unchanged only if population trends follow the low projection. But this share will increase gradually from 1.1 per cent in 1970-1975 to 1.3 per cent in 1995-2000 if the high projection were to obtain.

However, the situation will be different if the Government of Thailand were to implement a health programme in which service ratios would be improved as assumed earlier. The share of the GDP required will then rise "substantially even if the low population projection is followed, but the rise is much sharper if fertility declines slowly, as in the high population projection. The share of GDP required rises 64 percent during the 30-year period when the low population projection is followed, but the increase is 96

percent if the high population projection obtains. In either case, realization of the goal of improving health service ratios would require that a substantially larger share of GDP (and, presumably, also of government revenues) be channelled into health services."^{16/}

The general message of the Jones and Boonpratuang study is very clear. Thailand could achieve health personnel/population ratios which are comparable to international standards before the end of this century only if: larger proportions of Government revenues are allocated for development of health services particularly in the rural and remote areas; attrition rates, caused especially by overseas emigration of doctors and nurses, could be lowered; and rates of population growth can be reduced. Probably all these changes need to occur simultaneously.

E. LABOUR FORCE AND EMPLOYMENT

An important consequence of population growth is the increase in the workforce or the number seeking employment, though there is always a time lag of 15 years or more. Population increase due to declining mortality and high fertility affects the size of the workforce in the short as well as the long run. In the short run, the decline in mortality results in an increase in the survival of the existing workforce. In the long run, the large number of births occurring as a result of high birth rates will tend to increase the number of persons seeking employment after about 15 years or so.

^{15/} If it is assumed that Government budgets will continue to constitute the same share of GDP, the trends shown in table 184 would also apply to share of health costs in Government budgets.

^{16/} Gavin W. Jones and Chet Boonpratuang, *op.cit.*, p. 126.

Table 184. Total cost of health services as a percentage of GDP, alternative assumption: Thailand, 1965-1970 to 1995-2000

Assumption	1965-1970	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
1. GDP grows at 5 per cent <i>per annum</i>							
Constant service ratios ^{a/}							
High projection	.83	1.11	1.21	1.34	1.47	1.60	1.74
Medium projection	.83	1.11	1.20	1.28	1.38	1.46	1.53
Low projection	.83	1.08	1.14	1.21	1.29	1.36	1.44
Improving service ratios ^{b/}							
High projection	.83	1.27	1.60	2.00	2.33	2.73	3.15
Medium projection	.83	1.27	1.58	1.93	2.19	2.47	2.76
Low projection	.83	1.06	1.49	1.81	2.06	2.33	2.60
2. GDP grows at 6 per cent <i>per annum</i>							
Constant service ratios ^{a/}							
High projection	.83	1.07	1.13	1.00	1.24	1.29	1.33
Medium projection	.83	1.07	1.12	1.14	1.15	1.16	1.16
Low projection	.83	1.05	1.06	1.07	1.09	1.09	1.09
Improving service ratios ^{b/}							
High projection	.83	1.24	1.48	1.76	1.96	2.19	2.42
Medium projection	.83	1.24	1.46	1.71	1.85	1.99	2.12
Low projection	.83	1.21	1.39	1.60	1.73	1.87	1.99
3. GDP grows at 7 per cent <i>per annum</i>							
Constant service ratios ^{a/}							
High projection	.83	1.04	1.05	1.05	1.05	1.04	1.02
Medium projection	.83	1.05	1.05	1.00	0.98	0.94	0.89
Low projection	.83	1.01	0.98	0.95	0.92	0.88	0.85
Improving service ratios ^{b/}							
High projection	.83	1.20	1.36	1.56	1.66	1.76	1.86
Medium projection	.83	1.20	1.35	1.51	1.55	1.60	1.64
Low projection	.83	1.18	1.28	1.42	1.46	1.51	1.53

Source: Same as table 182.

Notes: ^{a/} In Bangkok and rest of Thailand separately.

^{b/} Improving service ratios outside Bangkok but constant service ratios in Bangkok.

In Thailand, the rapid increase of population in recent decades resulted in an increase in the work-force during the 1960s and the continuing high fertility is the cause of a large number of young persons now entering the labour force every year. The labour force in 1970 was estimated at about 16,850,000 or roughly 49 per cent of the total population. The labour force participation rate in 1970 of the population aged 15 years and over was 80.4 per cent compared with 85.5 per cent in 1960.

Since persons who will be entering the labour force over the next 15 years are already born, this number is not likely to be affected by any changes in the birth rate. However, the participation rates at the younger age groups may change due to an increase in school enrolments resulting from expanded educational fa-

cilities. Assuming a gradual increase in the school enrolment of youngsters aged 14 years and over, the Manpower Planning Division of the National Economic and Social Development Board has projected the trend in labour force participation rate of persons aged 15 years and over. These rates were applied to the medium projection of persons 15 years and over and the resultant estimates of the labour force during the 1970-1990 period are shown in table 185. It will be observed that the total labour force, estimated at 18.8 million in 1975 will increase by 10.7 million or about 57 per cent to 29.5 million in 1990. Between 1975 and 1985, the labour force will increase by about 660,000 *per annum*, but during the subsequent quinquennium the annual increase is estimated at about 824,000. These increases will adversely affect the employment situation in the

Table 185. Projected labour force, 15 years and over, Thailand, 1970-1990

Year	Labour force participation rate	Labour force 15 years of age and over (thousands)
1970	80.2	16,243
1975	79.4	18,812
1980	78.6	21,853
1985	77.8	25,408
1990	77.0	29,528

country.

In Thailand, the recent increase in the labour force has not been matched by a corresponding increase in the rate of growth of the economy. This meant that the number of new job opportunities created in the economy was not sufficient to absorb the increments to the labour force. The result has been that every year the country has been accumulating a number of unemployed persons. As noted in chapter IX, the data from the censuses and labour force surveys indicate an unemployment rate of less than 2 per cent. This very low rate, however, may be due to the labour force concepts^{17/} adopted for measuring unemployment which are not meaningful in an agricultural economy. It is, however, suspected that the unemployment rates are much higher than those indicated by the data of the censuses and labour force surveys.

Besides unemployment, it is also estimated that there is a considerable amount of underemployment in the country, particularly in the rural areas. Rural employment surveys^{18/} jointly carried out by the Department of Labour and the National Economic Development Board show that up to 50 per cent of the agricultural workforce and up to 21 per cent of the non-agricultural workforce do not work in various months of the year. The National Longitudinal study carried out by the Population Institute of Chulalongkorn University also shows that about 15 per cent of the rural households do not work during March and April. It may be safely estimated that at the minimum about 1 million additional jobs have to be created annually to take care of the current backlog of unemployed

^{17/} In Thailand four-fifths of the labour force is in agriculture and eight out of 10 employed persons are own-account and unpaid family workers. In these circumstances, where production is largely organized in family units, the boundary between work and leisure is not clear, certainly not as clear as it is in an industrialized society where work can be more reliably measured by the time for which a person receives pay.

^{18/} These surveys were carried out from 1968 to 1972 and the chief objective was to assess the nature, extent and significance of unemployment and underemployment in rural areas.

and underemployed as well as the future annual additions to the labour force.

The task of creating adequate employment opportunities is indeed a difficult one for Thailand. At present only about 4 per cent of the country's workforce is employed in the manufacturing sector. Even if there were to be a much more concentrated effort to expand the industrial sector as envisaged in the development plan, it would have only a limited impact on the growing workforce and on the employment problem. The ratio of investment to employment in modern industry is relatively high^{19/} and, being essentially capital intensive, would require large inputs of capital and foreign exchange, the supply of both of which are limited in Thailand as in other developing countries. Therefore, a strategy of employment creation which has to be responsive to the needs of the increasing workforce has to rely largely on the agricultural sector.

As noted in chapter IX, about 78 per cent of Thailand's labour force is engaged in agricultural and related industries. A recent study^{20/} has estimated that the agricultural labour force will, by 1985, increase to about 19 million or by about 50 per cent over the 1970 level. The same study also estimated that there will be an increase in the extent of arable land by only about 20 per cent between 1970 and 1985. Thus, the expected slow-down in the increase in arable land combined with the continued high increase in farm labour force implies a deteriorating land/man ratio from about 5.4 *rai* per worker in 1975 to about 4.4 *rai* in 1985. This changing situation will require a new approach to the question of labour inputs in agriculture.

In contrast to the situation during the first half of the twentieth century, when an increasing population helped to increase agricultural production (through the growth of the agricultural labour force) the increase of population during the 1950s and 1960s had an opposite effect. Given the limited land supply, each increment of labour brought about diminishing returns from the marginal units of the labour force and consequently there has been disguised unemployment.

^{19/} For a detailed discussion on the limits to employment potential in the industrial sector, see Gavin W. Jones and S. Selvaratnam, "Some problems of employment creation in Ceylon" in *MARGA*, Colombo, vol. I, No. I, 1971, pp. 72-91. The results of the analysis for this country apply equally to most developing countries in Asia.

^{20/} F.W. Fuchs and J. Vingerhoets, *Rural Manpower, Rural Institutions and Rural Employment in Thailand* (Bangkok, NESDB, 1972).

This surplus labour "should have been transferred to the more productive activities. In Thailand, however, no such productive activities existed".^{21/} Further, yield per unit of land has, in recent years, increased only about 2 per cent *per annum* and there is little immediate prospect of rapidly increasing productivity per unit of land. Hence, the anticipated rapid increase in the agricultural labour force may result in a labour surplus in agriculture, aggravating the existing problems of agricultural underemployment.

F. CONCLUSIONS

An attempt has been made in the preceding sections to assess the implications of population growth for education, health and employment in Thailand. The analysis could also be extended to cover housing and other social overheads, the accumulation of savings and capital, the development of agriculture, industry, transport and other economic overheads. The conclusions, however, will be the same, viz., that the current high rates of population growth render difficult the expansion of the economy and the achievement of higher standards of living.

The most formidable obstacle to any planned economic development in Thailand, as in other developing countries, is the shortage of capital. The proportion of the national output that could be expended for development is limited to a large extent by the degree of inclination and capacity of the private households and individuals to save. At a given level of income, a family with a greater number of children will tend to consume more and save less. The rapidly increasing population will only help to increase the average family size and thus render more difficult the accumulation of savings and formation of capital in a coun-

try where the *per capita* income is already low. A high rate of population growth will also tend to divert a large proportion of whatever savings have been accumulated into social overhead expenditure instead of the directly productive sectors of the economy.

The problem of economic development is to increase production at a rate faster than the rate of population growth. The magnitude of this problem is greater in a country where population is growing rapidly than in one where population growth is slower. Any population growth requires some investment of available capital just to maintain the same level of *per capita* gross national product. The faster, the population growth, the larger the share of each year's income which must be invested simply to maintain constant *per capita* GNP and the less there is available to increase *per capita* GNP.

The high rate of population growth obtaining in Thailand imposes serious strains on the country's economy and restricts its capacity to expand rapidly. It acts as a great set back to the efforts and objectives of economic and social development and to the rising aspirations of the people. If the present high rate of population increase is sustained indefinitely or for an excessively long period, Thailand will hardly be able to reap the benefits of even an extremely strenuous effort at development. There is thus the need to moderate the rate of population growth in the interest of socio-economic development. A slower rate of population growth will help to promote a higher rate of national saving and make available more goods and services for the people. Of course lower rates of population growth alone cannot bring about rapid social and economic development. Programmes to reduce rates of population growth can be economically effective when taken in the context of an over-all development programme involving the careful reinvestment of surplus income to create facilities for increasing production.

^{21/} Chattip Nartsupha, *Foreign Trade, Foreign Finance and the Economic Development of Thailand, 1956-1965* (Bangkok, Prae Pittaya Ltd., 1970), pp. 46-47.

Annex I

SOURCES OF DEMOGRAPHIC DATA

A. INTRODUCTION

In Thailand, data relating to the size, growth, distribution and characteristics of the population are available from four principal sources:

- (a) The census of population taken at intervals of about 10 years;
- (b) The vital registration system which provide information regarding births, deaths and marriages;
- (c) Sample surveys;
- (d) Other sources.

While the population censuses provide the benchmark data on the size and composition of the population, intercensal information relating to growth and composition are mostly obtained through vital statistics and sample surveys. Nevertheless, because of the deficiencies in regard to coverage in terms both of area and of subject, as well as weaknesses in the concepts and definitions used, the various sources do not provide all the information needed at the desired level of accuracy. In the sections which follow, an attempt has been made to discuss the nature and regularity of the data available from each of the three sources.

B. POPULATION CENSUSES

1. History

The first census conducted in 1905 covered only 12 monthons^{a/} of the country. The first population census on a Kingdom-wide basis was undertaken in 1909-1910. Thereafter six more censuses were carried out in 1919, 1929, 1937, 1947, 1960 and 1970. The by-census of 1954 was taken on a sample basis. The first two censuses required two years to complete, but thereafter more rapid enumeration became the rule. The censuses of 1911, 1960 and 1970 were taken on 1 April of the respective years; the censuses of 1919 and 1929 on 15 July while the censuses of 1937 and 1947 were taken on 23 May.

The data collected in the first three censuses of 1911, 1919 and 1929 were tabulated by the Ministry

of Interior and the results published in the *Statistical Year Book* and the *Thesaphiban (Government Gazette)*.^{b/} No separate publications relating to these censuses are known to exist.

Mechanical tabulation using punched cards was introduced in the 1937 census. The results of this census have been published by the Department of Local Administration of the Ministry of Interior in four volumes: (1) Location; (2) Characteristics; (3) Occupation; and (4) Agriculture. A summary bulletin for the whole Kingdom was also published. The results of the 1947 census were published in six volumes: (1) Population classified by *changwat*, *amphur* and *tambon*; (2) Citizenship; (3) Marital status; (4) Occupation; (5) Education; and (6) Literacy.

The 1960 census was conducted by the National Statistical Office and the results were published in 73 volumes: one volume for each *changwat*, one for the Northeast Region and a summary volume for the Kingdom. The results of the 1970 census have been published in 76 volumes; one volume for each *changwat*, one volume for each region and a summary volume for the Kingdom.

2. Enumeration procedure

Information on the methods adopted for enumerating the population at the first three censuses held in 1911, 1919 and 1929 are not available. At the 1937 census, people were enumerated at their usual place of residence. There were about 1,500 persons per enumeration district.

The 1947 census enumeration included persons at their usual place of residence as well as persons temporarily absent, those who had gone abroad for studies, those who were stationed abroad, members of the armed forces, residents of temples and boarding schools, inmates of prison or those sent to another *changwat* under sentence of court. Tourists, foreign businessmen or nomadic groups who had no usual place of residence in the country but were residing in a house or any place where the enumeration took place were enumerated at the place where they were residing. Persons having their

^{a/} A *monthon* consists of a few *changwat* or provinces.

^{b/} Available in the library of the Ministry of Interior, Bangkok.

usual residence elsewhere but found in another house on the enumeration date were not included.

The enumeration procedures adopted for the censuses of 1960 and 1970 were the same. Each person was enumerated as an inhabitant of his usual place of residence, the exception being students who were enumerated at the place where they were residing as of the census date. The following categories of persons were included in the 1960 and 1970 census enumeration:

(a) All Thai nationals;

(b) Persons having their usual residence in Thailand, but as of the census date, were at sea or temporarily abroad;

(c) Government officials, both military and civilian, including Thai diplomatic personnel and their families located abroad.

The 1970 census further included:

(d) Civilian citizens of foreign countries having their usual residence in Thailand, or who had resided in Thailand for at least three months.

The population not covered by the enumeration included:

(a) Nomadic groups, i.e., hill tribes and fishing groups having no fixed place of residence;

(b) Foreign military and diplomatic personnel and their families located in Thailand;

(c) Citizens of foreign countries temporarily visiting or travelling in Thailand for less than three months.

In the 1970 census, approximately 22,000 enumerators were assigned to work in about 49,000 census enumeration districts throughout the whole Kingdom.

3. Topics enumerated in the censuses

Table 1 gives a list of topics enumerated in the 1960 and 1970 population censuses of Thailand. An asterisk indicates those topics recommended by the United Nations for inclusion in the regional programme of ESCAP for the 1970 population censuses.^{c/}

^{c/} United Nations, *Principles and Recommendations for the 1970 Population Censuses* (Sales No. 67.XVII.3), pp.151-152.

The topics included in the last two censuses are very similar. Fertility questions were not asked in the censuses of 1947 and earlier. With regard to ethnicity a question on race was asked in the censuses of 1937 and 1947 but dropped in the subsequent censuses.

The 1970 population and housing census is the seventh population census of Thailand, but it is the first housing census conducted in the country.

With regard to fertility, a question on children living was asked for the first time in 1970. This will permit a study of infant mortality. The question on the ability to speak Thai was dropped in the 1970 census. A new question on physical disabilities was asked in the last census.

4. Tabulations of the census data

A synoptic table showing the availability of tabulations of data from the various population censuses carried out in the country since 1911 is given in the appendix. The table indicates for each tabulation the geographic units in respect of which the data were tabulated. It also indicates with asterisks the tabulations recommended by the United Nations for the 1970 population censuses.^{d/} It will be observed that the number of tabulations in respect of the censuses from 1911 to 1947 was very limited but thereafter this number was considerably expanded. Only three tables were presented from the data of the 1911 and 1919 censuses; four tables from the 1929 census data; 17 tables were published for the 1937 census and 19 tables in respect of the 1947 census. However, the results of the 1960 census were presented in 29 tables, while 37 tables were compiled for the 1970 census excluding the tabulations on housing.

For the 1960 and 1970 censuses, there are some tabulations which have not been included in the publications but which are available in print-out form. It is also proposed to carry out some cross tabulations of the 1970 census data on a sample basis.

C. VITAL STATISTICS

1. Administrative organization for the registration of births, deaths and marriages

In 1916, a law was passed requiring the registration of births, deaths and migration in Bangkok. Subsequently there were many laws and regulations

^{d/} *Ibid.*

Table 1. Topics enumerated in the 1960 and 1970 censuses of Thailand

Topics	1970	1960
Geographic characteristics		
*Place where found at time of census	x	x
*Place of usual residence		
*Place of birth	x	x
Place of origin	x	-
*Duration of residence	x	x
‡Place of previous residence	x	x
Residence status (permanent, short-term, no house)	x	
*Urban and rural	x ^{1/}	x ^{1/}
Personal characteristics		
*Sex	x	x
*Age	x	x
Date of birth	x	
*Relationship to head of household	x	x
*Relationship to head of family		
*Marital Status		
‡Age at first marriage	x	x
‡Duration of marriage		
*Children born alive		
*Children living	x	x
+Citizenship/nationality	x	-
+Race	x	x
*Literacy		
*School attendance	x ^{2/}	x
*Educational attainment	x ^{3/}	x
‡Professional or vocational education	x ^{4/}	x ^{5/}
*Language	-	x ^{6/}
*Religion	x	x
Physical disabilities	x	-
Economic characteristics		
*Type of activity	x	x
*Occupation	x ^{7/}	x
*Industry	x	x
*Status (as employer, employee etc)	x	x
‡Time worked		
Reason for not working	x	x
Household characteristics		
Type of house	x	x
Number of person	x	x
*Household composition	x	x
‡Family composition		

Notes: Topics preceded by * are those recommended as basic in the Asian programme for the 1970 population census, and topics with ‡ are other recommended topics

1/ Municipal area - non-municipal area.

2/ School attendance and grade as of 1 January, 1970.

3/ Higher grade completed as of 1 January, 1970.

4/ Highest degree or vocational educational certificate received.

5/ Certificate of vocational school completed.

6/ Ability to speak Thai.

7/ Occupation during the week before the date of the census, as well as occupation during the year previous to the census.

concerning the population census and vital registration in municipal areas, outside municipal areas and in the Bangkok area. However, the systems of registration adopted in each of these areas differed from each other. A new system of vital registration applicable throughout the entire country was introduced under the terms of the 1956 Act for Registration of Population. Under this Act, the registration of still births introduced into the municipal areas in 1936 was extended throughout the Kingdom.

Marriages and divorces have been registered since 1935 but this is not compulsory. As noted earlier, Thailand is divided into provinces or *changwat* and each province is sub-divided into districts or *amphur*, and each district is divided into *tambon* or communes. There are also municipalities in some districts. The registrars are provided in accordance with regional administrative areas. The registrar in the municipal area is called the municipal registrar, and that in non-municipal or outside municipal area, the commune registrar.

2. The registration process

According to the law, any birth, death or stillbirth occurring in a house in any area should be reported by the head of the house, or relative or others to the registrar of that area within 15 days in the case of birth and 24 hours in the case of death or stillbirth.

According to the old regulations, the registrar had to fill out the details of information in the four parts of the certificate of birth, death or stillbirth. Parts 1 and 2 consisted of basic information, part 3 consisted of the detailed information about the event. Part 4 was given to the informant for use as evidence of registration. Different procedures were adopted by the municipal registrars and the commune registrars in regard to the transmission of the first three parts of the certificate.

In a municipal area, the municipal registrar retained part 1 at the municipal office and sent part 2 to the mayor, who subsequently forwarded it to the provincial registrar at the provincial office. Part 3 was sent to the municipal health officer, who used this part as the basis for preparing the primary reports of birth and stillbirth, death all ages, and deaths under 1 year for the whole municipality. The municipal health officer later sent part 3 together

with the prepared primary reports to the provincial health officer at the provincial health office.

In a non-municipal area, at the end of each month, the *kamnan* or commune registrar sent all three parts to the district registrar who retained part 1 at the district office and forwarded part 2 to the provincial registrar, who kept this part at the provincial office, and part 3 to the provincial health officer at the provincial health office.

The provincial health officer had to examine carefully the relevant information, particularly causes of death. He then prepared the primary reports of births and stillbirths, deaths at all ages, and deaths under 1 year for the province as a whole. The reports were sent to the Division of Vital Statistics for further compilation. At the same time, all the birth, death and stillbirth certificates were sent to the Division of Vital Statistics for further processing.

The defects in the published vital statistics arise partly from the initial failure of reporting of vital events and partly from the subsequent stages of transmission of recorded and their inclusion in final compilation.

In October 1972, the Ministry of Interior took initiatives to improve the reliability and the speed with which registration was recorded. A new set of regulations was put in to effect on 5 January, 1973. The two major changes which have had a strong impact on the system are the introduction of new registration forms and the decentralized authorization for the enforcement of fines imposed for failure to register.

Births and deaths are now registered in a three-part document. In municipalities, part I is given to the person registering the event as a certificate. Part II is retained at the office while part III is passed on to the health office. In non-municipalities, the registration follows the same format except that the *kamnan* (*tambon* headman) has to forward part II to be recorded at the *amphur*, whereas formerly the *kamnan* retained it. A separate form is now used for stillbirths whereas previously this required filling out both a birth and death registration form.

The nature of data recorded in regard to live births, deaths and marriages are given in table 2 while the available tabulation of vital events is shown in table 3.

Table 2. Vital events information currently recorded in Thailand

Live births

Characteristics of the event of child:

Name
Sex
Nationality
Date of birth
Place of occurrence of birth
Type of birth (single or multiple)
Birth parity
Child number
Period of gestation
Weight at birth
Height at birth
Birth injuries
Physical defects at birth
Illness
Informant name, relationship and place of residence
Date of registration
Date of change of name of child
Name of registrar

Characteristics of mother:

Name
Maiden name
Age
Nationality
Place of residence
Place of birth
Religion
Education
Principal occupation
Illness due to pregnancy
Other illness
Illness due to delivery
Special delivery
Was marriage registered?
Duration of marriage
Number of children (including event being registered and children who have died)

Characteristics of father:

Name
Age
Nationality
Place of birth
Religion
Education
Principal occupation
Usual place of residence

Birth attendant (i.e. self-delivery, neighbour, midwife etc.):

Type of person who performed delivery
Name
Place of residence

Other :

Signature of birth attendant
Signature of doctor

Deaths

Characteristics of the event:

CONTINUED

Table 2.Continued 2

Date of occurrence
Cause of death (primary and secondary)
Place of occurrence
Informant name
Informant relationship
Informant address
Disposition of remains (i.e. cremation, burial etc)
Place of disposition
Date of registration
Autopsy - if performed and results
Name, address and position of person certifying cause of death

Characteristics of decedent :

Name
Sex
Age
Nationality
Religion
Marital status
Education
Principal occupation
Place of birth
Usual place of residence
Duration of stay at place of occurrence
Characteristics of illness

Characteristics of mother and father of decedent:

Name
Nationality
Place of birth
Principal occupation

Still births

Characteristics of the event of still birth:

Date of delivery
Sex
Place of occurrence
Place of registration
Principal symptoms of illness (of mother and father)
Date of occurrence
Date of registration
Type of birth (single or multiple issue)
Cause of death
Attendance at birth
Weight at birth
Period of gestation
Legitimacy
Nationality
Certifier
Disposition of remains
Birth parity
Child number
Height at birth
Died (during or before delivery)
Physical defect at birth
Birth injuries
Operation

Characteristics of mother:

Name
Age

CONTINUED

Nationality
Place of usual residence
Place of birth
Religion
Education
Occupation
Delivery
Duration of marriage
Order of birth
Children living
Children born dead
Checking of pregnancy
Type of delivery
Was marriage registered?
Last pregnancy

Characteristics of father:

Name
Age
Nationality
Place of usual residence
Place of birth
Religion
Education
Occupation
Place of residence

Marriages

Characteristics of the event:

Date of occurrence of marriage
Date of resigration
Place of marriage

Characteristics of bride and groom:

Name
Place of residence
Age
Marital status (previous)
Previous marraige
Nationality
Place of origin
Mother tongue
Occupation
Educational attainment/literacy
Religion
Place of birth
Father's name
Mother's name

Table 3. Available tabulation of vital statistics (Public Health Statistics)

Tabulation

(a) Live births

- Number of live births by month
- Number of live births by sex and region and rates
- Number of live births by sex and rates
- Number of live births by birth order
- Number of live births by age of mother

(b) Deaths

- Number of deaths by sex and rates
 - Number of deaths by sex and region and rates
 - Number of deaths by sex and age

 - Deaths under one year (infant deaths)
 - Number of deaths under one year by sex and rates
 - Number of deaths under one year by sex and region
 - Number of deaths under one year by age and sex

 - Deaths under 28 days (neo-natal deaths)
 - Number of deaths under 28 days by sex and rates
 - Number of deaths under 28 days by sex and region
 - Number of deaths under 28 days by sex and age

 - Maternal deaths
 - Number of maternal deaths by region and rates
 - Number of maternal deaths by age

 - Still births (foetal deaths)
 - Number of still births by sex and rates
 - Number of still births by sex and region and rates
 - Number of still births by age of mother

 - Causes of deaths
 - Number of deaths from leading causes
 - Number of deaths by sex and cause
 - Number of deaths under one year from leading causes
 - Number of deaths under one year by sex and cause
-

D. SAMPLE SURVEY

As noted earlier, several sample surveys have been carried out in the country on a regular as well as *ad hoc* basis for collecting demographic data. These surveys have mostly been carried out during intercensal periods and have been aimed at collecting detailed information on particular characteristics of the population. The various demographic surveys conducted in Thailand in chronological order and their main features are listed in table 4.

1. Demographic and Economic Survey - 1954

The 1954 Demographic and Economic Survey of Thailand was designed as a multipurpose national sample survey to provide data on the social and economic characteristics of the population and on business establishments. It was considered useful to

conduct a special survey between the 1947 and 1960 censuses to obtain recent data on population needed for formulating plans in regard to the social and economic development of the country. It was the first national sample survey to be undertaken in Thailand.

Because of budgetary limitations, it was decided to design the survey as to provide accurate estimates for each of the four major regions: Northeast, Northern, Central and Southern.

In each of the nine administrative regions of Thailand, except for the two *changwat* of Phra Nakhon which included the capital city of Bangkok, Bangkok and Thon Buri at that time being separated, samples of one in 200 households and one in 50 small business establishments were selected. In the two *changwat* of Bangkok and Thon Buri, higher sampling ratios of one in 40 for households and one in 20 for small

Table 4. Demographic sample surveys in Thailand

Survey	Period and frequency	Main topics	Sample size	Conducted by
Longitudinal Study of Social, Economic and Demographic Change	1969 rural 1970 urban 1972 rural 1973 urban	Mortality, fertility, migration interrelations among social, economic and demographic factors	1,500 rural households 2,000 urban households	Institute of population studies Chulalongkorn University
Survey of Population Change	1964-1967 four times each year	Current fertility mortality under registration of the official registration	29,000 households	National Statistical Office
Labour Force Survey	Every year since 1963	Labour force	variable from one round to another	National Statistical Office
Demographic and Economic Survey	1954	Social and economic characteristics	24,439	National Statistical Office
Follow-up survey	1971	Family planning	3,194	National Family Planning Programme Ministry of Public Health
Socio-Economic Survey	1957 - 1958 1962 - 1963 1968 - 1969	Household expenditure	1968-1969: 6000 households	National Statistical Office

establishments were applied. The multi-stage sampling, except in the *changwat* of Phra Nakhon and Thon Buri, consisted of the selection of some *amphur* for each region followed by the selection of some municipalities and villages from each of those *amphur*. In the provinces of Phra Nakhon and Thon Buri, the municipalities and rural areas were treated separately.

The Demographic and Economic Survey began in February 1955 and continued for nearly a year and a half until it was completed in August 1956. The number of households in respect of which the population questionnaire was completed totalled 24,439. The questionnaire sought information on the following items: name, relationship to head of household, sex, age at last birthday, marital status, religion, nationality, place of birth, length of stay in the province at which enumerated and, when appropriate, place from which the person moved, mother tongue, literacy and education, occupation, industry, status and income.

2. Socio-economic surveys

The National Statistical Office has conducted this survey of non-institutional households throughout the country five times during 1957-1958, 1962-1963, 1968-1969, 1971-1973 and 1975-1976 to collect data on household characteristics, assets and liabilities, income, expenditures and consumption patterns. In the first survey, 1,562 sample households were selected from only employee households in eight important municipal areas throughout the Kingdom. Results were reported in terms of individual municipal area by name. The second survey, called the Household Expenditure Survey was published in five volumes for regions, Bangkok-Thon Buri combined, and the whole Kingdom. For the 1968-1969 survey, the name was changed to the Socio-economic Survey, but its objectives were about the same as for the earlier surveys. The report was published in only one volume for the four regions, Bangkok-Thon Buri and the whole Kingdom, showing figures separately for

municipal areas, sanitary districts and villages. The fourth survey was conducted in the Northeastern region in 1971, in the Northern Region and in Bangkok-Thon Buri combined in 1972, and in the Central and the Southern Regions in 1973. The results were published in one volume, showing data regionally by community types, i.e. municipalities, sanitary districts and villages.

The National Statistical Office has been conducting the Socio-economic Survey 1975-1976 for which the field work would continue monthly from November 1975 until October 1976. In addition to the objectives mentioned for earlier surveys, the National Statistical Office was seeking information on household enterprises and detail of food purchased and consumed. Approximately 12,000 sample households were to be interviewed. The results are expected to be published in 1978.

3. Labour force survey

Since 1963, the National Statistical Office has conducted a series of labour force surveys as part of its 1960-1970 Ten-Year Statistical Programme.^{e/} One of the main objectives of the labour force survey is to make available to the Government and private agencies periodic and up-to-date information on the supply and demand for labour in the country. Some major statistical information to be obtained from the data are:

- (a) The size and characteristics of employed and unemployed persons;
- (b) The number and kinds of occupation which workers were performing in each type of industry, as well as the number of hours worked;
- (c) Changes in the size of the labour force during various periods.

Such an analysis would also form the basis for the formulation of specific manpower policies aimed at reducing unemployment, provision of vocational guidance, setting up of educational and training institutions etc.

The surveys covered only the civilian non-institutional population. The sample design varied from one survey to another. The information collected up to

^{e/} For detailed discussion on the history of these surveys, the definitions and concepts used, see S. Selvaratnam, "Sources of labour force data in Thailand" (Bangkok, I.L.O., ARTEP, 1974) (mimeo).

1969 has been published in 15 volumes for municipal areas, Bangkok-Thon Buri and rural (non-municipal) areas. The data include labour force participation rates for all persons 11 years and over, employed and unemployed persons by variables such as age, sex, marital status, employment status (six categories), occupation (nine groups), industry (eight groups), working time and education. In 1971, the sample was enlarged to permit tabulating separate sets of tables for municipal and non-municipal areas in respect of the Bangkok Metropolis and the Central, Northern, Northeast and Southern Regions.

4. Survey of Population Change

The Survey of Population Change was undertaken during 1964-1967 in order to obtain urgently needed data for the accurate measurement of the levels and fertility and mortality in the country.^{f/} The main objectives of the survey were to estimate:

- (a) Reliable birth and death rates by age and sex;
- (b) Underregistration of births and deaths in the country.

In order to achieve these objectives, quarterly demographic sample surveys were conducted to collect information on births and deaths which had occurred in the sampled households during the Survey period. This information would then be matched item by item with the records of current civil registration.

Household interviews were conducted at intervals of approximately three months. During the first round of interviews, the basic demographic characteristics of all household members were recorded. In the second and subsequent interviews, the enumerator compared the list of household members with that derived from the preceding interviews and investigated any changes which might have occurred in the household composition due to births, deaths, and in- and out-migration.

At the beginning of the Survey, after two rounds of interviews, clerks were sent to copy information from the official birth and death registration documents for the sample areas. Later, the copying/matching operation was carried out every three months after every round of interview. In some cases, the clerks sent to the local administrative offices ex-

^{f/} For further details, see Government of Thailand, *The Survey of Population Change, 1964-1967* (Bangkok, National Statistical Office, 1970).

perienced difficulties in finding the registration books for the communes in which the sample villages were located. The births and deaths reported in the Survey were matched manually with the births and deaths copied from the registration system. The basic criterion for deciding whether two independently recorded events were, in fact, the same was name. In the case of births, parental names were also used. Secondary criteria were characteristics common to both the registration and Survey records: sex, age of mother or age of deceased, place of occurrence, and place of residence of the parents of the deceased.

The sample for the rural areas of Thailand consisted of villages. As for municipal areas, each of which contains some urban-type conglomerations of people, the basic problem was one of size. For practical considerations, and because vital registration was thought to be relatively complete in these areas, the largest municipal areas, Bangkok and Thon Buri with over 2 million population at that time, were excluded from the universe from which the sample was selected. For municipal areas falling in the sample, blocks were delineated in supplementary field work and were selected using the same sampling ratio as for villages.

A stratified, two-stage probability sampling procedure was adopted with the *amphur* as primary sample units and the villages, or blocks within municipal areas, as the second-stage sampling units. The primary sampling units consisting of 60 *amphur* were selected systematically with probability proportional to size out of the universe of approximately 500 *amphur* (excluding Bangkok and Thon Buri). Using an over-all sampling ratio of 1 in 150, within the sixty selected *amphur*, 331 enumeration districts were selected. For several reasons, some villages had to be dropped and the final sample consisted of approximately 29,000 households with around 176,000 persons in 312 villages in rural areas and 17 blocks in municipal areas. The sample was so selected that the distribution of the 60 sample *amphur* reflects the distribution of the population by region and in *amphur* with and without municipal areas.

5. The Longitudinal Study of Social, Economic and Demographic Change

The Longitudinal Study of Social, Economic and Demographic Change in Thailand began in 1968 with an initial stage of planning and preparations. This was a sample survey, national in coverage and broad in terms of the variety of information collected, and was conducted by the Institute of Population Studies, Chulalongkorn University. The stated goal of this study was to assess the interrelations among social,

economic and demographic changes in the country.

Selection of households from the districts included in the Study was made through a stratified, three-stage cluster sampling procedure. The stratifying variable was the percentage of the population in each district not engaged in agriculture. A sample of 1,500 rural households was interviewed in April and May of 1969 and a year later a sample of 2,000 urban households was interviewed. Both rural and urban samples were essentially national in scope, although for various reasons certain areas, particularly the four predominantly Muslim provinces in the Southern Region, were excluded from the sampling universe.^{g/} The second rounds of the Survey took place in April and May 1972 for the rural sample, and in April and May 1973 for the urban sample. Thus the Survey was both longitudinal and cross-sectional.

In the rural sample of 1969, the male household head, his wife and all other ever-married women under age 60 living in the household were interviewed. Two interview schedules were used, one for the household head (whether male or female) and other for ever-married women (including the wife of the male heads of the household). The combined schedules contained over 350 items including some questions on knowledge, attitude and practice of family planning.

For the 1970 urban sample, the population living in legally designated municipal areas was considered to constitute the urban population. Selection of households in the municipal areas included in the Survey was again made through a stratified, three-stage cluster sampling procedure, although for the urban sample the stratification was on the basis of regional location, with the metropolis of Bangkok-Thon Buri constituting a separate stratum. A number of questions that proved unsuccessful in the rural survey or were thought to be inappropriate for persons living in an urban setting were deleted and a few new ones added resulting in a shorter schedule. The schedules for heads of household and ever-married women contained 266 questions. As in rural surveys, household heads, their wives and all ever-married women under 60 years of age living in the household were interviewed.

This survey served several useful functions. First, it provided needed data for the assessment of fertility, mortality and migration behaviour as well as for analysis of the interrelations among social, eco-

g/ For the rural round the population of the excluded areas constituted about 18 per cent of Thailand's total rural population; for the urban survey the excluded areas comprised about 5 per cent of the total urban population.

conomic, political and demographic factors. Secondly, it provided information needed for comparisons of the rural with the urban population with regard to demographic, economic and social variables. Thirdly, it permitted for the first time in Thailand, a cohort approach to the analysis of population.

The Institute of Population Studies, Chulalongkorn University, has so far published two reports relating to the Study.^{h/} The first describes methodology, while the second discusses the results obtained in the first rounds of the survey.

6. The 1971 Follow-up Survey

The 1971 Follow-up Survey was based on a national probability sample of women who had accepted either an IUD or pills through the National Family Planning Program (NFPP), Ministry of Public Health, as of 31 October 1970 and was stratified by method, region and volume of acceptors. A total of 16 districts fell into the sample, but the metropolitan area of Bangkok-Thon Buri was excluded from the sampling frame. Field work for the survey was conducted by members of the Research and Evaluation Unit of the NFPP during the months of May and June 1971. Of the total of 3,194 women sampled, 2,589 (or 81 per cent) were actually interviewed.

The contraceptive continuation and termination rates reported for the interviewed women were calculated according to the life table techniques specified by Potter.^{i/}

E. OTHER SOURCES

1. Housing census, 1970

As noted earlier, a housing census was taken for the first time in Thailand in 1970, jointly with the population census of that year. This census collected information on the type of structure, type of construction material used, ownership and tenure, facilities available etc.

Tabulations of data on housing available from the

^{h/} Institute of Population Studies, Chulalongkorn University, *The Methodology of the Longitudinal Study of Social, Economic and Demographic Change*, Research Report No. 6 (Bangkok 1971); *ibid.*, *The Rural and Urban Population of Thailand: Comparative Profiles*, Research Report No. 8 (Bangkok 1972).

^{i/} Robert G. Potter, "The multiple decrement life table as an approach to the measurement of use effectiveness and demographic effectiveness of contraception", *Contributed Papers Sydney Conference of the International Union for the Scientific Study of Population*, August 21-25, 1967, pp. 869-883.

1970 census include the number of private households by type of living quarters, by type of construction materials of living quarters, by type of tenure of living quarter, by type of land occupancy, by monthly rent paid, by type of owner and by years of construction.

The tabulated information is published in the census reports relating to each *changwat*, each region and the whole Kingdom. The same tabulations are available in print-out form for the districts or *amphur*.

2. School and teacher census

In 1964, the National Statistical Office and the Educational Planning Office, Ministry of Education, together conducted the first School and teacher census. Since then, educational statistics have been collected every year. The main objective is to obtain data for the purposes of educational and manpower planning, general administration and educational research.

The schools covered in the censuses are of the following types: kindergarten, elementary, municipal, handicapped, special, demonstration, private, secondary, teacher training, vocational, adult education and training. According to the educational administration and planning of the Ministry of Education, Thailand is divided into 12 educational regions.

The school and teacher census, now called the Report on Education Statistics, is conducted on a self enumeration basis with schools as the units of enumeration. The principals, head masters or directors of schools are entrusted with the responsibility of filling out the questionnaires and ensuring that the data are complete and accurate. Under the present system, questionnaires are sent from the National Statistical Office to the *changwat* statistical officers, from where they are distributed to the *changwat* education officers of the local provincial administration organization, the Ministry of Education and the municipal offices; these officers then send the questionnaires to their *amphur* officers, who in turn distribute them to the schools within their respective *amphur*. These officers are also responsible for collecting the completed questionnaires and sending them to the National Statistical Office for processing. In order to suit the diversified requirements of different types of schools, 10 different kinds of questionnaires are used for collecting particulars regarding the school, while three separate questionnaires are used for collecting particulars regarding teachers.

Appendix. Tabulations in the population censuses of Thailand

Tabulations ^{1/}	1970	1960	1947	1937	1929	1919	1911
*1. Population by sex	KCA (T) (m) (ED) ^{2/}	KCA (T)(ED)	KCA T	KCA T	KMC	KMC	KMC ^{3/}
*2. Population in localities by size-class of locality and sex	-	-	K ^{4/}	-	-	-	-
*3. Population of principal localities and their urban agglomerations, by sex	K ^{5/}	K ^{5/}	-	-	-	-	-
*4. Households and population in households by size of household	KCA R	KCA (T) (ED)	-	-	-	-	-
5. Households and population by sex by type of household	KCA R	KCA (T) (ED)	-	-	-	-	-
6. Collective households and population in collective households by type of household	KCA R	-	-	-	-	-	-
7. Agricultural households	KCA (T) (m) (ED) R	KCA (T)(ED)	-	-	-	-	-
8. Population in agricultural households	KCA (T) R	KCA (T)(ED)	-	-	-	-	-
Relationship to head of family							
*9. Population by relationship to head of family and sex ^{6/}	S	(T)(ED)	KCA	KC	-	-	-
Age							
*10. Population by single years of age and sex	KC R	KC	K	K	-	-	-
11. Population by five-year age-groups and sex	KCA R	KCA	KCA	KC	-	-	-
12. Population by broad age groups and sex ^{7/}	(T)(ED) R	-	-	-	KM	KM	KM
Marital Status							
*13. Population ^{8/} years of age and over by marital status and sex	KC (T)R	KC (A)	KCA	KC	-	-	-
*14. Population ^{8/} years of age and over by marital status, age and sex	KC (T) ^{9/} R	KC (A)	KCA	-	-	-	-

Tabulations	1970	1960	1947	1937	1927	1919	1911
Place of birth							
*15. Population by place of birth and sex	KC R	KC (A)	-	-	-	-	-
*16. Native and foreign-born population by age and sex	KC R	-	-	-	-	-	-
*17. Foreign-born population by country of birth, age and sex	KC R	-	-	-	-	-	-
*18. Native population by major civil division of birth, age and sex	KC R	-	-	-	-	-	-
Citizenship							
19. Population by citizenship and sex	KC R	KC	KCA	KC	KM	KM ^{10/}	-
20. Population by citizenship, age and sex ^{11/}	KC R	KC (A)	KCA	-	-	-	-
Race							
21. Population by race, citizenship and sex	-	-	KCA	KC ^{12/}	-	-	-
Economic characteristics ^{11/}							
*22. Population 11 years of age and over by type of activity, age and sex	KC ^{14/} (A) (T) R	KC	-	-	-	-	-
*23. Population not economically active, by functional categories, age and sex	-	-	-	-	-	-	-
24. Occupied population by nationality and sex	-	-	KC	KC	-	-	-
*25. Economically active population by industry, age and sex	KC R	KC (A)	-	-	-	-	-
26. Occupied population by industry, nationality and sex	-	-	K	KC ^{15/}	-	-	-
27. Occupied population by occupational groups ^{16/}	KC R	-	-	-	K	-	-
*28. Economically active population by occupation, age and sex.	KC ^{14/} (A) (T) R	KC (A)	-	-	-	-	-

Tabulations	1970	1960	1947	1937	1929	1919	1911
29. Economically active population by occupation (last year), age and sex	KCR ^{14/} (A)(T)	-	-	-	-	-	-
30. Occupied population by occupation, nationality and sex	-	-	KC	-	-	-	-
*31. Economically active population by status, age and sex	KCR	(C) (A)	-	-	-	-	-
*32. Economically active population by status, industry and sex	KCR	KC (A)	-	-	-	-	-
*33. Economically active population by status, occupation and sex	KCR	KC (A)	K	-	-	-	-
*34. Economically active population by industry, occupation and sex	S	-	-	-	-	-	-
*35. Economically active population by occupation, marital status, age and sex	S	-	-	-	-	-	-
*36. Female population ^{8/} years of age and over by type of activity, marital status and age	S	-	-	-	-	-	-
Literacy							
*37. Population 10 years of age and over by literacy, age and sex	KCR ^{17/}	KC (A)	KC ^{18/}	KC ^{19/}	-	-	KM ^{20/}
*38. Literate persons 10 years of age and over by ability to read and write Thai and sex	-	-	KC	-	-	-	-
Education							
*39. Population 6 years of age and over, by educational attainment, age and sex	KCR ^{21/}	KC ^{21/} (A)	-	-	-	-	-
40. Population 10 years of age and over, by educational attainment, nationality (Thai or foreign) and sex	-	-	KC ^{22/}	KC	-	-	-
*41. Population 6 to 29 years of age by school attendance, educational attainment, age and sex	KCR	-	-	-	-	-	-
42. Population 6 to 29 years of age who are attending school, by grade of school attended, age and sex	KCR	-	-	-	-	-	-
*43. Population 6 to 29 years of age by school attendance, single years of age and sex	KCR	-	-	-	-	-	-

Tabulations	1970	1960	1947	1937	1929	1919	1911
*44. Economically active population by occupation, educational attainment, age and sex	S	-	-	-	-	-	-
Fertility							
*45. Ever-married women 15 years of age and over by age and number of children born alive	KCR ^{23/}	KC	-	-	-	-	-
*46. Ever-married women 15 years of age and over by age and number of children living	SKR ^{23/}	-	-	-	-	-	-
*47. Female population 15 years of age and over by age, number of children born alive and educational attainment	S	-	-	-	-	-	-
Religion							
48. Population by religion	KCA R	KC (A) (T) (ED)	KCA	KC	KM	-	-
49. Population by religion and sex	KCA R	KC (A) (T) (ED)	KCA	C ^{24/}	-	-	-
*50. Population by religion, age and sex	-	-	-	-	-	-	-
Language ^{25/}							
*51. Population 5 years of age and over by language, age and sex	-	KC (A)	-	KC ^{26/}	-	-	-
52. Population 10 years of age and over by language and nationality	-	-	-	KC	-	-	-
Disabilities							
53. Population by disability and sex	(K)(C)(A) unpublished	-	-	KC	-	-	-
54. Population by disability, age and sex	(K)(C)(A) unpublished	-	-	K	-	-	-
Migration							
*55. Population by duration of residence in locality and major civil division, age and sex	S KR	-	-	-	-	-	-
56. In-migrants 5 years of age and over, by <i>Changwat</i> of previous residence, age and sex	KCR ^{27/}	C ^{27/} (A)	-	-	-	-	-
57. In-migrants 5 years of age and over and non-migrants, by type of activity, age and sex	S	(A)	-	-	-	-	-
58. Ever-married women who moved from one non-migrants, by five-year age groups and whether in agricultural households or not	-	(K) ^{28/}	-	-	-	-	-

Tabulations	1970	1960	1947	1939	1929	1919	1911
*59. Migration of population 5 years of age and over by age group and sex (persons who migrated to <i>Changwat</i> of present residence after 1 April 1965)	-	-	-	-	-	-	-
*60. Migration of population 5 years of age and over by region	-	-	-	-	-	-	-

Notes: 1/ An asterisk (*) preceding the number of the tabulation indicates that it is a recommended tabulation in the Asian programme for the 1970 population censuses.

2/ The level of geographic division for which the tabulation is available as indicated as follows:

K: Kingdom total, M: *monthon*, C: *changwat*, A: *amphur*
T: *Tambon* m: *muban*, ED: enumeration district R: Regional

A symbol in parentheses indicates that the data for that geographic division are tabulated, but not published in the census reports.

- indicates that the tabulation is not available

S means based on sample tabulations.

3/ *changwat* figures are not classified by sex.

4/ Classified according to size class of *tambon* as follows: 20,000 or more, 10,000-19,999, 5,000-9,999, 2,500-4,999, 1,000-2,499, less than 1,000.

5/ Municipal areas.

6/ Not cross-classified by marital status as in the Asian Recommendations.

7/ Age groups used are as follows:

For 1911: -14, 15-17, 18-20, 21-25, 26-35, 36-40, 41-60, 61⁺.

For 1919: -5, 6-9, 10-11, 12-14, 15-17, 18-20, 21-25, 26-35, 36-40, 41-60, 60⁺ for Monthon Krung Tep; -6, 7-9, 10-11, 12-14, 15-16, 17, 18-20, 21-22, 23-29, 30-39, 40-44, 45-49, 50-60, 61⁺ for other 17 *monthons*.

For 1970: 0-14, 15-59, 60⁺ for *tambons* and ED's.

8/ 1937 and 1947: 17 years of age and over for males, and 15 years of age and over for females; 1960 and 1970: 13 years of age and over.

9/ For *tambon* data, age groups are: 15-29, 30-39, 40-49, 50⁺.

10/ Not classified by sex.

11/ Five-year age groups for 1960 and 1947, except national figures for 1947, which are classified by single years of age. Broad age groups for 1970: 0-9, 10-14, 15-19, 20-24, 25-29, 30-39, ... 60-69, 70⁺.

12/ *Changwat* figures are not classified by sex.

13/ Minimum age above which the economic activity of individuals was tabulated is 11 for 1960 and 1970, 14 for 1947 and 10 for 1937.

14/ Broad age groups: 11-14, 15-44, 45-59, 60⁺ for *amphur* and *tambon*.

15/ *Changwat* figures are not classified by nationality.

16/ Occupational groups not in conformity with a concept of occupation used in the later censuses.

17/ Broad age groups: 10-19, 20-29, 30-39, 40-49, 50⁺ for *amphur* and *tambon*; 10-19, 20⁺ for ED.

18/ Further cross-classified by nationality (Thai and non-Thai). The tabulation is made only for illiterate persons, however, the data for literate persons can be derived by subtracting illiterate persons from the total.

19/ Not cross-classified by age, but by nationality (Thai or non-Thai).

20/ Covers all ages. Classified by unconventional age groups: -5, 6-9, 10-11, 12-14, 15-17, 18-20, 21-25, 26-35, 36-40, 41-60, 61⁺. *Monthon* figures are not cross-classified by age.

21/ Age classifications: single years of age up to 24, and five year age groups above 25. *Amphur* figures for 1960 are classified by single years of age.

22/ *Changwat* data are not cross-classified by nationality.

23/ 1970: Refers to those 13 years of age and over. Age groups used are: 13-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-59, 60-69, 70⁺ for the Kingdom and *changwat* data; 13-14, 15-19, 20-29, 30-39, 40-49, 50⁺ for smaller areas.

24/ Some *changwat* only. *Changwat* where Buddhists comprise 99 per cent or more are omitted from the published statistics.

25/ For 1960, language refers to ability to speak Thai. For 1937, language refers to whether knowing Thai or other languages.

26/ Refers to population 10 years of age and over. Data are not classified by age.

27/ *Changwat* data are classified by ten-year age groups: 5-9, 10-19, 20-29, ... 60⁺; unpublished *amphur* figures by five-year age groups.

28/ Special tabulation based on a 1 per cent sample.

Annex II

EVALUATION OF THE QUALITY OF DEMOGRAPHIC DATA

A. APPRAISAL OF CENSUS DATA

I. Introduction

As stated earlier, population censuses have been carried out in Thailand at almost regular intervals since 1911. As in most countries, the Thai census data are subject to two sources of error: errors of coverage and response errors.

The errors of coverage occur when a particular segment of the population is underenumerated, or counted more than once or missed altogether. For instance, people travelling during the census period may either be missed completely or double counted. It has also been noted that in a number of countries the enumeration of females and children has been incomplete due to the reluctance on the part of the householders to divulge information about their women-folk and children.

On the other hand, response errors "occur because of the inability or unwillingness of the respondent to give correct information. For example, many people do not report their income, and even if they do so, they do not give their correct income. In some countries, people do not report their ages correctly, not because they do not wish to tell their age but because they in fact do not remember their correct age. This phenomenon of inability of the respondent to recall information is known as 'recall lapse'. The extent of recall lapse varies with characteristics such as age and may also vary according to the type of information needed to be recalled. Recall lapse not only tends to introduce response errors but may also result in errors of coverage."^{a/}

It is also possible that errors may occur at various stages of data collection. In the population census, errors could occur due to lack of adequate preparation and planning of the census or the lack of proper training and supervision of the field staff, or ambiguities in the questions asked or due to problems in the processing of the data. An attempt is therefore made in the sections that follow to assess the reliability and comparability of the data collected in the various census carried out in the country.

^{a/} A.H. Pollard, Farhat Yusuf and G.N. Pollard, *Demographic Techniques* (Rushcolters Bay, NSW, Australia, Pergamon Press, 1974), p. 135.

2. The total population

The first kingdom-wide census was taken in 1911. The operation was a novel one and would therefore have been accompanied by all the difficulties which attend such operations in the developing countries. In the first instance, there would have been the general lack of knowledge of methods since officers, whether at the highest or lowest rank, had no previous practical experience of census taking. Added to this would have been the general lack of education of the masses and the difficulty of recruiting adequately qualified enumerators to carry out the operations smoothly throughout the country. Further, as was noted by Graham, "the census began a leisurely enumeration in 1909, which by dint of checking and revision, was at length brought within measurable distance of a fairly accurate representation of the number of the people".^{b/} However, some of the difficulties confronting the first census would have been minimized at subsequent censuses.

In the absence of any post enumeration surveys, it is not possible to assess precisely the extent of under or over-enumeration at the past censuses. However, a fair indication of the extent of errors of coverage could be obtained by a comparison of the intercensal growth rates of the total population. The total population as enumerated in the censuses since 1911 as well as the average annual rates of growth are given in chapter 1, table 3. The growth recorded between 1929 and 1937 seems abnormally high and it is probable that the extent of underenumeration was greater in the 1929 census. However, the average annual rate of growth of the population aged 5 years and over (see table 1) during the 1929-1937

Table 1. Intercensal annual rates of growth of total population and population aged 5 years and over

Intercensal period	Average annual growth rates	
	Total population	Population 5 years and over
1929-1937	2.96	2.32
1937-1947	1.89	2.07
1947-1960	3.22	3.10
1960-1970	2.76	2.70

intercensal period is much lower, thus suggesting that underenumeration in 1929 was largely in respect of children aged 5 years and under.

^{b/} A.W. Graham, *Siam* (London, 1924), p. 113

It will also be observed that the average annual growth rate for the 1937-1947 period is abnormally low. It has been pointed out that "the successive census counts until 1947 were of varying degrees of completeness. While the series generally improved in coverage and quality with passage of time, Census '47 had slipped down, presumably from lingering post-war stress on the civil administrative machinery."^{c/} The relatively large extent of underenumeration at the 1947 census is confirmed by a study of the growth sequence of the *changwat* population over the census years which disclosed a break in the otherwise smooth progression in a few *changwat*. Further investigation on the basis of data for smaller areas revealed that certain areas were in fact omitted from the 1947 census count.^{d/} also accuracy indices calculated in respect of the various censuses rated the 1974 census as inferior to the 1937 and the 1960 censuses.^{e/}

The growth rate for the 1960-1970 intercensal period also appears to be low. An analysis of the 1970 census data indicated an underenumeration by 4.7 per cent in the total population, the extent of underenumeration being larger in respect of children aged 0-4 years. The average annual intercensal growth rate based on the adjusted figure is 3.1 per cent which is nearly equal to the rate obtaining during the previous intercensal period. Details of adjustment are discussed later in section 4.

3. Enumeration of children

As noted earlier, there has been significant underenumeration of children in various censuses of Thailand. Adjustments for this underenumeration were made in regard to all censuses up to 1947 by Bourgeois-Pichat ^{f/} on the basis of assumed mortality. Das Gupta and others, instead of assuming a mortality schedule for estimating the number of children aged 0-4 years, fitted a second degree exponential curve to the enumerated population at

c/ Ajit Das Gupta and others, "Population perspective of Thailand", in *Sankhya: Indian Journal of Statistics* vol. 27, Parts 1 and 2, September 1965. p. 38.

d/ Thip Chalothorn, "Changwat population growth patterns in Thailand," (1963) (mimeo).

e/ Wiwit Siripak, "Comparative accuracy indices of census age distribution in Thailand", (1963) (mimeo).

f/ Jean Bourgeois-Pichat, "An attempt of appraise the accuracy of demographic statistics for an under-developed country: Thailand," *Perspective on Thai Population*, Research Report No. 11 (Bangkok, IPs, Chulalongkorn University, 1974), pp. 1-31.

individual ages 0-10. "From the known run of survival ratios in general, it therefore appeared that a second degree curve should provide a satisfactory fit to the natural logarithms of the populations at individual ages 0-10, when the growth rate and the logarithms of the childhood survival ratios had changed slowly during the decade".^{g/} This method gave an estimated 3.1 million children aged 0-4 years instead of the 2.6 million enumerated in the 1947 census, implying an underenumeration of children 0-4 years by 14.6 per cent. The estimated number of children according to Bourgeois-Pichat's method was 2.9 million. By the same procedure Ajit Das Gupta and others estimated the number of children aged 0-4 years in 1960 to be 5.2 million as against the enumerated population of 4.2 million, implying 21.5 per cent underenumeration of children and 3.5 per cent underenumeration of total population.

An attempt has also been made to adjust the enumerated population in the age group 0-4 years on the basis of "sex-age adjusted birth rates" and reverse survival method. The "sex-age adjusted birth rate" is defined as the number of births per thousand of a weighted aggregate of numbers of women in the various five-year age groups from 15 to 44 years. A standard set of weights is used in computing this aggregate.

Assuming a mortality level for each census period, the reverse survival method is applied in order to compute the "sex-age adjusted birth rates" on the basis of the 0-4 and the 5-9 age groups, i.e., over a 10-year period preceding each census. For example, underenumeration of children aged 0-4 in the 1960 census was adjusted as follows: an estimate of the sex-age adjusted birth rate of 39.6 per thousand for the period 1955-1960 was derived by means of "reverse survival" ^{h/} of age group 0-4 in 1960 and the weighted sum of the mean estimates of female population aged 15-44 in the period 1955-1960. In the same way, the "reverse survival" method was applied to estimate a sex-age adjusted birth rate of 45.1 for the period 1950-1955 derived from the age group 5-9 in 1960 and from the weighted sum of the mean estimates of females aged 15-44 in the period 1950-1955. The rate for the period 1955-1960 is probably underestimated, since it is likely that children 0-4 were incompletely enumerated in the 1960 census.

g/ Ajit Das Gupta and others *op.cit.*, p. 40.

h/ The level of mortality used corresponds to an expectation of life at birth of 60.4.

Examination of census data yields little evidence that numbers aged 5-9 years are subject to any special inaccuracy of reporting. Moreover, it is not unlikely that fertility in 1955-1960 was fully as high as in 1950-1955. On the assumption that the sex-age adjusted birth rates in the two periods were actually the same, the extent of underenumeration of children 0-4 years old at the census can be estimated by taking the percentage difference between the sex-age adjusted birth rates as computed for the two periods. In this example, there is a difference of 13.9 per cent between the two rates which means an underenumeration of 589,295 children age 0-4 years. If this estimate is correct, then the total population of Thailand in 1960 would have been at least 589,295 more than the census figure. The results obtained for each census are presented in table 2 except for the 1929 census in which a high level of underenumeration appears in each young age group. For this census, the estimates made by Bourgeois-Pichat ^{l/} (correction of 680,000 for the 0-14 age group) are used. The population in the age group 0-4 years as corrected by different methods is given in table 3.

4. Estimated population 1970

As noted in the preceding section, the average annual intercensal growth rate for the 1960-1970 period appears low even if only the population aged 10 years and over is considered. This would suggest that there has been an underenumeration at the 1970 census. The post-enumeration survey which followed the 1970 population census indicated that there was an underenumeration by about 3.3 per cent in municipal areas and by about 1.4 per cent in non-municipal areas making a national average of approximately 1.7 per cent. However, the post-enumeration survey estimate is "subject to many of the same problems as the original count since parallel procedures were used in both instances. For this reason, it is felt that PES estimates provide at best a lower limit to actual census undercount and Thailand is no exception to this rule." ^{j/}

An attempt was made by Boonpratuang and Robinson ^{k/} to estimate the extent of underenumeration

at the 1970 census by comparing the results of the 1960 and 1970 censuses. The method adopted was to apply the survival rates derived from the life tables constructed on the basis of the Survey of Population Change ^{l/} to the 1960 population. This procedure however assumes that (a) the enumeration at the 1960 census is not subject to any error; (b) the life table used is appropriate, and (c) international migration during this period was negligible. It was estimated that the extent of underenumeration was about 4.5 per cent of the observed census count, somewhat lower if the estimated population was used as the percentage base instead of the observed population. However, this estimate was based on an early 1 per cent sample from the 1970 census which is now considered to be an inadequate data base.

Another estimate of the extent of underenumeration in the 1970 census was made by Fulton ^{m/} who arrived at a higher over-all estimate of underenumeration of 5.3 per cent based on the 100 per cent census count.

The nature and extent of errors in the 1970 census was also the subject of another study by Arnold and Phananimamai ^{n/} which provides revised estimates of the age-sex distribution of the 1970 population. The estimation method consisted of three different procedures for three broad age groups of the population. The population aged 0-9 was estimated by adjusting registered births and deaths upward to account for underregistration. The population aged 10-59 was estimated by surviving the 1960 adjusted census population forward to the date of the 1970 census. Finally, the population aged 60 and over was taken as enumerated in the 1970 census. After these steps were completed, a graduation technique was applied in order to smooth erratic fluctuations in the sex ratios. The final adjusted population is compared with the enumerated population in table 4.

The total estimated population according to Arnold and Phananimamai is 36,099,200 which implies an over-all net underenumeration in the 1970 census of 1,701,900 persons or about 4.7 per cent of the estimated population. This figure compares with

^{l/} Bourgeois-Pichat, *op.cit.*,

^{j/} Fred Arnold and Matana Phananimamai, *Revised Estimates of the 1970 Population of Thailand*, Research Paper No. 1 (Bangkok, National Statistical Office, 1975), p.10.

^{k/} Chet Boonpratuang and Warren C. Robinson, "An estimate of the age and sex distribution of the Thai population in 1970 based on an evaluation of the one percent sample of the 1970 census" (Bangkok, National Economic and Social Development Board, 1973) (mimeo).

^{l/} The Survey of Population Change was conducted by the National Statistical Office in 1964-1967. The life table corresponds to the period 1964-1965 and gives an expectation of life at birth of 55.9 for males and 62.0 for females (after correction).

^{m/} John Peter Fulton, "Evaluation of selected aspects of the 1970 census of Thailand", unpublished M.A. thesis (Brown University, Providence).

^{n/} Fred Arnold and Matana Phananimamai, *op.cit.*

Table 2. Correction of underenumeration of children in the various censuses

Census year	Sex-age adjusted birth rate calculated on the basis of the 0-4 age group (per 1,000)	Sex-age adjusted birth rate calculated on the basis of the 5-9 age group (per 1,000)	Percentage difference	Total number in 0-4 age group	Correction	Corrected total number
1970	43.5	47.2	8.5	5,666,329	481,638	6,147,967
1960	39.6	45.1	13.9	4,246,773	589,265	4,836,038
1947	41.8	47.1	12.7	2,644,354	333,189	2,977,543
1937	48.3	50.0	3.5	2,436,126	85,285	2,521,411

Table 3. Population in the age group 0-4 years as corrected by different methods, census years 1937 to 1970

Census year	Enumerated population in age group 0-4	Correction for underenumeration of children			Corrected population in the age group 0-4		
		(1)	(2)	(3)	(1)	(2)	(3)
1937	2,437	85	...	85	2,522	...	2,522
1947	2,644	214	450	333	2,858	3,094	2,977
1960	4,247 ^{2/}	...	910	589	...	5,157	4,836
1970	5,666 ^{2/}	482	6,148

Notes: 1/ Corrections (1) are according to Bourgeois-Pichat's; corrections (2) are according to Ajit Das Gupta and others; corrections (3) are based on "sex adjusted birth rates" referred to in this annex.

2/ Adjusted for "unknown".

Table 4. Comparison of the enumerated and estimated population as of 1 April 1970 (in thousands)

Age	Male				Female			
	Estimated population	Enumerated population	Difference	Percentage difference	Estimated population	Enumerated population	Difference	Percentage difference
	(1)	(2)	(3)=(1)-(2)	(4)=(3)/(1) x 100	(5)	(6)	(7)=(5)-(6)	(8)=(7)/(5) x 100
0-4	3,219.1	2,866.6	352.5	11.0	3,090.1	2,799.8	290.3	9.4
5-9	2,725.4	2,682.6	42.8	1.6	2,644.5	2,609.0	35.5	1.3
10-14	2,298.7	2,312.5	-13.8	-0.6	2,218.9	2,255.5	-36.6	-1.6
15-19	1,988.0	1,834.5	153.5	7.7	1,920.8	1,887.8	33.0	1.7
20-24	1,689.8	1,323.3	366.5	21.7	1,618.6	1,363.4	255.2	15.8
25-29	1,269.2	1,099.5	169.7	13.4	1,238.3	1,144.8	93.5	7.6
30-34	977.6	1,048.6	-71.0	-7.3	1,005.7	1,078.4	-72.7	-7.2
35-39	885.5	954.2	-68.7	-7.8	928.1	958.8	-30.7	-3.3
40-44	764.3	775.3	-11.0	-1.4	792.0	767.3	24.7	3.1
45-49	643.8	599.9	43.9	6.8	670.7	598.2	72.5	10.8
50-54	489.1	472.8	16.3	3.3	513.8	490.4	23.4	4.6
55-59	399.1	388.8	10.3	2.6	425.0	402.2	22.8	5.4
60-64	301.2	301.2	-	-	324.6	324.6	-	-
65-69	213.2	213.2	-	-	239.2	239.2	-	-
70+	251.0	251.0	-	-	353.9	353.9	-	-
Total	18,115.0	17,124.0	991.0	5.5	17,984.2	17,273.3	710.9	4.0

Total deficit - 1,701,900 or 4.7 per cent

Source: Fred Arnold and Matana Phananiramai, *Revised Estimates of the 1970 Population of Thailand*, Research Paper No. 1 (Bangkok, National Statistical Office, 1975).

a net underenumeration rate of 2.5 per cent or higher among some of the most highly accurate censuses that have been taken and a usual range of 3 to 10 per cent net under-coverage for censuses conducted by reasonably competent statistical offices ^{o/}.

The revised estimates indicate that males contribute substantially more to the total deficit in the Thai census than females, with a male deficit of about 5.5 per cent and a female deficit of about 4.0 per cent of the estimated population. The deficit varies considerably among age groups, with the largest deficits in the early childhood years (age 0-4) and again in the young adult years (age 15-29). "The deficit in the first age group is to be expected since young children, particularly those under one year of age are often missed in censuses. A high level of underenumeration is similarly common in the age group 15-29, especially for males, because of the high mobility of people at these ages. The undercount is particularly large in the 20-24 age group, in which the estimated rates of underenumeration are 21.7 per cent for males and 15.8 per cent for females." ^{p/}

It may also be noted that the results of the study by Arnold and Phananimamai agree reasonably well with the results of the two studies mentioned earlier with respect to the extent of underenumeration in the 1970 census. In addition all three studies indicate that the degree of undercount is at least one-third higher for males than it is for females.

Table 5 gives the total population adjusted for underenumeration at the various censuses and the average annual growth rates based on the adjusted data. The average annual growth rate for the 1960-1970 period works out to 3.0 per cent. This rate appears to be more likely than the rate computed on the basis of the enumerated population and compares with the estimated growth rates for the earlier intercensal periods.

5. Accuracy of age and sex distribution of the population

As noted earlier, errors in age and sex distribution of the population may be caused both by differences in the relative completeness of enumeration

^{o/} Jacob S. Siegel, "Estimates of coverage of the population by sex, race and age in the 1970 census", *Demography* (Washington, D.C.) Vol. 11, No. 1, pp. 1-24.

^{p/} Fred Arnold and Matana Phananimamai, *op.cit.*, p. 10.

of persons in different age groups, and by mis-statement of age.

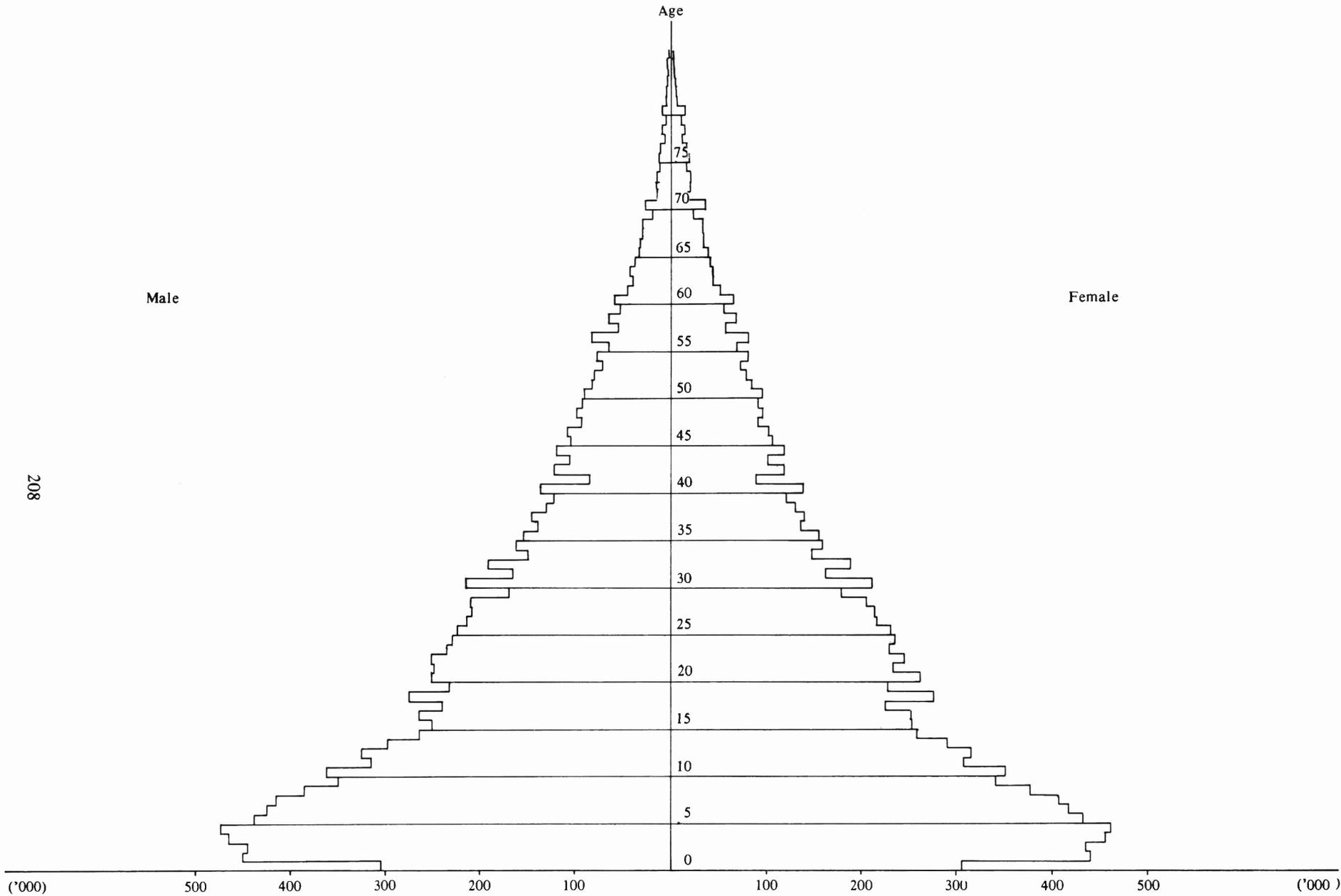
Figures 1 and 2 show the single year age-pyramids of the population as enumerated at the 1960 and 1970 censuses respectively. Compared with age-pyramids of other developing countries, the pyramids for Thailand appear to be regular. Age-heaping is not very marked; only preference in the 1960 census for ages ending in "0" and a preference for ages ending in "5" in the 1970 census can be noticed. This tendency is also confirmed by the digit preference indexes calculated according to Myers "blended" method ^{q/} in respect of the two censuses (see table 6). These indexes show a strong preference for digit 0, dislike for digits 1 and 9, and slight preference for the even digits in 1960, while at the 1970 census the preference was for digit 5 and a dislike for the adjacent digits, 4 and 6. It is also evident from the table that the extent of accuracy in age reporting is higher in 1970 than in 1960.

Errors in age-reporting due to likes and dislikes for certain terminal digits are serious when single years of age are considered. These errors tend to be minimized when the population is considered in five-year age groups, since heaping at age 0 and 5 will be offset by deficits at the adjacent ages. However, other indexes were calculated to test the accuracy of the age distribution in five-year age groups. One method was to compare the "sex-ratios" for successive age groups as recorded in the census. "If the distributions are accurate or if the errors for males are as frequent and of the same kind as those for females, sex-ratio will change very gradually from one age to another, as a result of sex differences in mortality and in rates of migration, but cannot vary abruptly or fluctuate violently" ^{r/}

Another test was provided by "age-ratios" which are the numbers reported in one age group per 100 of the mean of the numbers reported in the two adjacent age groups. "In general, any considerable

^{q/} Myers has developed a "blended" method to avoid the bias in the indices due to the fact that numbers ending in "0" would be normally larger than the numbers ending in other digits because of the effect of mortality. For details of computation see, Robert J. Myers, "Errors and bias in reporting of ages in census data", in *Transactions of the Actuarial Society of America*, vol. XII, 1940.

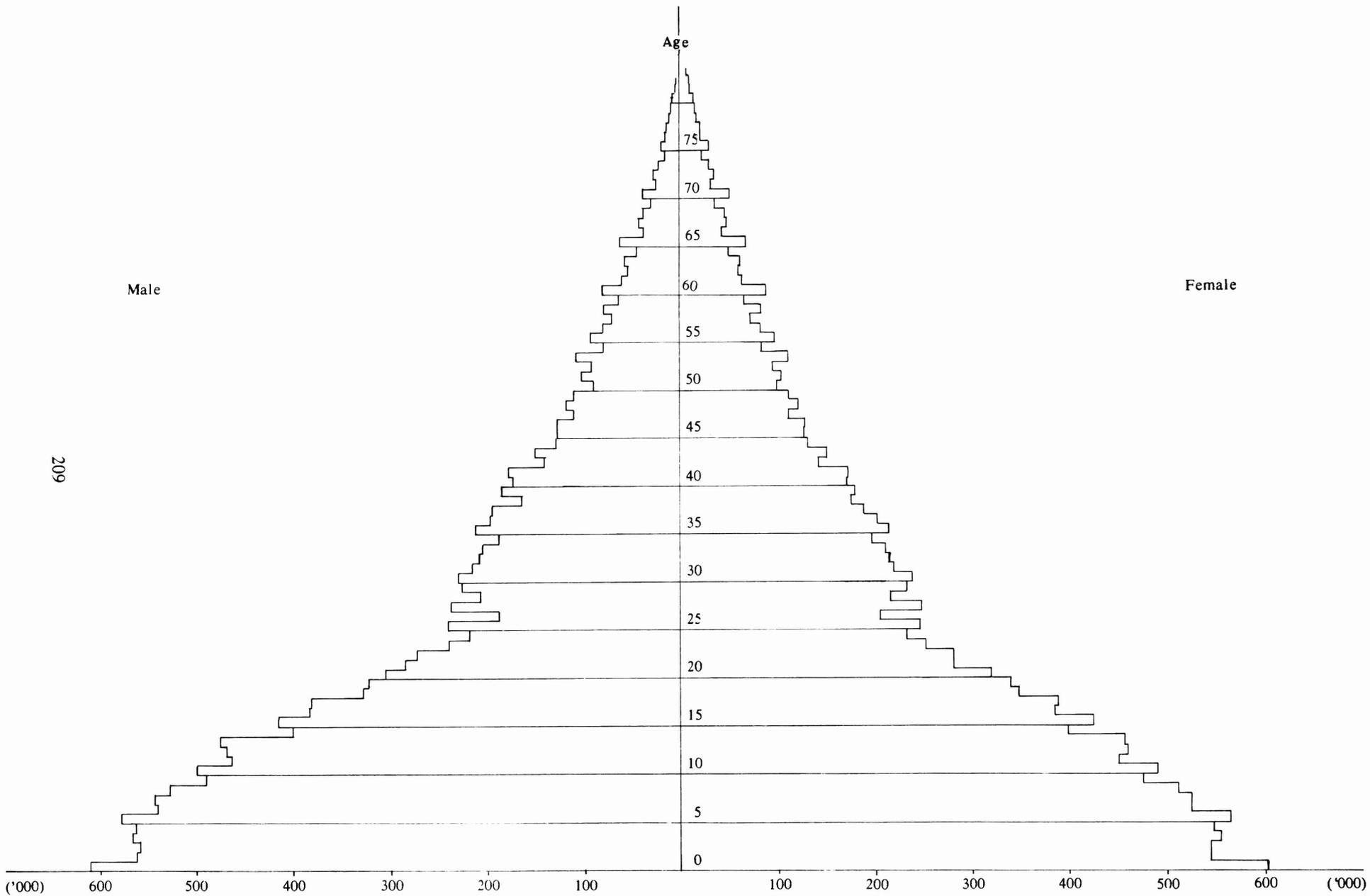
^{r/} United Nations, "Accuracy tests for census age distributions tabulated in five-year and ten-year groups", *Population Bulletin*, No.2, October 1952, (Sales No. 1952.xiii.4), p.60.



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Source: Government of Thailand, 1960 Population Census (Bangkok, National Statistical Office, 1962).

Figure 1. Age structure for Thailand, 1960



Source: Government of Thailand, 1970 Population Census (Bangkok, Central Statistical Office, 1973).

Figure 2. Age structure for Thailand, 1970

Table 5. Total population adjusted for underenumeration at the censuses, 1919-1970 and average annual growth rate of the population

(in thousands)

Census year	Population enumerated	Correction for under-enumeration	Corrected population	Intercensal increase	Average annual intercensal growth rate (percentage)
1919	9,207	556 ^{1/}	9,763		
1929	11,506	680	12,186	2,423	2.2
1937	14,464	85	14,549	2,363	2.2
1947	17,443	333	17,776	3,227	2.2
1960	26,258	589	26,847	9,071	3.2
1970	34,397	1,940	36,337	9,252	3.1

Note: ^{1/} Correcting the 1919 census in the same way as the 1929 census.

Table 6. Myers' indexes of digit preference, 1960 and 1970 censuses

Digit	1960 census		1970 census	
	Male	Female	Male	Female
0	0.8	1.2	0.26	0.50
1	-0.7	-0.8	0.15	-0.17
2	0.6	0.4	-0.09	-0.14
3	-0.3	-0.3	0.30	0.19
4	0.2	0.2	-0.76	-0.66
5	-0.1	0.1	0.62	0.55
6	0.2	0.0	-0.41	-0.31
7	-0.4	-0.5	0.30	0.17
8	0.5	0.4	-0.38	-0.10
9	-0.8	-0.7	0.02	-0.03
Absolute sum	4.6	4.6	3.3	2.8

fluctuation of the age-ratios indicate inaccuracies in age-reporting or incomplete enumeration. Some real variations in these age-ratios may be expected, however, mainly owing to variations in numbers of births in the past or to variations in the past rates of migration or in an age distribution of migrants. Variations in age-ratios due to difference in age-specific mortality rates can be neglected, since almost throughout the entire scale of ages, year to year changes in mortality rates are gradual and systematic.”^{s/}

The degrees of variability of the sex-ratios and age-ratios for the censuses were compared by com-

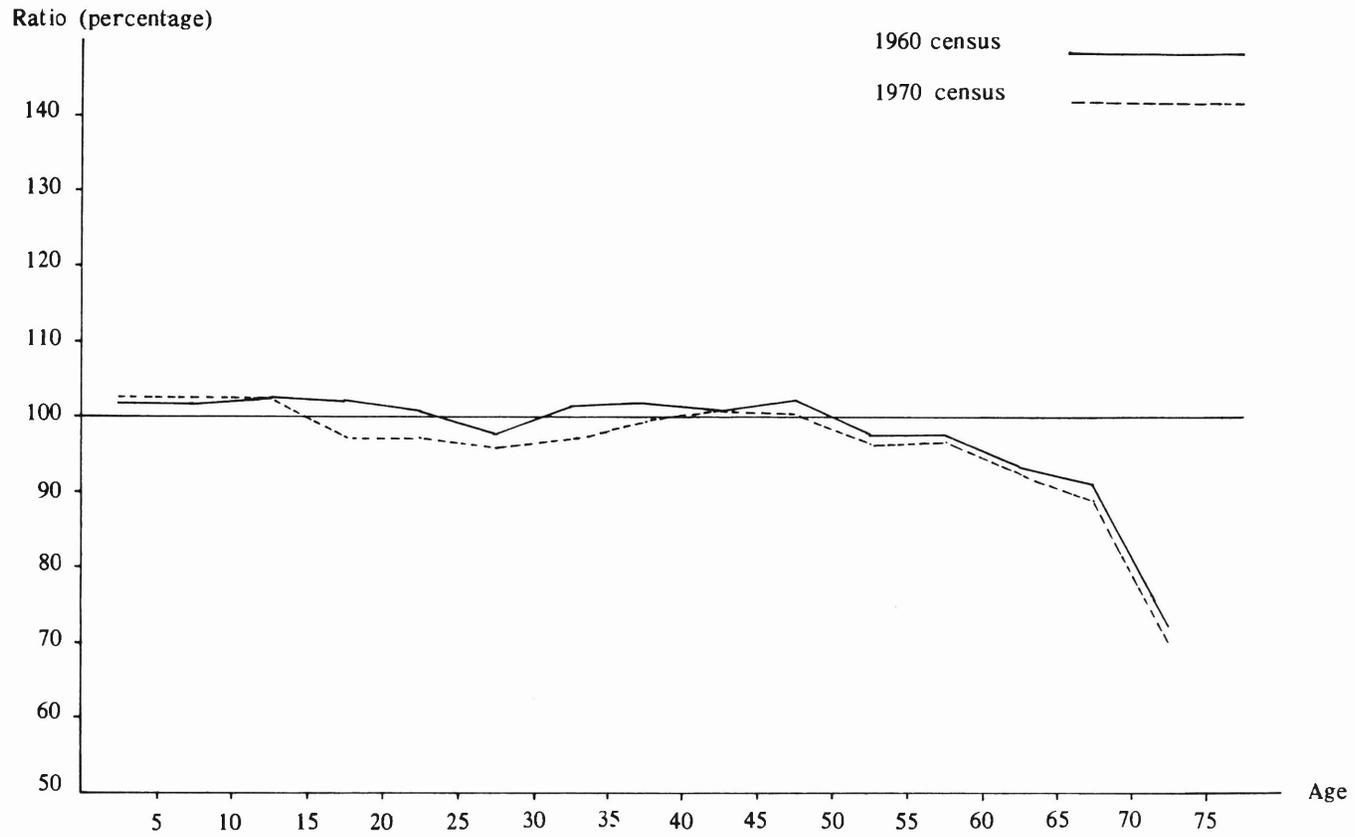
puting two summary measures: (a) “sex-ratio score” or the mean difference between sex-ratios for the successive age groups averaged irrespective of sign; and (b) “age-ratio score” or the mean deviation of age ratios from 100 per cent, also irrespective of sign. A “joint-score” was also derived by adding three times the sex-ratio score to the sum of the age-ratio scores for the two sexes. The results are presented in table 7. It will be seen from this table that the age-sex distribution of the population as recorded in the 1970 census was more accurate than in the earlier censuses.

Figure 3 shows the sex-ratios by five-year age groups for the 1960 and 1970 censuses. It will be observed that these ratios are irregular and are too low for ages 25 years and over. Since sex-ratios are expected to decline gradually with advancing age, the irregular series for Thai censuses suggest an increasing omission of women with age.

The various indices discussed in the preceding paragraphs have shown that the age-sex distribution of the 1970 population was rather accurate, although there was substantial underenumeration at this census. The total male and female population at this census corrected for underenumeration was prorated in five-year age groups according to the recorded age and sex distribution. It may be noted that the population aged 5 to 9 years and 70 years and over were not subjected to any correction. The population of 1970 adjusted for underenumeration by sex and five-year age groups is given in table 8.

The estimation of the age and sex distribution of the 1970 population made by the National Statistical Office on the basis of the results of the 1965 Survey of Population Change is shown in table 34 in chapter III.

^{s/} *Ibid.*



Sources: 1960 and 1970 Census Reports.

Figure 3. Sex ratios by 5-year age group

Table 7. Sex ratio scores, age ratio scores and joint scores computed for the censuses of 1937, 1947, 1960 and 1970

Year of census	Sex-ratio score	Age-ratio score		Joint score
		Male	Female	
1937	3.8	3.5	3.1	18.0
1947	3.0	4.3	2.4	15.7
1960	1.7	4.2	3.5	12.8
1970	1.9	3.3	3.4	12.5

Table 8. Estimated population by sex and five-year age group, Thailand, 1970

Age	Both sexes	Male	Female
All ages	36,337,434	18,211,103	18,126,331
0-4	6,148,332	3,110,403	3,037,929
5-9	5,291,579	2,682,560	2,609,019
10-14	4,860,654	2,484,706	2,375,948
15-19	3,959,698	1,971,131	1,988,567
20-24	2,858,083	1,421,874	1,436,209
25-29	2,387,321	1,181,362	1,205,959
30-34	2,262,797	1,126,754	1,136,043
35-39	2,035,254	1,025,233	1,010,021
40-44	1,641,334	833,056	808,278
45-49	1,274,711	644,555	630,156
50-54	1,024,598	507,996	516,602
55-59	841,497	417,779	423,718
60-64	665,583	323,614	341,969
65-69	481,085	229,107	251,978
70-74	297,270	129,395	167,875
75-79	168,891	70,535	98,356
80+	138,747	51,043	87,704

B. APPRAISAL OF REGISTRATION DATA

1. Over-all defects

As noted in annex I, registration of birth, death and still birth is compulsory throughout the country. For the convenience of the people, vital registration is decentralized and a registrar is appointed to each village. However, the vital registration data is subject to errors of underregistration since not all vital events occurring in the country do in fact get recorded.

In 1964, the National Statistical Office, in co-operation with the Ministries of Interior and of Public Health, initiated the Survey of Population Change in order to estimate the extent of official underregistration and to obtain reliable trends in birth and death rates in the country. The main results of the survey may be summarized as follows:-

(a) Comparison of crude birth and death rates based on the results of the survey and official

registration data indicated that only 85 per cent of the births and 71 per cent of the deaths in the country are registered;

(b) The percentage underregistration for male and female births are approximately the same, i.e., about 15 per cent;

(c) The percentage underregistration of female deaths (40 per cent) is higher than the proportion for males (35 per cent).

(d) The underregistration of deaths under 1 year of age was 50 per cent for males and 53 per cent for female deaths.

It has, however, to be noted that the results of the Survey of Population Change are themselves subject to limitation in that a significant portion of the nation's population, i.e. those living in Bangkok and Thon Buri municipal areas, was not included in the sample.

Annual data on births and deaths are available from 1920 onwards and attempts were also made to correct these data on the assumption that the completeness of registration has improved over time. Bourgeois-Pichat ^{t/} estimated the trends in fertility and mortality from 1920 to 1955 on the basis of the censuses of 1929, 1937, and 1947 as well as of the population survey of 1956. The same method was adopted to estimate the actual rates for subsequent years based on the 1960 and 1970 censuses. Since the 1956 survey itself was subject to errors, and there is no way of correcting these errors, any adjustments made on the basis of this survey have to be treated with caution.

2. Fertility trends

An attempt has been made to estimate the trends in fertility by applying the "reverse survival" method to the various censuses of Thailand. The number of births were estimated from the curve of the sex-age adjusted birth rates over time for short periods of time (five years). This number was compared with the number of registered births for the same time period to arrive at the correction factors. A curve of the correction factors was then drawn for purposes of correcting the number of births registered every year. This method is discussed in some detail in the following paragraphs.

Since the reverse forecast gives only a fraction

^{t/} Bourgeois-Pichat, *op.cit.*

Table 9. Calculation of a reverse forecast of the female population of Thailand on the basis of the 1960 census ^{1/}

Age groups	Survival ratios of model life table	1915	1920	1925	1930	1935	1940	1945	1950	1955	Female population at census 1960
(Births)	(0.9208)	699,929	825,776	1,036,484	1,225,198	1,387,122	1,404,920	1,717,131	2,209,535	2,282,728	
0-4	.9731	567,574	644,495	760,375	954,394	1,128,162	1,277,262	1,293,651	1,581,134	2,034,540	2,101,936
5-9	.9914	487,249	552,307	627,158	739,921	928,721	1,097,815	1,242,903	1,258,825	1,538,602	1,979,811
10-14	.9906	408,499	483,059	547,557	621,764	733,558	920,734	1,088,373	1,232,214	1,248,025	1,525,370
15-19	.9865	326,143	404,659	478,518	542,410	615,920	726,662	912,079	1,078,143	1,220,632	1,236,294
20-24	.9839	243,460	321,740	399,196	472,058	535,087	607,605	716,852	899,766	1,063,588	1,204,153
25-29	.9826	197,516	239,540	316,560	392,769	464,458	526,472	597,822	705,311	885,280	1,046,464
30-34	.9811	166,369	194,079	235,372	311,052	385,935	456,376	517,312	587,420	693,038	869,876
35-39	.9783	269,029	163,225	190,411	230,924	305,173	378,641	447,751	507,535	576,318	679,940
40-44	.9727		263,191	159,683	186,279	225,913	298,551	370,425	438,035	496,521	563,812
45-49	.9631			256,006	155,323	181,193	219,745	290,400	360,312	426,076	482,966
50-54	.9482				246,559	149,592	174,507	211,637	279,685	347,016	410,354
55-59	.9238					233,787	141,843	165,468	200,674	265,197	329,041
60-64	.8825						215,973	131,035	152,859	185,382	244,989
65-69	.8162							190,596	115,638	134,898	163,600
70-74	.7197								155,564	94,384	110,104
75-79	.5955									111,960	67,928
(80+)	(0.3576)										66,672

Note: ^{1/} It is assumed that the mortality level remained stable in the past at the level shown in the column 2.

Table 10. Calculation of the sex-age adjusted birth rate for Thailand on the basis of the 1960 census

Age groups	Weights	1920	1925	1930	1935	1940	1945	1950	1955	1960
		<u>Level 80</u>								
15-19	1	404,659	478,518	542,410	615,920	726,662	912,079	1,078,143	1,220,632	1,236,294
20-24	7	2,252,180	2,794,372	3,304,406	3,745,609	4,253,235	5,017,964	6,298,362	7,445,116	8,429,071
25-29	7	1,676,780	2,215,920	2,749,383	3,251,206	3,685,304	4,184,754	4,937,177	6,196,960	7,325,248
30-34	6	1,164,474	1,412,232	1,866,312	2,315,610	2,738,256	3,103,872	3,524,520	4,158,228	5,219,256
35-39	4	652,900	761,644	923,696	1,220,692	1,514,564	1,791,004	2,030,140	2,305,272	2,719,760
40-44	1	263,191	159,683	186,279	225,913	298,551	370,425	438,035	496,521	563,812
Weighted aggregate		6,414,184	7,822,369	9,572,486	11,374,950	13,216,572	15,380,098	18,306,377	21,822,729	25,493,441
Weighted aggregate at the centre of the interval		7,118,277	8,697,428	10,473,718	12,295,761	14,298,335	16,843,238	20,064,553	23,658,085	
Annual aggregate female births		165,155	207,297	245,040	277,424	280,984	343,426	441,907	456,546	
Sex-age adjusted birth rate (per 1,000 females)		47.6	48.8	48.0	46.3	40.3	41.8	45.1	39.6	

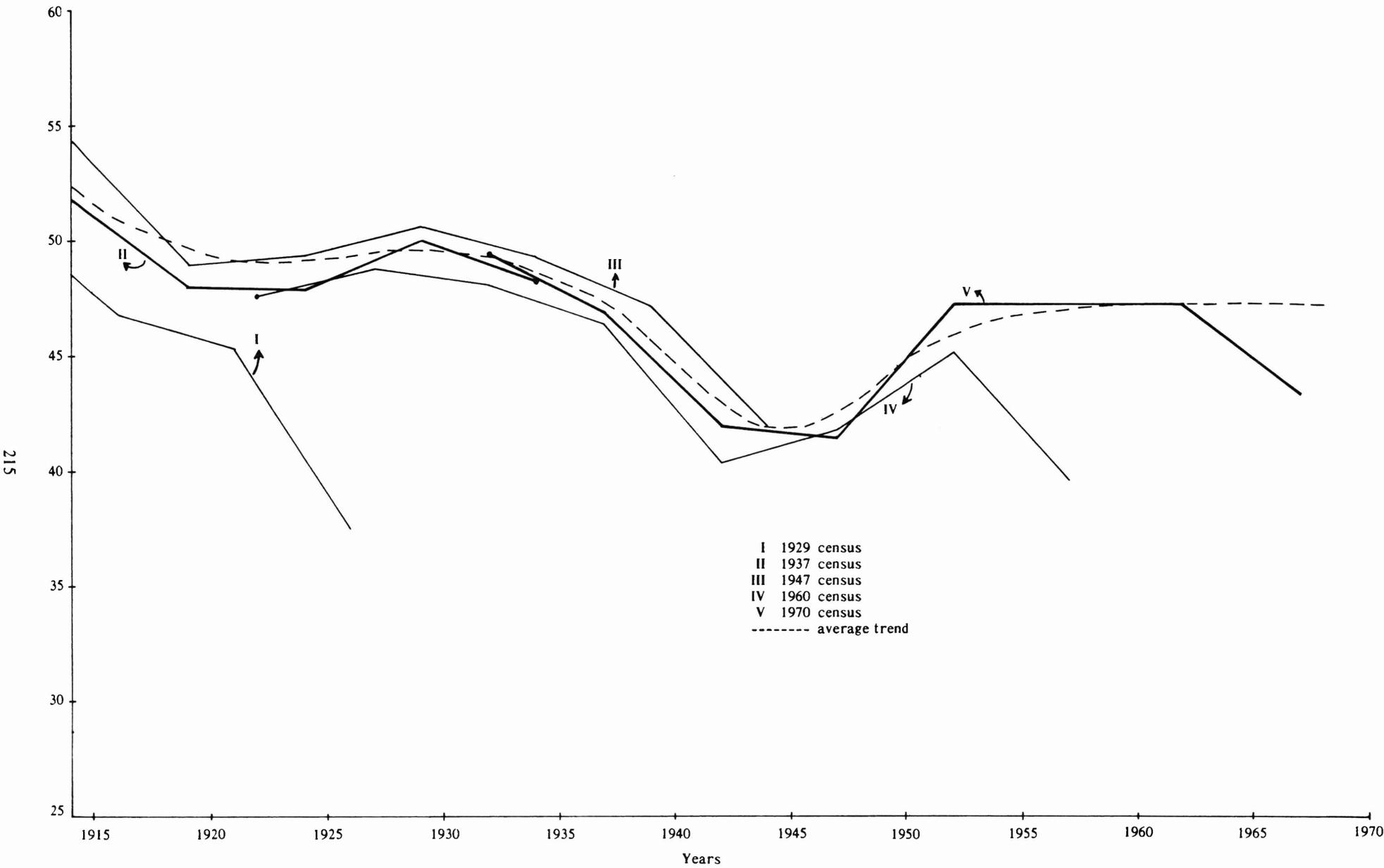


Figure 4, Thailand: sex-age adjusted birth rates based on various censuses

of the population, the crude birth rates could not be estimated directly from the census data because the total population must be known. Therefore, a sex-age adjusted birth rate was used. This rate was obtained by dividing the births by a weighted aggregate, by age group, of females between the ages of 15 and 44 years. The relative weights given to the six five-year age groups 15-19, 20-24, 25-29, 30-34, 35-39 and 40-44, were 1, 7, 7, 6, 4 and 1 respectively. An illustration of the calculations for 1960 is given in tables 9 and 10.

In table 9, the five-year age groups of female population in the 1960 census were divided by the survival ratios computed from a model life table ^{u/} in order to obtain the female population as well as births in 1955, 1950, 1945 back until 1915. In table 10, the sex-adjusted birth rates as at the mid-point of the five-year intervals were computed by dividing the annual number of female births by

that the estimates of birth for this period are based on the population aged 0-4 years at the census, and as noted earlier, this age group was underenumerated in the various censuses.

A line was drawn on figure 4 to represent the average of fluctuations of the sex-age adjusted birth rate. The average sex-age adjusted birth rates for each five-year period was determined from this average trend line. These rates when multiplied by the appropriate weighted aggregate of females aged 15 to 44 years gave the estimated number of births (annual average) for each five-year period. This estimated number was compared with the registered number of births (annual average) to obtain a set of correction factors. The calculations are presented in table 11. The correction factors to be applied to registered births each year were obtained by drawing a curve based on the five-year average correction factors given in the last column of table 11.

Table 11. Comparison of registered and estimated births for successive five-year periods from 1920 to 1970

Periods	Sex-age adjusted birth rates ^{1/}	Weighted aggregate of females between 15 and 44	Estimated births (annual average)	Registered births (annual average)	Correction factors
1920-1924	49.4	10,340	510,796	273,848	1.865
1925-1929	49.6	11,570	573,872	329,662	1.741
1930-1934	49.0	12,860	630,140	435,760	1.446
1935-1939	47.0	14,110	663,170	503,098	1.318
1940-1944	43.5	14,902	648,237	566,057	1.145
1945-1949	43.0	16,793	722,099	437,852	1.649
1950-1954	46.0	20,065	922,990	587,932	1.570
1955-1959	46.9	23,658	1,109,560	779,542	1.423
1960-1964	47.2	25,273	1,192,886	988,549	1.207
1965-1969	47.2	28,636	1,351,619	1,130,674	1.195

Note: ^{1/} From figure 1.

the mean weighted aggregate multiplied by 2.05 to allow for masculinity at birth. A curve could then be drawn to join the points corresponding to the different sex-age adjusted birth rates.

The curves resulting from similar computations for each census are shown in figure 4. A peculiarity appears in each of these curves in the low level of the sex-age adjusted birth rate for the five-year period preceding the census. This is due to the fact

Figure 5 shows that there had been an improvement in the registration of births from 1920 to 1942, a deterioration from 1942 to 1947 probably due to the Second World War and an improvement up to the last decade. It is therefore, difficult to assess the right correction factors for each year. However, the registered number of births during the 1960s and the results of the Survey of Population Change suggest a possible slight decrease in the completeness of registration of births between 1965 and 1970. The corrected birth rates are given in table 12.

^{u/} The model life tables prepared by the United Nations Secretariat were adopted for this purpose. The life table used for the 1960 census corresponds to a mortality level with an expectation of life at birth of 60.4 years. For details, see *Methods for Population Projections by Sex and Age*, Manual III, Population Studies No. 25 (Sales No.: 1956.XIII.3).

The stable population method is often used in developing countries to correct the age distribution of the censuses or to estimate the level of fertility.

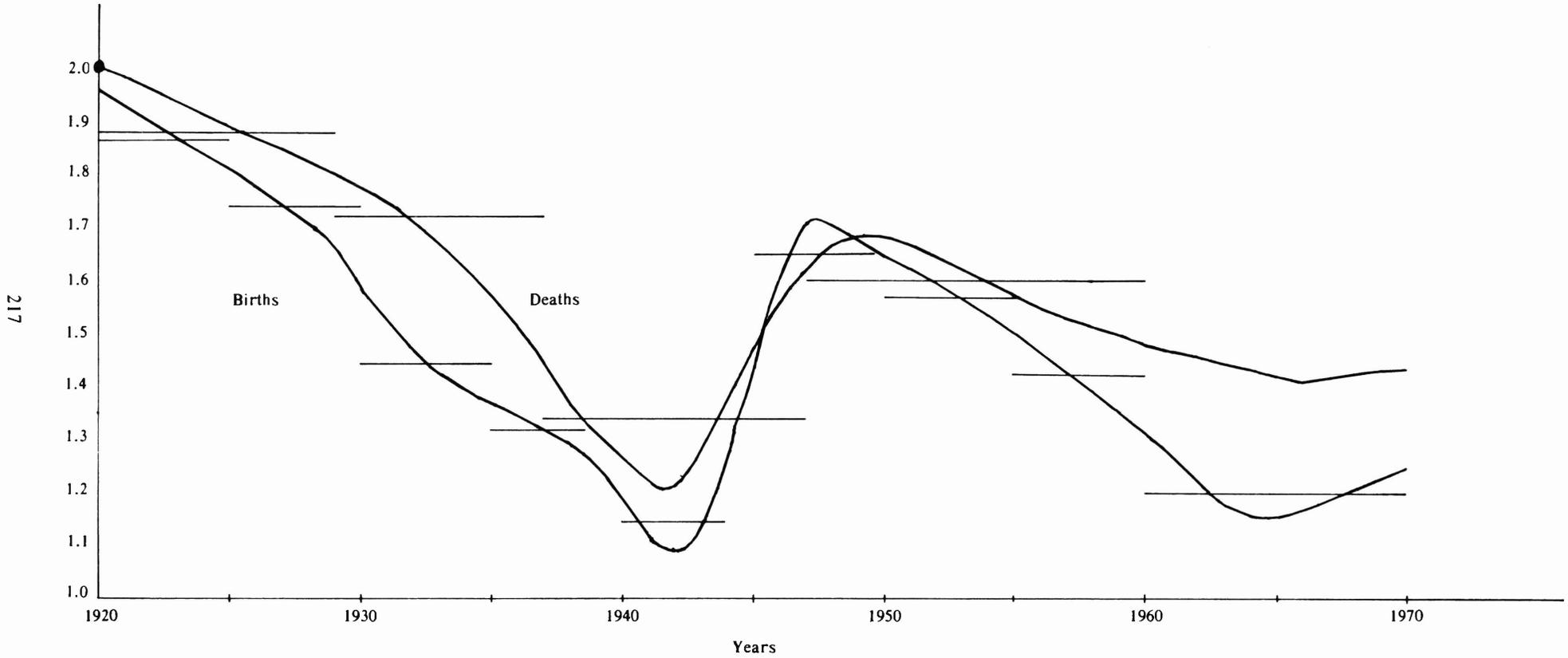


Figure 5. Thailand - correction factors to apply to vital statistics

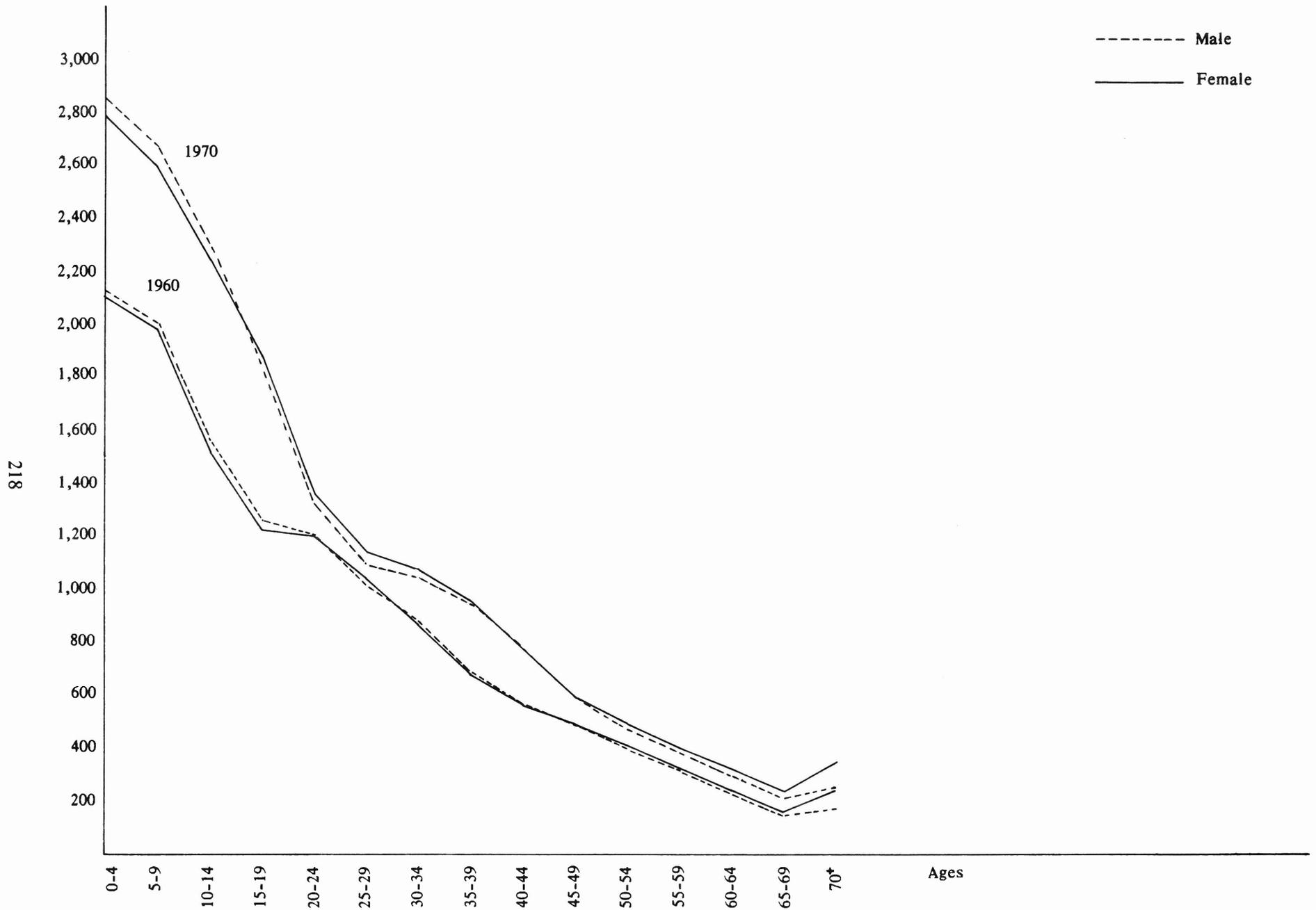


Figure 6. Thailand: age distribution of the population, 1960-1970

Table 12. Estimates of crude birth rates, 1920-1970

1920	48.8	1946	37.9
1921	48.8	1947	39.8
1922	50.6	1948	39.5
1923	51.6	1949	44.5
1924	48.8	1950	44.0
1925	50.9	1951	44.4
1926	47.5	1952	43.8
1927	49.0	1953	44.0
1928	49.3	1954	47.0
1929	48.9	1955	45.2
1930	49.6	1956	47.8
1931	50.6	1957	45.2
1932	49.8	1958	43.3
1933	47.9	1959	44.7
1934	47.7	1960	44.3
1935	45.5	1961	41.6
1936	47.9	1962	41.3
1937	46.3	1963	40.6
1938	44.5	1964	42.9
1939	45.8	1965	41.2
1940	42.4	1966	39.5
1941	39.9	1967	40.0
1942	37.6	1968	42.5
1943	41.0	1969	39.6
1944	40.3	1970	39.4
1945	36.8		

This method was not used in the present study because the age distribution of the population does not conform to that of a stable population. An examination of the age distributions obtained in the censuses of 1960 and 1970 shows that fertility was greatly reduced around the period of the Second World War. It is evident from figure 6 that the two low points in the age distribution do not occur at the same age at both censuses as would have been the case if age-misreporting was the cause of these low points, but rather advances by 10 years from the 1960 census to the 1970 census. Therefore, the method of stable population analysis does not seem appropriate for Thailand.

3. Mortality trends

The correction factors to be applied to the registration data on deaths were computed by means of the balancing equation: $I = B - D + M$

where I — intercensal increase

B — births during the intercensal period

D — deaths during the intercensal period

M — Balance between immigrants and emigrants during this intercensal period.

Hence $D = B + M - I$.

This equation was used to obtain the number of

Table 13. Successive intercensal balances between the different censuses of Thailand

	1919-1929	1929-1937	1937-1947	1947-1960	1960-1970
Estimated births during the interval between the censuses	5,458,771	5,109,317	6,579,346	12,937,567	12,692,458
Excess of immigrants over emigrants ^{1/}	383,684	126,783	181,190	283,143	46,440
Increase ^{2/}	2,423,000	2,363,000	3,227,000	9,071,000	9,490,000
Estimated deaths	3,419,455	2,873,100	3,533,536	4,149,710	3,248,898
Average annual deaths estimated	341,945	359,137	353,354	319,208	324,890
Annual registered deaths	161,172	209,316	264,006	197,825	227,726
Correction factors	2.12	1.72	1.34	1.60	1.43
Estimated crude death rate (per thousand)	31.3	27.0	22.0	14.4	10.4

Notes: ^{1/} Source: *Statistical Yearbook of Thailand*.

^{2/} Obtained from corrected census data.

deaths during each intercensal period, the figures relating to intercensal increase and number of births being those estimated previously. Table 13 illustrates the calculation for the various intercensal periods from 1919 to 1970.

The annual number of estimated deaths was then compared with the annual number of registered deaths in order to obtain correction factors for the intercensal periods. A curve of the correction factors was then drawn (see figure 5). It will be observed that the troughs and peaks on this curve occur during the same periods as those on the curve which represents the correction factors for births. There was an improvement in death registration before the Second World War followed by a deterioration until 1947-1948 and thereafter an improvement. During the last decade, the degree of completeness seems to have been much higher for births than for deaths as confirmed by the results of the Survey of Population Change.

The corrected death rates are given in table 14. The crude death rates estimated for 1964 (10.9 per 1,000) and 1965 (9.9 per 1,000) are consistent with the figure estimated by the Survey of Population Change for the period 1964-1965 (10.9 per 1,000).

Table 14. Trend of crude death rates, 1920-1970 (estimation)

Year	Rate	Year	Rate
1920	31.3	1946	23.2
1921	30.0	1947	21.4
1922	30.0	1948	17.3
1923	28.9	1949	16.9
1924	27.8	1950	15.9
1925	25.8	1951	16.1
1926	29.3	1952	14.3
1927	24.9	1953	13.8
1928	27.3	1954	13.9
1929	27.4	1955	12.9
1930	27.9	1956	13.2
1931	27.8	1957	13.7
1932	25.5	1958	12.5
1933	26.9	1959	11.9
1934	25.8	1960	12.2
1935	26.7	1961	11.2
1936	22.4	1962	11.3
1937	24.7	1963	11.4
1938	20.7	1964	10.9
1939	22.7	1965	9.9
1940	17.0	1966	10.3
1941	20.6	1967	9.9
1942	19.4	1968	9.7
1943	23.2	1969	9.9
1944	23.9	1970	8.8
1945	24.0		

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