

Bangkok and Its Environment as the Context of Commuting

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Introduction

Commuting as a major feature of life in Bangkok has occurred with the process of rapid economic growth following World War II. Until now, studies of the Bangkok environment (see for example, Sternstein, 1971, 1976 and 1982; Suwannamart, 1982; Wongthranga, 1982; Korff, 1986) have not commented on commuting, which suggests that it has not been a major issue. In the past, in addition to the much smaller population and built-up area compared with the present, many people lived in "shophouses", where residences and workplaces were located in the same structure, or in inner city slums close to their workplaces, supporting the claim that there was limited long-distance commuting.

Commuting has been seen as a reflection of the combined processes of urbanisation and industrialisation, especially the improvement of transportation and communication systems. Rapid economic growth has been associated with a considerable increase in population and expansion of the city's built-up areas. Expansion of the built-up area has been made possible by increasing accessibility afforded by the provision of infrastructure and transportation, which have raised the level of movement and encouraged commuting over considerable distances. On the other hand, economic growth has also led to changes in occupational structure towards increasing numbers of people participating in white-collar employment precipitates a shift in lifestyle in which people demand more space for housing of a higher quality.

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This results in housing being located far from the congested city center. This, along with a demand for more comfort in commuting, encourages an increasing use of cars. The high rate of private-vehicle use leads to congestion, which results in increased commuting times. Furthermore, government policies relating to land use, housing and labour markets, and the provision of transportation systems and modes have determined commuting patterns(Yapa et al., 1979; Fuchs and Demko, 1978; Evers, 1989; Skeldon, 1990).

This report discusses how changes in economic growth, population growth, expansion of built-up areas, patterns of land use and land prices, transportation modes and infrastructure and varying government policies associate with commuting patterns in Bangkok and the Bangkok Metropolitan Region (BMR).

Economic Growth

Thailand has experienced impressively high growth of Gross Domestic Product (GDP) for almost three decades, averaging almost 8 per cent per annum in the 1960s and almost 9 per cent per annum during the period 1975-1979 (The Economist Intelligence Unit (EIU), 1992 and 1993). After 1979 there was some slowing in the rate of growth partly because of an "oil crisis" (Ayal, 1992), but GDP rose markedly during the second half of the 1980s, and the Seventh Plan (1992-1996) of the National Economic and Social Development Board (NESDB) has set a target of more than 8 per cent per annum in GDP growth (NESDB et al., 1991). This growth translates into a projected per capita annual income of approximately 72,000 Baht by the end of 1996, which is an increase of about 45 per cent over the per capita annual income of approximately 48,000 Baht in 1992 (Bank of Thailand, 1994).

The rate of growth of GDP in Thailand is remarkable in itself, but the changing structure of the Thai economy is even more remarkable. During the period

1960-1990, the share of agriculture in GDP declined by more than 60 per cent, while the share of the industrial sector almost doubled (see Table 1).

Table 1: Thailand: percentage distribution of gross domestic product by sector 1960-1990.*

Sector	Year			
	1960	1970	1980	1990
Agriculture ¹	38.2	27.0	20.6	14.4
Industry ²	19.4	25.2	30.8	35.8
Services ³	42.4	47.8	48.6	49.8
GDP (Million Baht)	56,094	155,694	299,472	631,610

Source: ESCAP, 1993 Table 1: 97:

¹ Agriculture includes crops, livestock, fisheries and forestry.

² Industry includes mining and quarrying, manufacturing, construction and electricity and water supply.

³ Services include transportation and communications, wholesale and retail trade, banking, insurance and real estate, ownership of dwellings, public administration and defence and other services.

* Data for 1960 based on 1962 prices; data for 1970-1990 based on 1972 prices. Although the total GDP for 1960 would increase if based on 1972 prices, the proportion within each sector would change only marginally.

Occupational structure

In Thailand during the period 1960-1990, numbers in each occupational category increased but the proportion of the population engaged in agriculture declined as that in non-agricultural occupations increased (see Table 2).

Table 2: Thailand: occupational structure of population aged 15 and over, 1960-1990.*

Occupation	1960		1970		1980		1990	
	'000s	%	'000s	%	'000s	%	'000s	%
Agricultural ¹	11,359	83	11,734	78	15,604	72	20,377	67
Professional and Administrative ²	200	1	530	3	1,098	5	1,914	6
Clerks/Sales/ Service ³	1,163	9	1,442	10	2,580	12	4,059	14
Transport/Craftsmen/ Production/Labourers ⁴	951	7	1,278	9	2,522	11	4,036	13
Total	13,673	100	14,984	100	21,804	100	30,386	100

Sources: NSO (1960: Table 16); NSO (1970: Table 19); NSO (1980: Table 24); NSO (1990a: Table 22)

1 Includes agricultural, animal husbandry and forest workers, fishermen, hunters, miners, quarrymen, well drillers and related workers.

2 Includes professional, technical, administrative, executive, managerial workers, government officials and related workers.

3 Includes clerical, sales, service and related workers.

4 Includes transport equipment operators, craftsmen, production workers, labourers and related workers.

* In the relevant tables in all censuses, numbers in the categories 'unknown' occupation are excluded.

Those whose age was "unknown" are excluded because 15 is the youngest age at which the different age groups of the employed population in the 1960, 1970, 1980 and 1990 censuses can be made comparable. In the 1960 census, age is not classified but a minimum age of 11 is set for inclusion in the employed population. If we assume that the proportion of the employed population aged 11-14 and "unknown" is the same in the censuses of 1960 and 1970, proportions among the different occupational categories do not change significantly.

The definition of "economically active population" is the same for the censuses of 1960, 1970, 1980 and 1990 with the one exception that in 1990 the minimum age was 13 as opposed to 11 in the previous censuses. The tables which are generated by this definition are somewhat different among these censuses but it appears that reasonably comparable data are available from Table 16 in 1960, Table 19 in 1970, Table 24 in 1980 and Table 22 in 1990.

The trend of a decreasing proportion of the population in the agricultural sector and an increasing proportion in the non-agricultural sector and especially white-collar occupations (professional and administrative) for Thailand is shown most dramatically in the BMR, Bangkok and the peripheral provinces (see Table 3). Between Bangkok and the peripheral provinces the proportional changes in the occupational structure obviously differ and point to a diffusion of non-agricultural occupations into the peripheral provinces. All these changes in the occupational structure of the population of the BMR suggest an increase in commuting as employment is separated from the place of residence. The rapidity of these changes caused a marked increase in commuting in recent decades, even considering only the large number of agriculturists who have turned to other occupations and the substantial increase in professional and administrative personnel who are likely not to reside close to their places of work. The higher education required for skilled occupations also suggests a considerable and rapid increase in student commuting.

Table 3: Bangkok Metropolitan Region (BMR), Bangkok (BMA) and peripheral provinces: occupational structure of population aged 15 and over, 1960-1990*.

Occupational structure	1960	1970	1980	1990
Per cent of total				
BMR				
Agricultural	43	26	17	11
Professional/Administrative	4	11	13	17
Clerks/Sales/Service	30	33	36	35
Transport/Craftsmen/Production/Labourers	23	30	34	37

Table 3: Continued

Occupational structure	1960	1970	1980	1990
Per cent of total				
Bangkok				
Agricultural	19	10	5	3
Professional/ Administrative	6	14	16	21
Clerks/Sales/ Service	43	42	45	41
Transport/Craftsmen/Production/Labourers	32	34	34	35
Per cent of total				
Peripheral Provinces				
Agricultural	75	57	42	27
Professional/ Administrative	2	5	7	9
Clerks/Sales/ Service	13	16	19	24
Transport/Craftsmen/Production/Labourers	10	22	32	40

Sources: NSO (1960: Table 16); NSO (1970: Table 19); NSO (1980: Table 24); NSO (1990a: Table 22).

* See notes under Table 2 for details of occupation in each category

Note: Percentages add vertically, so that each occupation category adds up to 100.

Economic growth in Thailand and Bangkok has led Bangkok to develop more strongly than other parts of the country. This has caused rapid growth in Bangkok's population and in its built-up area. The population growth has caused changes in population structure and employment distribution. The expansion of the built-up area relates largely to the patterns of housing, employment, and transportation networks.

The following sections describe the consequences of economic growth in Bangkok and Thailand for its population, and the expansion of the built-up area.

Population growth

In recent decades, the population of Thailand has increased considerably but at a decreasing rate which reflects, in the main, markedly reduced fertility. The population of the BMR has also increased but also at a decreasing rate which reflects reduced fertility counter-balancing a considerable positive net in-migration. The changing rate of growth of the BMR largely reflects the changing rate of growth of the BMA (see Table 4). The peripheral provinces, on the other hand, have experienced an increased rate of growth in recent decades; indeed, the rate of growth in the 1980-1990 period in the peripheral provinces was greater than that experienced in Bangkok and is expected to remain higher, though declining, in the current decade and in future (see, Table 4, and also TDRI, 1991; Thailand Environment Institute (TEI) et al., 1993).

Within the BMR, population has spilled from Bangkok to the peripheral provinces during recent times. The mobility of the population among the provinces of the BMR indicates the attraction of employment and amenities in Bangkok, the expansion of Bangkok's built-up area to adjacent provinces, particularly Nonthaburi and Samut Prakan where many new housing estates were developed (Browder et al., 1992).

Population structure

The great growth and considerable redistribution of the population of the BMR, within and between Bangkok and the peripheral provinces, is accompanied by changes in the age structure (see Table 4) and changes in gender composition (Sternstein, 1995). The remarkable change in age structure and gender of the population during the period 1960-1990 has resulted from a dramatic decline in fertility abetted by

an increasingly age-specific migration of young adults, and especially of females aged 15 to 25 (Sternstein, 1995).

Table 4: Population growth: Thailand, Bangkok Metropolitan Region (BMR), Bangkok (BMA) and peripheral provinces, 1960-1970, 1970-1980, 1980-1990 and 2000-2010.

Period	Average Annual Population Growth Rates (%)			
	Thailand	BMR	Bangkok	Peripheral Provinces
1960-1970	2.70	3.07	3.46	2.27
1970-1980	2.65	3.83	4.22	2.93
1980-1990	1.96	2.57	2.26	3.29
1990-2000	1.62	2.29	1.95	3.00
2000-2010	1.04	1.50	1.10	2.25

Sources: Data for 1960-1990 from NSO(1960); NSO(1970); NSO(1980); NSO(1990) (all Table 1) and for 2000-2010 from NESDB(1991).

Note: Population figures for 2000 and 2010 are projected.

Table 5: Changing age structure of the Bangkok Metropolitan Region (BMR), Bangkok (BMA) and Peripheral Provinces, 1960-1990.

Age group	1960		1970		1980		1990	
	'000	%	'000	%	'000	%	'000	%
BMR								
Less than 15	1,337	42	1,818	40	2,014	30	1,933	23
15-59	1,713	53	2,477	55	4,271	65	6,113	71
60 +	164	5	230	5	359	5	544	6
Bangkok								
Less than 15	874	41	1,185	39	1,351	29	1,267	21
15-59	1,158	54	1,748	57	3,108	66	4,265	73
60 +	99	5	141	4	238	5	351	6
Peripheral Provinces								
Less than 15	462	43	633	44	663	34	666	25
15-59	555	51	729	50	1,163	60	1,848	68
60+	65	6	89	6	122	6	193	7

Sources: NSO (1960); NSO (1970); NSO (1980); NSO (1990a).

Note: Percentages add vertically, so that each category adds up to 100.

The increasing number and proportion of the population in the labour force age groupings implies a heightening level of commuting to work and also to school because of the need for higher education in order to meet the growing demand for white-collar and skilled workers. A heightened level of commuting also implies longer

distances and times of commuting to work and to school. Finally, the increasing female participation in the labour force suggests an increasing level of commuting.

The changes in occupation and relative age structure of the population in the BMR during the period 1960-1990 suggest a much increased demand for schooling. The population under 15 years of age increased absolutely until 1980, and numbers since have been more or less maintained (see Table 5). Despite the division of Bangkok into school districts (for the secondary school level) a considerable number of students commute long distances to school and contribute to traffic congestion because there is no effective mass transportation system, only competing privately-owned bus lines (Sternstein, 1976). However, the main problem is parents taking children to school. The government has tried to operate school bus services, but they have been unsuccessful. The general standard of education in the provinces is markedly lower than in Bangkok, and only a relatively few specialised schools are located there (Sternstein, 1976). Approximately half the university students in Thailand are concentrated in Bangkok (NSO 1990: Table 19). Students who migrate to Bangkok from the provinces are unlikely to find housing near their places of education and must commute over long distances. The effect of school commuting on commuting generally is revealed dramatically when schools are closed during holiday periods; at these times commuting to work is shortened considerably, even halved (Tanaboriboon and Jin, 1995).

Land Use

Factors that encourage the expansion of built-up areas are not only economic development and population growth but also improvement of transportation systems linking outlying and inlying areas of cities (Herbert, 1972). In the BMR, the great growth of economic activity and population, and an associated commensurate expansion of infrastructure has been reflected in a dramatic increase in the built-up area. This has spilled over the boundary of the BMA into adjacent peripheral provinces and particularly Nonthaburi and Samut Prakan provinces. This expansion of the built-up area is

perhaps best underlined by noting that during the period 1974-1984 about 45 per cent of land converted to urban use was developed within a band 11 to 20 km from the city centre (the Central Railway Station, CRS), but during the period 1984-1988 about 45 per cent of land converted to urban use was developed beyond a distance of 30 km from the city centre (see Table 6).

Table 6: Bangkok Metropolitan Region (BMR): land converted to urban use, 1974-1984 and 1984-1988.

Distance from city centre (in km)	1974-1984		1984-1988	
	Land converted to urban use (km ²)	Percentage of total converted	Land converted to urban use (km ²)	Percentage of total converted
0-5	9.21	2.7	0.03	-
6-10	29.77	8.8	15.08	5.1
11-20	153.22	45.2	75.48	25.6
21-30	64.36	19.0	70.49	23.9
Over 30	82.12	24.2	133.88	45.4
TOTAL	338.68	99.9	294.96	100.0

Source: Dowall (1992: Table 1).

Note: city centre is Central Railway Station (see Figure 1).

The most important process of expansion is ribbon development, in which the built-up area expands along the routes of the major roads extending from Bangkok. The expansion of built-up areas has changed patterns of land use, particularly from land for agriculture to residences and workplaces. The distribution of residences and workplaces

is shaped by land prices, which reflect land ownership patterns (NESDB et al., 1991). The next section discusses land-use patterns and the land market in Bangkok.

Patterns of land use and land prices

The need for space to accommodate economic activities and population in Bangkok causes expansion outward because land available around the city centre is for enterprises which need and can afford a central location, and for relatively wealthy residents (NESDB et al., 1991; Peerapun and Silapačharanan, 1992). This is because high land prices are related to the best public facilities being located in these areas. Expansion is occurring in all directions from the city centre, but in the near future expansion will probably be most rapid to the east and southeast where numerous projects such as the construction of a mass-transit system, highways and the second international airport are underway or planned. High-income housing estates and large-scale factories, together with increasing numbers of relatively low-priced high-rise residential condominiums, have been concentrated in this area (NESDB et al., 1991; Greenberg, 1994). Indeed, it may not be long before the built-up area extends more or less continuously around the head of the Bight of Bangkok to link with major developments along the Eastern Seaboard (Sternstein, 1995). Expansion will occur rapidly also to the northwest in Nonthaburi province where there are extensive residential developments (with some industry) from which residents now use the nine bridges crossing the Chao Phraya River to reach workplaces (NESDB et al., 1991). All these developments strongly suggest a huge increase in the incidence and length of commuting, if industry does not diversify in the same directions as housing.

High- and middle-income households have spilled into the outer area of Bangkok and into the peripheral provinces, and residential areas now spread along major roads (NESDB et al., 1991). Lower income households, especially migrants, have also spread out from the older built-up areas, but there is still sufficient housing for the poor around the city centre to attract their concentration. The city centre also holds wealthy

residents, because the valuation of commuting and leisure time is likely to increase with income, encouraging many of the well-to-do to live in expensive city-centre housing. The increasing number of high-rise condominiums and apartments along Sathon, Rama 4, Sukumvit and Wireless Roads attests to this preference (The Nation, August 29, September 8 and October 24, 1994). Though for some people these are second "short-term homes" (Bangkok Post, January 9, 1995), the Thai are increasingly residing in apartments. This is seen in the increasing proportion of this residential type: 2.6 per cent in 1970; 6.2 per cent in 1980 and 9.7 per cent in 1990 (Askew, 1994). So, some affluent Bangkok residents commute only short distances to work, but this group is tiny compared with middle- and low-income earners, and has little effect on overall commuting patterns.

After World War II and, indeed, well into the 1970s, land developers sold plots to individuals for residential use but there were no "housing developers". Housing developers became active only in the 1970s, and at present comprehensive housing developers account for approximately half of all the land converted to urban use in Bangkok (Changrien and Stimson, 1992). Since the predominant aim of private-housing developers in Bangkok is to provide relatively spacious residences for high- and middle-income families, housing estates are often located in the outer areas of Bangkok and the peripheral provinces, where land prices are relatively low (Koanantakool and Askew, 1993). High land prices in the inner city not only encourage relatively well-off residents to sell and relocate in newer, less central areas of the BMR, but also force inner-city slum dwellers to peripheral locations. During the period 1974-1988, for example, housing stock in the BMR as a whole rose about 45 per cent, while housing stock in the outer areas of Bangkok and the peripheral provinces increased by about 180 per cent (Greenberg, 1994).

The location of new housing has drawn a considerable number of families to outer areas of the BMR, families in which those employed are likely to work in the inner city and at least a significant fraction of those studying do so at inner city

schools. Even former inner-city slum-dwellers must commute to work in the inner city because there is insufficient employment for them as labourers, street vendors and drivers in the new residential areas (Thai Development Support Committee, 1987; Chanont, 1990; Setchell, 1991; Dowall, 1992).

Workplaces in the BMR remain concentrated in the inner area of Bangkok surrounding an original nucleus in which government, commerce and industry were roughly grouped around the Grand Palace. Recently, the BMR has taken on the characteristics of a polycentric metropolis with several new major commercial and industrial centres established in outer areas of Bangkok and the peripheral provinces (BMA, 1991; Kaothien, 1991; CU, 1993; Hack et al., 1995). This has occurred in the context of pressure from land prices in the inner city and the deconcentration policies of government (NESDB et al., 1991). So, though the majority of workplaces remain in the city centre, workplaces have increasingly located away from the city centre and there is even a growing tendency for the head offices of big businesses, especially new companies, to locate as much as 20 km from the centre. Additionally, many large department stores have found locations in the new shopping centres along main roads in the outer areas of the BMR (Kidokoro, 1992).

In short, the residential and workplace developments just described point overwhelmingly to the one conclusion: increasing and increasingly lengthy commuting in the BMR.

The land market

*...land price increases are demand-generated and that prices are rising
[in the BMR] is due to massive land requirements... and the effects of
infrastructure provision on plot prices.*

(Dowall, 1992: 33).

Increases in land prices approximated 50 per cent per year from 1977 to the mid-1980s (Greenberg, 1994). From the mid-1980s to 1990, land prices rose even more spectacularly, though the increase dropped dramatically in 1991 and 1992¹ (see also in Changrien and Stimson, 1992; Dowall, 1992). This remarkable recent decrease in the rate of increase reflects the uncertain situation which accompanied the overthrow of the Chatichai Chunhawan government by the military in 1991 and all but stopped speculation in land. Also contributing to the dramatically reduced increase in land prices was the promulgation of the Large-Scale Building Code in February 1992, under which the construction of high-rise buildings, particularly along narrow roadways, is restricted in the inner and CBD areas². This does not imply, of course, that actual land prices in the inner and CBD areas are decreasing or low but that the extraordinarily high land prices here are rising more slowly than elsewhere in the BMR. In fact, the average rise in land prices varied considerably and in a reasonably regular way from a low in the CBD to high in the outer areas³ of the BMR from 1991 to 1992, according to a survey conducted by the Agency for Real Estate Affairs, 1992. In the outer area, the increase in land prices rose some 22 per cent as real-estate developers prepared sites for future low- to medium- price housing developments associated with planned mass-transit systems. In the Agency's intermediate area⁴, land prices rose some 15 per cent. In sub-centres⁵, the rise was 12 per cent. In the inner area, the rise was 10 per cent; and in the CBD land price rose only 3 per cent from 1991 to 1992 (Bangkok Post, December 28, 1992).

The price of land is predominantly influenced by the private land market since approximately 80 per cent of all land in Bangkok is privately held (United Nations, 1987). Few government regulations for controlling private land owners, coupled with a low land tax, the lowest in Asia, encourages speculation (Mekvichai, 1992). This has led to rapidly rising land prices, and expanses of "unused" land within the built-up area as speculators wait to maximise their profits (NESDB, UNDP & TDRI, 1991). Indeed, speculation in land has influenced infrastructure development; for example, landowners actually give some of their land to government for roadways in order to increase

accessibility and, thereby, the price of their land may rise by up to 300 per cent (Greenberg, 1994). Farmers in the vicinity of the BMR prefer to sell or to rent their land instead of cultivating it because the market price of land is at least 50 times greater than the returns which can be expected from agricultural production (Mekvichai, 1992; Greenberg, 1994). Land prices also continue to rise, especially those east of Bangkok and along the Eastern Seaboard, as infrastructural developments proceed and the government encourages investment, particularly from foreign investors (NESDB et al., 1991).

The working of the land market, then, suggests that commuting and commuting distances have increased because of the spread of both residences and workplaces to areas of lower land prices, which are progressively pushed outward from the city centre, and the erection of high-rise, non-residential buildings in areas of high land prices.

The patterns of land use and land prices encourage increasing distances between places of residence and work in the BMR. However, these two types of places are linked by transportation which, when improved, encourages long commuting distances and hence commuting times. The next section considers how transportation development in terms of infrastructure and modes is associated with commuting patterns in Bangkok.

Infrastructure and transportation modes

Economic development goes hand in hand with highly improved transportation, which accommodates increasingly substantial flows of population and material. Transportation in Bangkok is now dependent on roadways; the splendid original transportation network of waterways focussed on the Chao Phraya River has long since been dismembered (Sternstein, 1976). Although these avenues have been greatly improved and will continue to be developed, it is forecasted that demand for

public transport will reach at least 11.4 million person trips per day by the year 2000 and that even provided all planned mass transportation systems were in place, only 40 per cent of passengers could be accommodated by mass transit (Wanisubut, 1994). Traffic speed will still be about 8 km per hour (JICA, 1990).

Severe traffic congestion in Bangkok stems in large part from insufficient and inefficient public transportation, which in part encourages the use of private vehicles. The 'solution' to the problem suggested by Owen in 1966 - that private automobiles be banned from downtown areas and efficient public transportation be provided - is unworkable in the present political context in Bangkok. Infrastructure developments are now being implemented and are to be followed by improvements in mass-transport modes. Government hopes these will provide a reasonably sufficient and efficient public transportation system by the year 2006 (JICA, 1990). The government plans to provide a working mass-transportation system are not new, but the many past plans which have been formulated, and even implemented, have been without success for largely the same set of conditions. These include a meagre amount of road space, a large number of road intersections, rapidly increasing vehicular population, and "lack of political will". For example, the so-called "bus lane" plan which gives buses priority in one lane in certain streets is not very effective for these reasons (IPSR, 1993).

Is the development of roadways always to be behind the need? Only a short time ago it was Bangkok's ring roads which were to "solve" the congestion caused by large and increasingly numbers of commuters forced to pass though the inner city to cross the metropolis, because roads were focussed in an axial pattern on the Grand Palace (Sternstein, 1976; Suwannamart, 1982).

... few people can escape the traffic congestion since, apart from the few trips on train and the river, all trips have to be made on roads.

(NESDB, UNDP and TDRI, 1991:8.14).

Although existing and proposed land and water transportation aims to provide choices of transport modes, which are expected to reduce commuting time, it is road space and road networks which determine the level of traffic congestion and thereby commuting time.

Infrastructure: road space and road networks

In Bangkok, traffic volume on main roads has increased from 15 to 20 per cent per year (Stickland, 1993). New car and motorcycle sales are growing at 13 per cent annually compared with only one per cent growth of road space (The Nation, February 5, 1995). Roadways occupy only 11 per cent of Bangkok's land compared with 20-25 per cent of cities such as London, Paris and New York (Stickland, 1993). This shortcoming is realised, and road space is being increased in the BMR. Preeminent among many projects is the Expressway System. The First and part of the Second Stage of the System which comprise some 47 km are now being used, though a decision is yet to be made on construction of a controversial collector/distributor road (part of the Second Stage of the Expressway System) which will displace 230 families of the Bangkok historic community of *Ban Krua* (Stickland, 1993; The Nation, April 14, 1995). When the Third and final stage of the system is built, the Expressway System will comprise some 135 km. The hope is that, on completion of the Expressway System, commuting in Bangkok will no longer be the "painful activity" it is at present (Daily News, September, 14, 1994).

Although the government claims that in comparison with other cities Bangkok's road network is fairly large and complete (NESDB, UNDP and TDRI, 1991). In fact, Bangkok is largely made up of many "super blocks" intersected by many little access roads commonly feeding to one main road without an adequate distributor road system (Halcrow Fox and Associates et al., 1992). Lack of convenient access is a consequence of development by private landowners, who provide roads of mediocre standard and have little incentive to build distributor roads which would connect access

roads to main roads and to each other (NESDB, UNDP & TDRI, 1991; Stickland, 1993). It is also a problem of state enterprises and departments holding large tracts of land and not providing access. Furthermore, to cut or widen roads in the already built-up inner area of Bangkok is many times more costly than in the suburbs (Sternstein, 1982).

Landowners, who often subdivide their land into small plots for sale or rent especially in the outer area of Bangkok, provide poor roadways and incomplete networks because they want to maximise profits by providing minimum public facilities. There is a regulation which covers the subdivision of land into more than 10 plots, but developers simply subdivide land into nine plots in order to avoid providing stipulated public facilities (Thadaniti and Pornchokchai, 1988).

Private ownership of land, together with loopholes in the regulations which deal with land acquisition, leads to substantial delays in the implementation of improvements in the road network. For example, according to the Property Act of 1987, a Royal Decree is required when expropriation is sought, then a committee has to be formed in order to fix compensation, which commonly takes many months. If the property owner does not agree with the compensation, he or she can appeal to the Prime Minister, who then must give a decision within two months. If the property owner disagrees with this decision, he or she can appeal to the courts, where there is no time limit within which a final decision must be reached (Daniere, 1993). Despite this obstacle course, during 1992 the government approved construction of 23 primary and distributor roads in the BMR at a cost of over 25 billion Baht or approximately A\$ 1.25 billion (Wanisubut, 1994). However, the question that must be asked is how many projects will be implemented? Past experience shows that the government has approved much but implemented little.

Transportation modes

The average travel speed of road transport is decreasing every year, and it is argued that even if all mass-transit systems were implemented by the year 2000, road travel speed would improve only for a relatively short time (Suraswadi, 1994; Phuchatkan Daily, January 30, 1995).

Mass transportation

There are three major mass-transit projects being implemented in Bangkok. The most advanced is the Elevated Road and Transit System, known as the Hopewell Project, which is the responsibility of the Ministry of Transport and Communications, and particularly the State Railway of Thailand (SRT). Conflict between the SRT and the concessionaire, Hopewell Holding Ltd stemming from an unusual contract signed by the Minister in 1990, has delayed completion (Bangkok Post, May 8, 1994a) but problems within Hopewell Holding Ltd have also contributed to the project being well behind the scheduled 1995 completion date of even the first phase of construction (Stickland, 1993; Bangkok Post, February 25, 1995).

The Bangkok Transit System, known as the Tanayong Project, involves the construction of 25 km of elevated rail above streets in the inner city. The contract for this project was signed in 1993 between the BMA and Tanayong Ltd; completion is scheduled for 1996, but there is a little hope of meeting this date. The main reason for the delay is because the government could not decide on a suitable depot site. The original site at Lumpini Park was strongly opposed by the press and the public, and an alternative site at Mor Chit Bus Terminal was opposed by the Ministry of Transport and communications, which controls the Land Transport Department which is the current occupier of the terminal. The government took six months to clear this depot site problem (Stickland, 1993) and construction was to begin mid-1994, but then the Traffic Police Management Committee raised objections because some road space will

be taken for piling and thereby add to traffic congestion. The project has been underway only since early 1995 (Bangkok Post, February 2 and April 17, 1995).

A light rail project (known as Sky Train), overseen by the Metropolitan Rapid Transit Authority (MRTA), has been delayed because of protests by an environmental group which is championing an alternative - an extension of the planned underground route from 600 metres to 11.3 km. It took about six months for the government to decide to approve the extended underground route (Bangkok Post, May 8, 1994a; Bangkok Post, December 31, 1994). Those who supervise the project, however, have not yet decided which company is to be given the construction contract. In early 1995, a contract had not been signed (Bangkok Post, April 15, 1995).

It is commendable that there are major mass-transit projects underway, even if slowly, but these projects need integrating in order to provide a convenient transportation network and efficient, cost-saving construction (NESDB, UNDP & TDRI, 1991). Unfortunately, an uncooperative attitude has developed among the different government departments responsible and project managers. Hopewell Holding Ltd, for example, appears unwilling to work with the other mass-transit projects to provide an interconnected comprehensive system (Bangkok Post, February 25 and March 8, 1995). The 'pain' of commuting will not be lessened by an uncoordinated system of mass transit.

It has been reported that about 80 to 90 per cent of commuters using vehicles in Bangkok travel by bus (Daniere, 1993; Thai Rath, January 24, 1995). Though the service is slow, overcrowded and unreliable, it is inexpensive (NESDB, UNDP & TDRI, 1991). During the period 1984-92, as the population of Bangkok increased by some 20 per cent, the number of ordinary public buses actually decreased by 5 per cent, while the number of cars and motorcycles increased by 92 and 137 per cent respectively (Pianuan, Kaosa-ard & Pienchob, 1994). The government has been accused of not even trying to improve bus transport in Bangkok but, in fact, there were attempts to increase

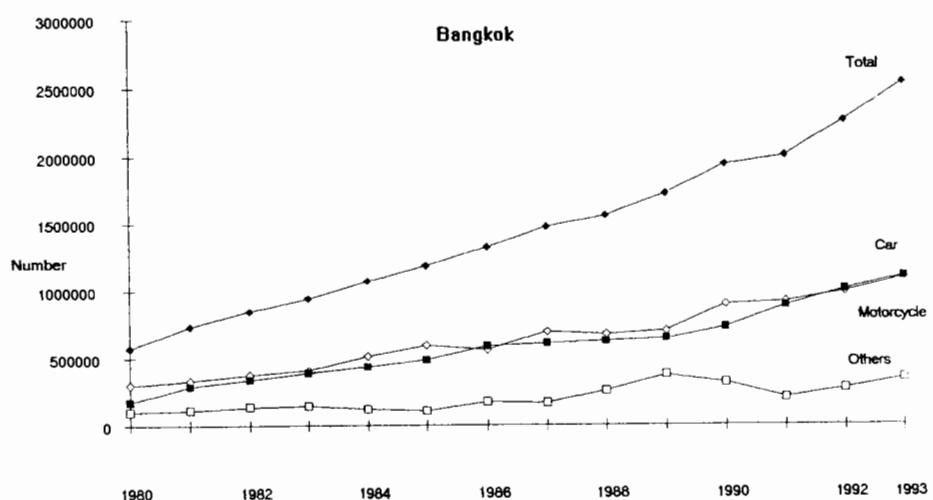
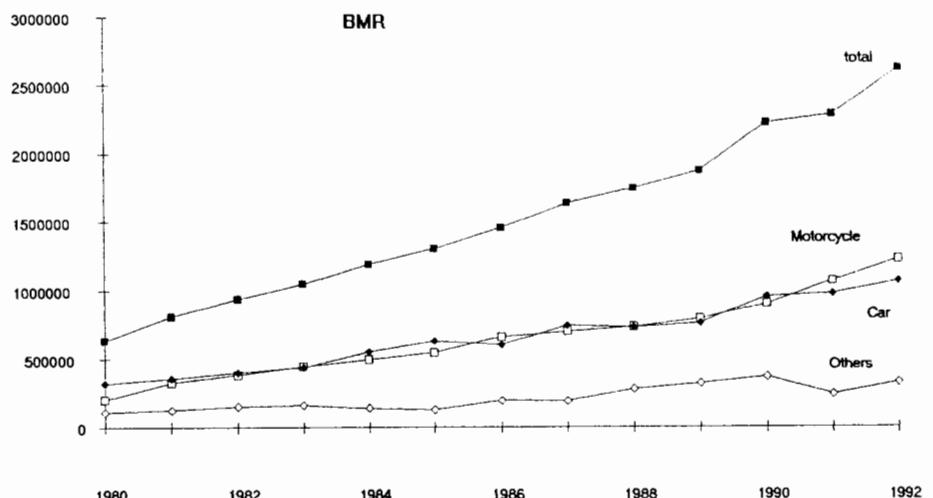
the numbers of buses, especially air-conditioned buses, to encourage the provision of company buses and school buses, to modernise bus depots, to designate bus ways and bus lanes, and to rearrange bus routes. Some of these attempts have had a measure of success - there are increased numbers of air-conditioned buses and school buses - but some have failed. For example, the BMA's school-bus programme evoked the remarkable criticism that government did not understand Thai culture; that the majority of Thai parents are very much concerned with the safety of their children, and prefer to drop them off and then pick them up at school themselves (Daily News, December 22, 1994; Siam Post, December 13, 1994; Matichon, November 1, 1994). Other reasons for the failure of this programme were more matter of fact: one mother stated that whatever the cost and difficulty she faces, she wants to take her children to school herself because the bus system has deteriorated to the point where it is almost cruel for parents to let their children take a bus to and from school (The Nation, February 5, 1995). In addition, the school-bus fare was relatively high, so where there were several students in a family it was more expensive than taking them to school by car.

An interesting bus project run by private companies and known as "Micro Bus" is gaining acceptance and is expected to draw people from cars. This is because it guarantees a seat, is more reliable and comfortable than the other types of buses, and provides newspapers and television, though the fare is higher than for an ordinary bus, and keeps increasing rapidly (Daily-Mirror, Matichon and Siam Post, September 12, 1994). It seems likely that the number of new cars added to Bangkok's traffic may be reduced as the "Micro Bus" service offers the comfort of a car, though it would be unreasonable to expect current car users to switch to this service given its limited routes.

Cars and motorcycles comprise the main private transport modes in Bangkok. Trips by private transport account for 51 per cent of all daily trips, the highest in any Asian city; in Tokyo and Hong Kong, private transport accounts for only a third of all daily trips (Poboon and Kenworthy, 1995). Domestic production of cars and

commercial vehicles has risen from less than 80,000 units in 1986 to more than 300,000 units in 1992 (Stickland, 1993). There were 610,404 registered vehicles in Bangkok in 1979 and more than 2.7 million in 1993, somewhat more than half being private cars and 42 per cent motorcycles. During the period 1991-93, vehicle ownership grew by 7.5 per cent per year (Thai Environment Institute et al., 1993) and the numbers of car and motorcycle owners have increased steadily since 1982 (see Figures below). There are some interesting differences among the peripheral provinces making up the BMR. For example, in Samut Prakan and Nakhon Pathom the numbers of motorcycles are far greater and increasing at a greater rate than cars, but in Nonthaburi and Pathum Thani the numbers of cars are greater and increasing at a greater rate than motorcycles. These differences may result from the different mix of land use in these provinces: Samut Prakan and Nakhon Pathom include relatively more industrial plants than residences, compared with Nonthaburi and Pathum Thani which have housing estates. High growth rates of private-vehicle ownership will probably continue, especially since duties on imported vehicles have been reduced. The reduced car prices can increasingly be afforded as people's per capita income grows. (see Figure below)

**Motor vehicles registered in the BMR and in Bangkok,
1980-1993*.**



Sources: NSO (1990d, 1992a and 1994); data for 1980-1981 and 1987-1988 from Department of Land Transport, Ministry of Transport and Communications (1992).

* Prior to 1989, data for the BMR do not include province Samut Sakhon.

City master plan

The First City Master Plan for Bangkok (NESDB, UNDP & TDRI, 1991) became a legal document in July 1992, more than 30 years after the first land-use plan "Greater Bangkok Plan 2533, A.D 1990" (GBP 2533), was completed in the 1960s by a consultant group from the United States. GBP 2533 was reviewed by the Department of Town and Country Planning (DTCP) and a "Report on the First Revision of the Plan for the Metropolitan Area", published in 1971, was used as foundation for the First City Master Plan. In fact, the first revision, the GBP 2533, completed by the City Planning Division in the BMA and published in 1969, was officially ignored because of in-fighting between the two government organisations responsible for planning in Bangkok -the DTCP and the City Planning Division in the BMA (Sternstein, 1982). In any event, the revised plans simply updated the first land-use plan with regard to population growth and expansion of the built-up area; the original concept to separate different land uses and to link these with roadways was endorsed and so encouraged commuting. In fact, the GBP 2533 recognised commuting consequences but without an integration between land-use and transportation plans, and in the context of economic growth, commuting was not accommodated appropriately. The First City Master Plan is seriously flawed because it follows instead of leads development (Peerapun and Silapacharanan, 1992; Hack et al., 1993 and 1995; Sussman and Schiamberg, 1995; Suraswadi, 1994). The Plan has little control over land-use, which will be greatly affected by the development of the Bangkok mass-transit system and expressways (Hack, Hiebert and Wang, 1995). The First City Master Plan recognises commuting consequences but like its predecessor, the GBP 2533, does not integrate land-use and transportation plans and is unlikely to accommodate commuting effectively.

Decentralisation and commuting

A policy of decentralisation was first presented in the Fifth National Economic and Social Development (NESD) Plan (1982-1986), though it was foreshadowed in the Fourth NESD Plan (1977-1981) as a needed change from the separation of workplaces and residences recommended in the GBP 2533. New laws and regulations on industrial activities which place more emphasis on environmental quality in densely settled areas, lower land prices in the outer areas of Bangkok, and incentives given by the Board of Investment (BOI) have induced some large- and medium-scale industry to locate outside Bangkok (JICA, 1990; NESDB, UNDP and TDRI, 1991). Small-scale industry, business and professional services, which depend on ready access to consumers, are not readily relocated (JICA, 1990). The shift of industry into provinces adjoining Bangkok, however, has had little to do with incentives provided by the BOI or the land-use policies of the DTCP; rather, they were related to the land market. This has led some authorities to conclude that government policy is of little consequence in determining the location of industry (Robinson, 1992).

In the attempt to decentralise Bangkok, the creation of "new towns" or "sub-centres", bringing both workplaces and residences to the new locations, has been emphasised repeatedly by planners (see, for example, Sternstein, 1982; Kaothien, 1991; Kidokoro, 1992; Robinson, 1992; Chuntavongsa, 1993). There are five recognised "new towns" in the BMR located 20 to 40 km from the city centre: Muangthong Thani in Nonthaburi province; the Lat Krabang Housing Project and Tana City in outer Bangkok; Bang-Phli New Town in Samut Prakan province; and, Nava-Nakhon Industrial Estate in Pathum Thani province (Tsuneo, 1993). A recent study by consultants from the Massachusetts Institute of Technology (MIT) recommends the location of new "sub-centres" in Lat Krabang, Bang Khun Thian and Taling Chan districts (Hack, Hiebert and Wang, 1995).

The major aim of the policy of decentralisation is to change the distribution of population. A major assumption is that employees will relocate close to places of employment. Migration studies have shown, however, that individual migration decision-making cannot be linked with availability of employment alone but depends on several interdependent factors, such as the availability of housing and other amenities (Guest, Boonchalaksi and Thongthai, 1993). It is questionable also whether "new towns", based on Western concepts, will work in the Thai culture. For example, whether the Thai people would live in apartments or high-rise buildings if they could not afford small or crowded detached houses (Sternstein, 1976).

An aim of new towns or sub-centres is to create self-sustaining communities, which would reduce commuting. In fact, the largest planned self-sustaining community in Thailand, Muangthong Thani, which was to hold 400,000 residents, has become a "new ghost town" because it has failed to attract both investors and residents⁶. Units for factories and their workers are unoccupied (Manager, May 1994), and only a few people who work or study in the neighbourhood actually reside there. If these new towns or sub-centres become dormitory suburbs dependent on road transport and far from employment opportunities, commuting will be encouraged.

Two features which have proved key factors for successful decentralisation projects elsewhere are efficient transportation systems and appropriate inter-related land use (Kidokoro, 1992). Bangkok has neither of these two essential features and so, the success of the new towns or sub-centres is problematic. In fact, most new towns built around the world have become dormitory towns dependent on old urban areas (Tsuney, 1993). In Thailand, new towns are developed by the private sector; government provides infrastructure which is not usually included in the developer's plans. On the other hand, the administration of new towns has to work with government, and this appears to have led to inefficient management. It has been suggested that government should be intimately involved in the process of establishing new towns in order to ameliorate commuting (NESDB, UNDP and TDRI, 1991).

The proposal to relocate government offices to a new city to be located in Chachoengsao province was approved by the Minister of Interior in 1993 (Bangkok Post, January 24 and May 9, 1993). It has been asked whether this new city would ease crowding and associated problems of Bangkok because government officials comprise only a small proportion of all Bangkok workers, and only a small number of these officials could relocate. On the other hand, the Interior Ministry may expect the movement of government workers to induce industry to follow, though there has been no research undertaken to indicate this would occur (Guest, Boonchalaksi and Thongthai, 1993). So far, there is no effort to start the development.

Other strategies for reducing commuting are to maintain a pattern of mixed land use and to balance workplaces and housing units. Apparently, three Planning Units (PUs) in the inner area require more housing to balance existing employment and four PUs in the outer area require more employment to balance the housing supply (Hack, Hiebert and Wang, 1995)⁷. On the other hand, the mismatch among different types of residents, housing, and employment might loosen close linkages between workplaces and residences. For example, about 70 per cent of all those eligible for low-cost housing located in peripheral provinces of the BMR sold their rights to higher-income families and remained in or returned to squatter-slums closer to the centre of the city. This was because the low-cost housing provided by government was still too expensive for poor urban residents, and low-income workers wanted to minimise transportation costs to the city centre where their employment was concentrated. Can low-cost housing (not slums) be provided close to the city centre to permit low-income workers access to employment there? On the other hand, workers whose employment is in outer areas of Bangkok often live close to the centre of the city and commute long distances because appropriate housing is not available in peripheral areas and local transportation is lacking or inconvenient (Douglass, 1992).

Transportation policies

A transportation policy was first included in the Sixth Five-year NESDB Plan, 1987-1991, and transportation is a first priority in the current Seventh NESDB Plan, 1992-1996 (NESDB, UNDP and TDRI, 1991). Specific transportation policies during the sixth plan period included the development of public mass transit as an alternative to the private car, an increase in the number and quality of buses, and the improvement of the road network through construction of links, distributor roads and highways (Penner, 1992). During the 1994 financial year, government agreed on budgets for 164 projects including the construction of mass rapid transit, expressways and ordinary roads to provide an improved transportation network within the city and between Bangkok and all of Thailand (Daily News, September 14, 1994).

Building more roadways to ameliorate traffic congestion is the main objective of the Fourth Bangkok Development Plan, 1992-1996 (BMA, 1991). Increasing roadways may reduce congestion initially by increasing speed, but will surely encourage increasing traffic. The use of private vehicles would become increasingly attractive because more roadways would increase the difference in travel time between public and private commuting modes. Those who previously would not have used their cars because of congestion or who would have used public transport because there was little difference in travel time would shift to cars, and, of course, fill the expanded roadways. If increasing roadway capacity is likely to have little impact on congestion, it will surely promote commuting.

In fact, many of the solutions to transportation problems in the BMR which have been proposed by different consultant groups over the years have not been implemented, though planners and engineers agreed these proposals were appropriate (Penner, 1992; Daniere, 1993). The formulation of a comprehensive transportation policy was also long delayed because of the absence of any authoritative organisation with clear responsibility for the co-ordination of various transportation projects

(Stickland, 1993; Gakenheimer and Gelfand, 1995). Ten government organisations have responsibility for land transportation, each with its own objectives .

Four separate organisations are involved in providing and regulating public transportation; at least three organisations are responsible for traffic management. These organisations promote their own projects based on their own policies and priorities: the organisation responsible for road construction wants to build roads forever, whereas the organisation charged with building expressways wants to build as many expressways as possible. The best example is that two political parties within the recent government coalition, formed since July 1995, have responsibility for traffic solutions. One political party is responsible for traffic in Bangkok, and the other for traffic in the nearby provinces. The "solutions" that they have implemented in their respective areas have led to complaints by the His Majesty the King that they are just passing the congestion between them, and this has resulted in a promise by the Prime Minister of better co-ordination (The Nation, August 18, 1995).

Small wonder, then, that Bangkok has a mediocre road network and that budget allocations are used inefficiently and ineffectively (Daniere, 1993). To collaborate, these organisations require the approval of several committees; the process is tedious and without a necessarily appropriate outcome. Also, since government agencies do not attract top professional and technical staff because of low salaries and poor prospects, they rely on consultants who apparently bring with them additional problems of collaboration (Daniere, 1993; Ross, 1995).

Conclusion

The Bangkok environment encourages commuting, but facilities sufficient to accommodate commuting are lacking. A growing economy has been associated with a dramatic shift in the share of the GDP from different sectors, with a decline in agriculture and increases in the industry and service sectors. There has been a large

increase in the number working in non-agricultural occupations. Although the population growth rate of Bangkok started to decline during the period 1980-90 and is even lower than those of the peripheral provinces, the population is still increasing. The built-up areas of Bangkok, particularly residential areas, have expanded to the peripheral provinces: Nonthaburi, Pathum Thani and Samut Prakan. Escalating land prices, caused by weak regulations to control private land ownership and land speculation, have also been evident. This has led to ribbon development along the highways and consequent increases in commuting distances and times. Commuting times have worsened because of traffic congestion, and this is exacerbated by the small proportion of road space to total land area, incomplete road networks, and insufficient choices of travel mode.

The government has formulated many policies and implemented many plans, but these seem to have been largely unsuccessful in solving the problems associated with commuting because policies have treated symptoms rather than causes of commuting. Political instability and the lack of political will has led to the failure of or delay in implementation of many projects.

Notes

¹ Average annual increase in land prices in the BMR during 1986-1992 from a survey by the Agency for Real Estate Affairs reported in Bangkok Post, December 28, 1992 were: 1986 - 59.2%; 1987 - 56.1%; 1988 - 83.9%; 1989 - 91.4%; 1990 - 107.7%; 1991 - 21.5%; 1992 - 8.5%.

² The "inner area" refers to Dusit, Sukumvit, Phraya Thai and Yan Nawa; "CBD" area refers to Silom, Surawong, Sathon, Pathum Wan and Ploenchit (Bangkok Post, December 28, 1992).

³ The "outer area" refers to Min Buri, Lat Krabang, Suwinthawong, Bang Bua Thong, Rangsit and Bang Phli (Bangkok Post, December 28, 1992).

⁴ The "intermediate area" refers to Bang Kapi, Phra Khanong and Taling Chan (Bangkok Post, December 28, 1992).

⁵ The "sub-centres" are Chang Wattana, Pinklao and Bang Na (Bangkok Post, December 28, 1992).

⁶ Muangthong Thani targeted Hong Kong investors who have moved to invest in China instead of Thailand because of the change in economic situation in China (Manager, May 1994).

⁷ The division of Planning Units (PUs) is based on the assumption that PUs should have a geographical logic, large enough to permit comparisons of the quality of public facilities, and allow for analysis of land uses and conditions. Bangkok is divided into 14 PUs, which recognise natural boundaries such as the Chao Phraya River, and group together with BMA districts (Hack et al., 1995).

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