PLANS, PEOPLE AND FLOODS: THE PROBLEMS OF URBANISATION IN THE KLANG VALLEY, MALAYSIA

BY

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others

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ABSTRACT

Urbanisation in Malaysia's Klang Valley has been increasing rapidly. In order to accommodate the growing population, massive land use development is taking place. Much of this is occurring on the flood plain of the Klang River, seriously exacerbating the problem of flooding and inflicting suffering on local residents and damage to their property. These problems have occurred within a context of blurred and divided administrative responsibilities. The Klang River and its tributaries flow through both the State of Selangor and the Federal Territory of Kuala Lumpur. The governments of these two entities have divergent development visions that place differing weights on the importance of environmentally sustainable planning. The consequence of these disagreements has been continued construction on the flood plain and ever more serious flooding.

This research illustrates these themes -- and the problems that result from lack of coordination in planning and development -- through an examination of the effect of flooding on two settlements. One is the settlement of TTDI Jaya in Shah Alam, Selangor, built and managed by a property developer, and the other is the squatter settlement of Kampung Haji Abdullah Hukom in Kuala Lumpur. The impact of flooding in these two study areas is examined through a questionnaire survey and interviews. Household strategies in these two contrasting communities are compared in terms of preparation against flooding and adjustments to property and lifestyle. The psychological effects are considered, alongside economic, social and physical impacts.

The research also examines the effectiveness of flood control measures in the light of the continuing occurrence of flooding. It analyses the role of local community committees, effective leadership and political involvement in protecting the rights of the effected communities to live in these settlement areas and make their voices heard. These questions are considered within the context of a broader examination of the relationship between land use development planning in the Klang Valley and the problem of flooding. The research concludes by arguing that a coordinated approach is needed to planning within river basins and that this planning should be informed by an understanding of river basin systems. It draws attention to the importance of adopting 'soft' approaches to flood management and mitigation. Finally, it questions conventional assumptions of greater security against flooding enjoyed in middle class settlements by suggesting that strong community cohesion can lead to a relatively more favourable outcome for the residents of otherwise less advantaged settlements. A materially poorer but more vibrant society can be considered better equipped, it is concluded here, and more resilient in the face of disaster.

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ABBREVIATIONS

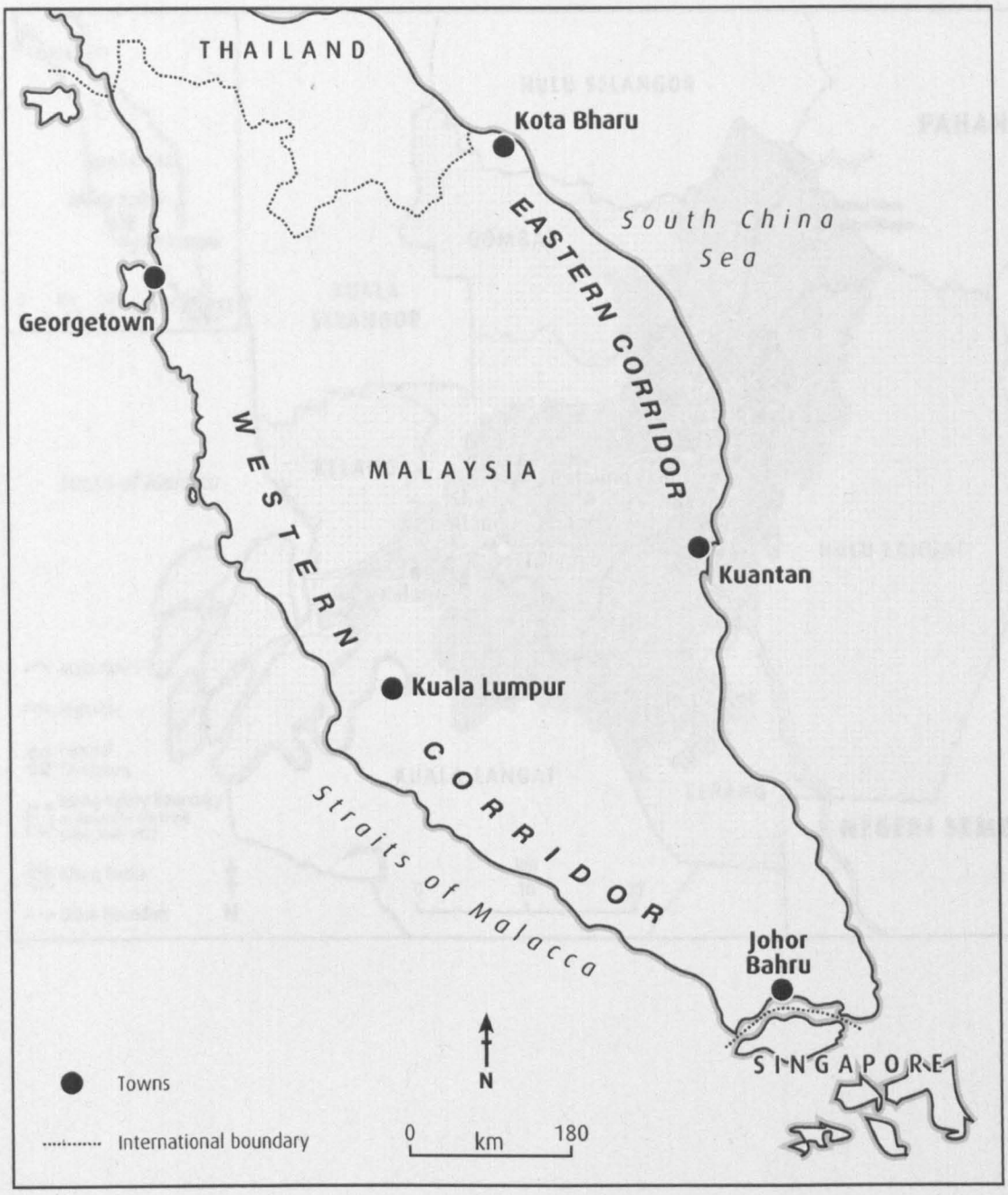
CBD	Central Business District
DID	Department of Irrigation and Drainage
EIA	Environmental Impact Assessment
EPU	Economic Planning Unit
EPZ	Export Processing Zone
FTZ	Free Trade Zone
HPAEs	High-Performance Asian Economies
IRBM	Integrated River Basin Management
IIUM	International Islamic University of Malaysia
KUTA	Klang Valley Urban Transport
KLCC	Kuala Lumpur City Centre
KLIA	Kuala Lumpur International Airport
LRT	Light Railway Transit
MRAs	Malay Reservation Areas
MSC	Multimedia Super Corridor
NIEs	New Industrial Economies
NEP	New Economic Policy
SWMA	Selangor Waters Management Authority
USMM	Urban Stormwater Management Manual
UMNO	United Malays National Organisation

NOTES

i. A few very minor changes have been made to the English in the interview quotations to increase clarity, care has been taken not to alter the original meaning.

ii. Present conversion rate of *Ringgit* Malaysia is 7.08 to the Pound Sterling

Map 1: Development corridors of Peninsular Malaysia



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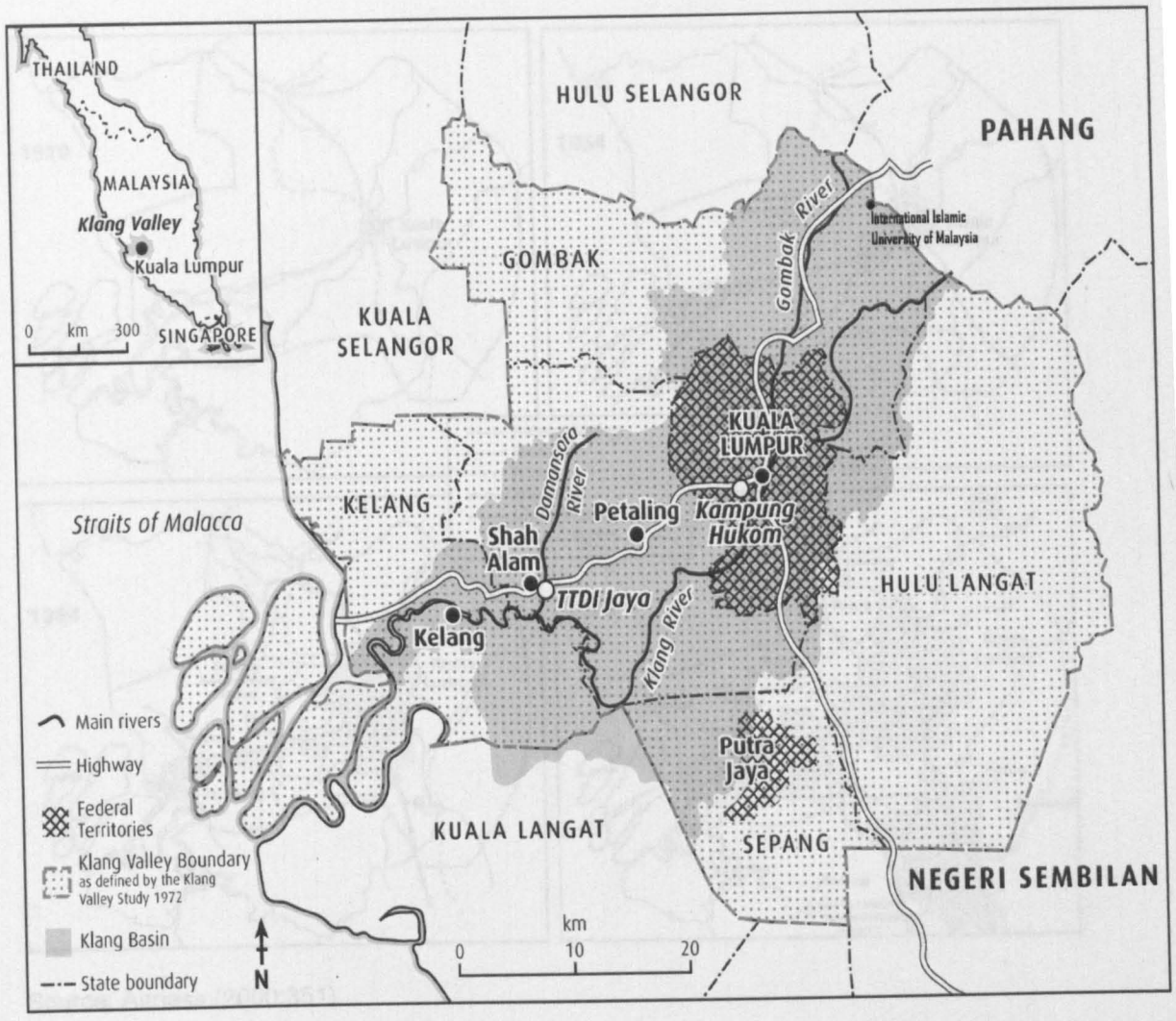

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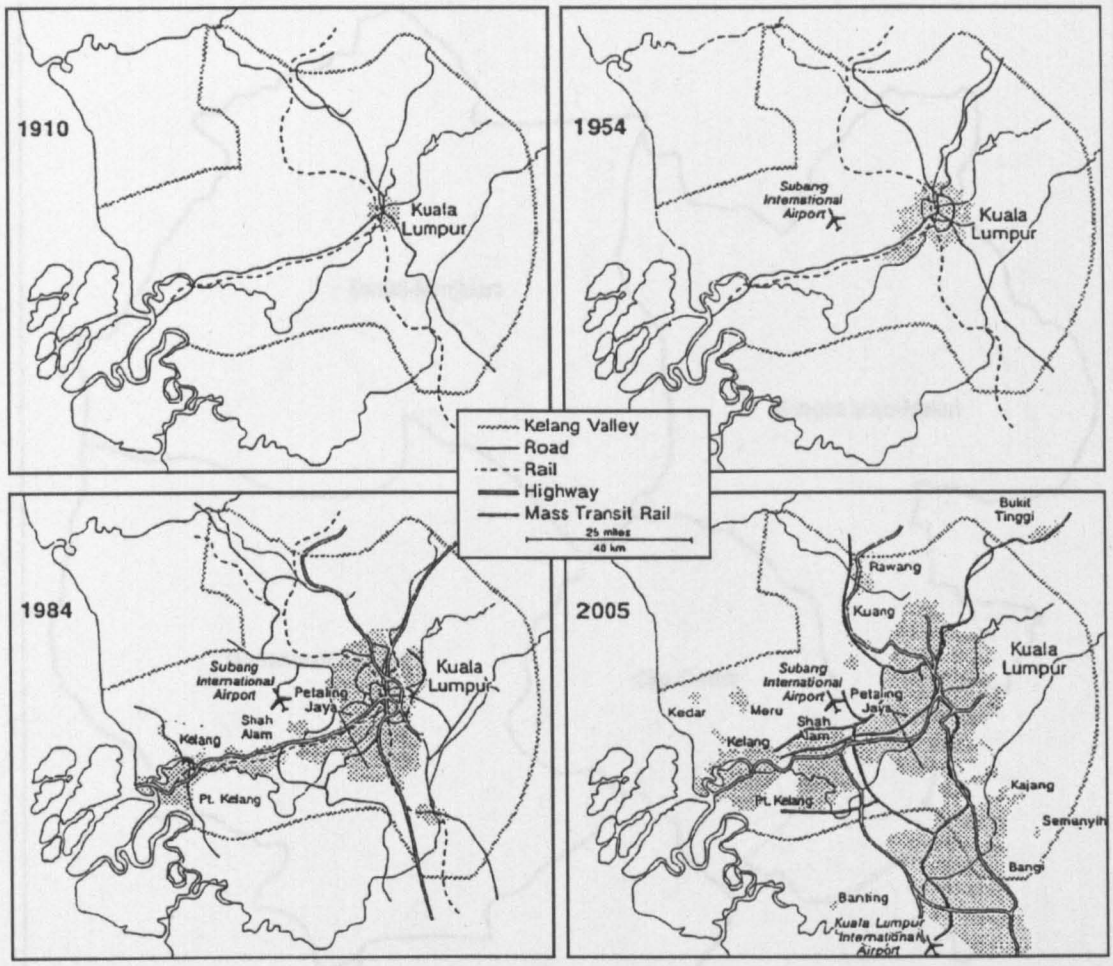

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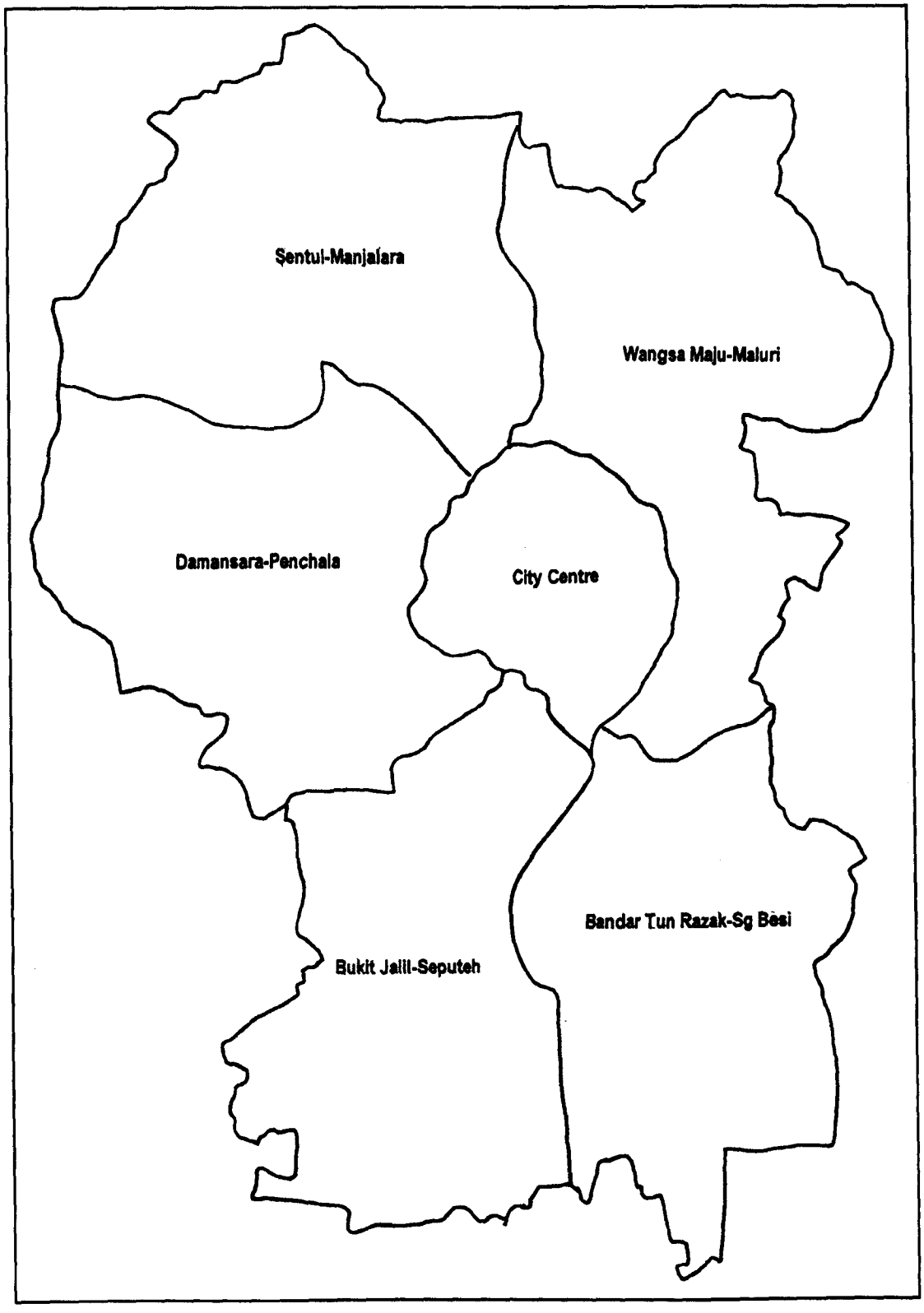

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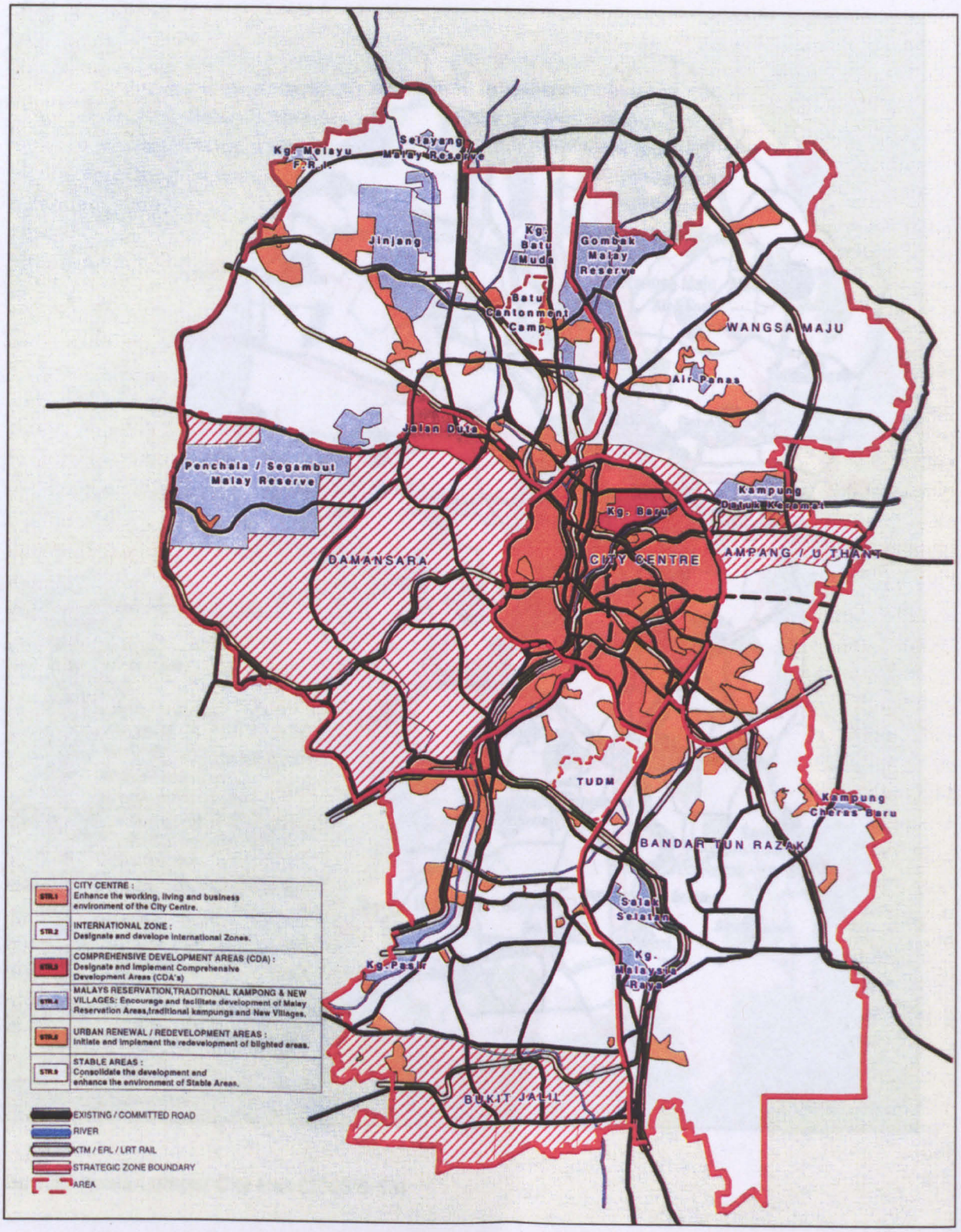

Source: Kuala Lumpur City Hall (2003:6-12)

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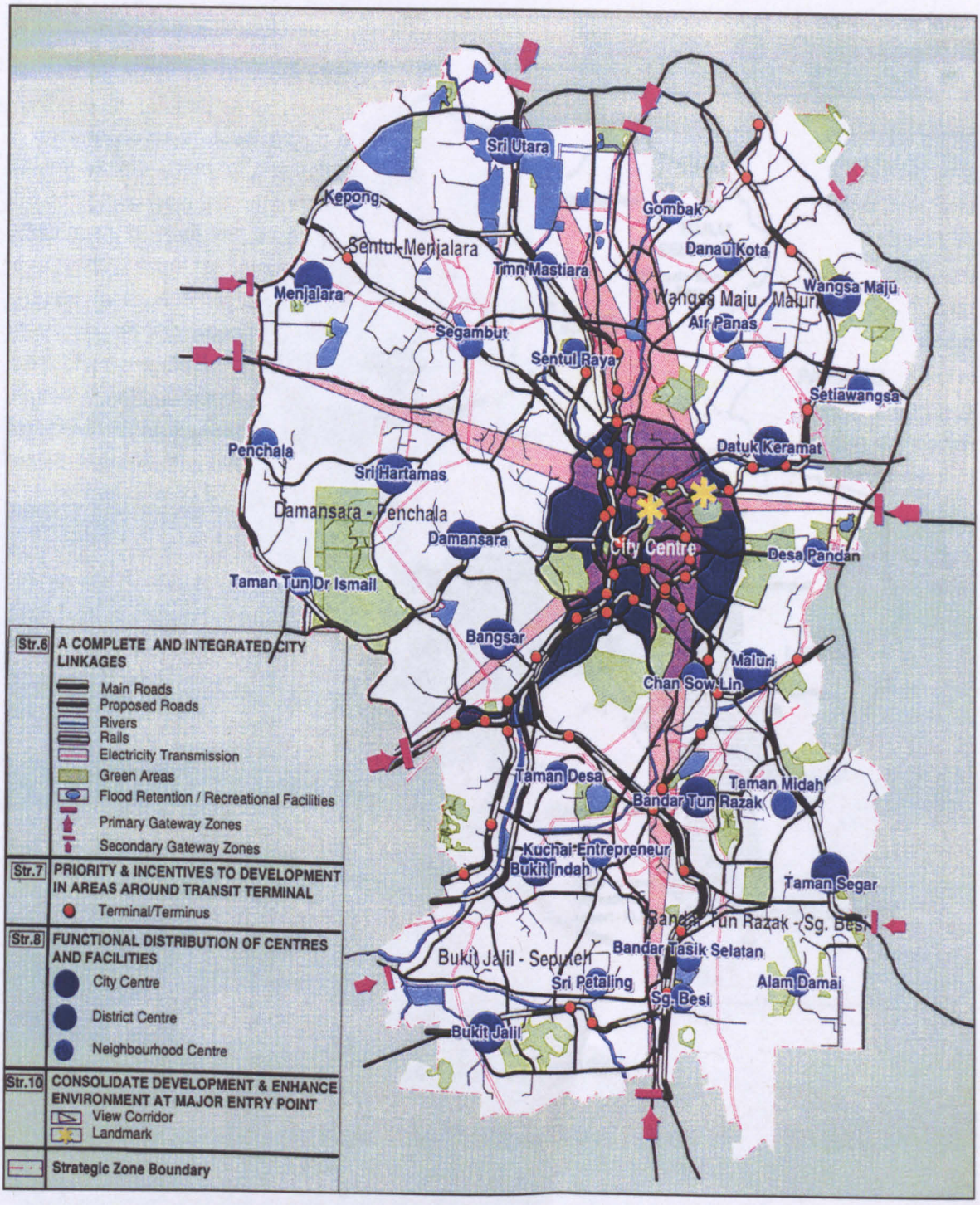

Source: Kuala Lumpur City Hall (2003:6-13)

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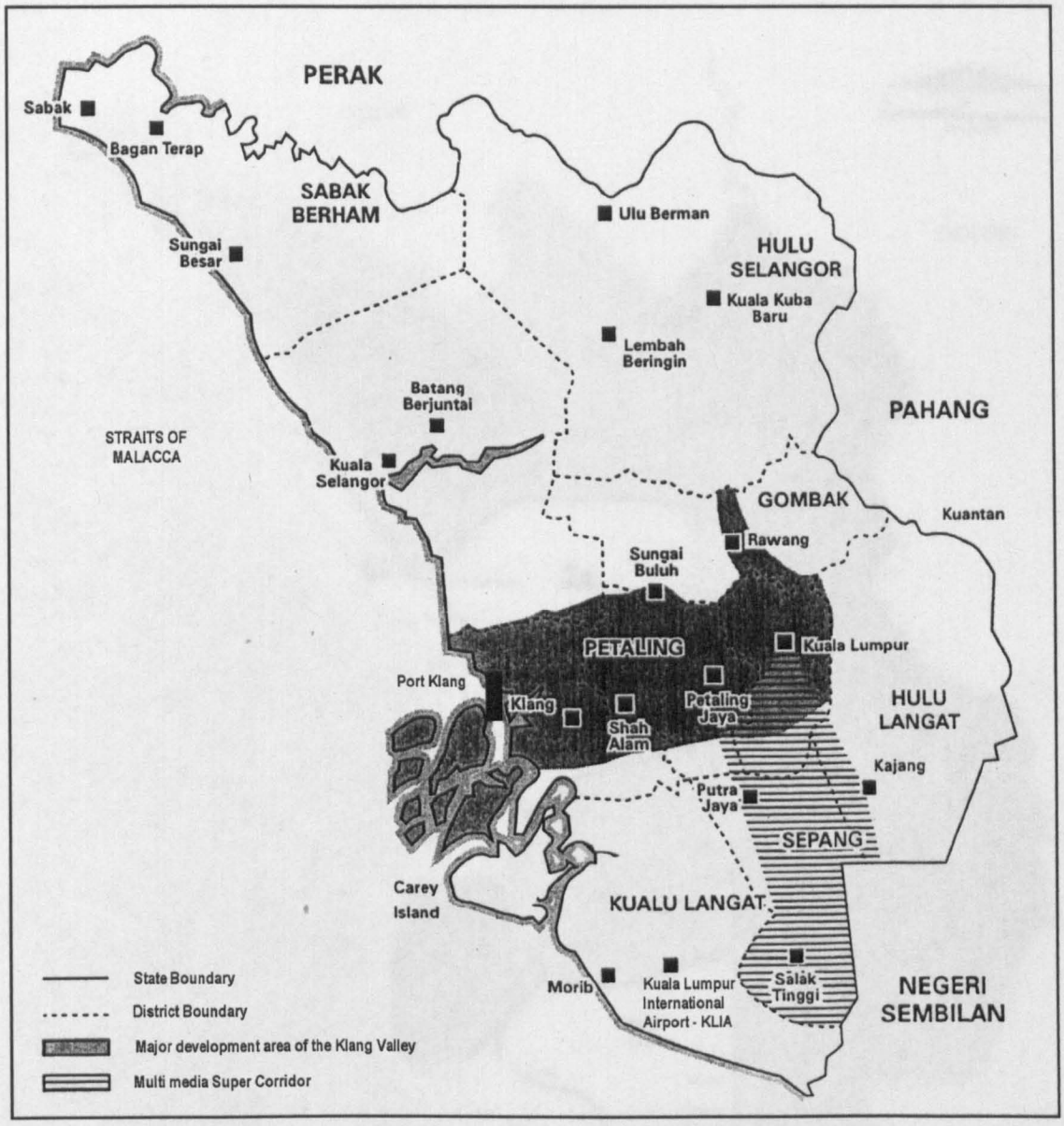

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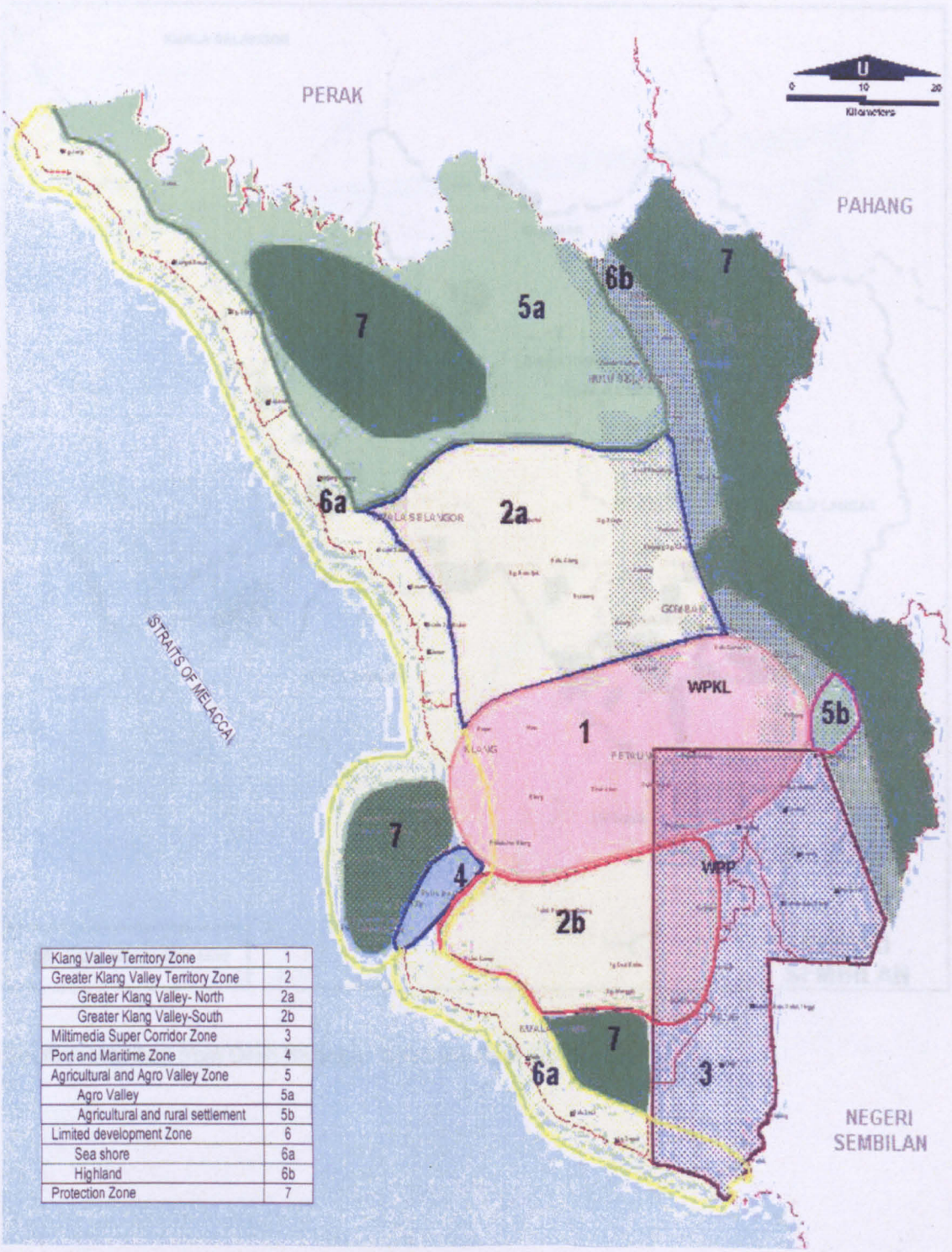

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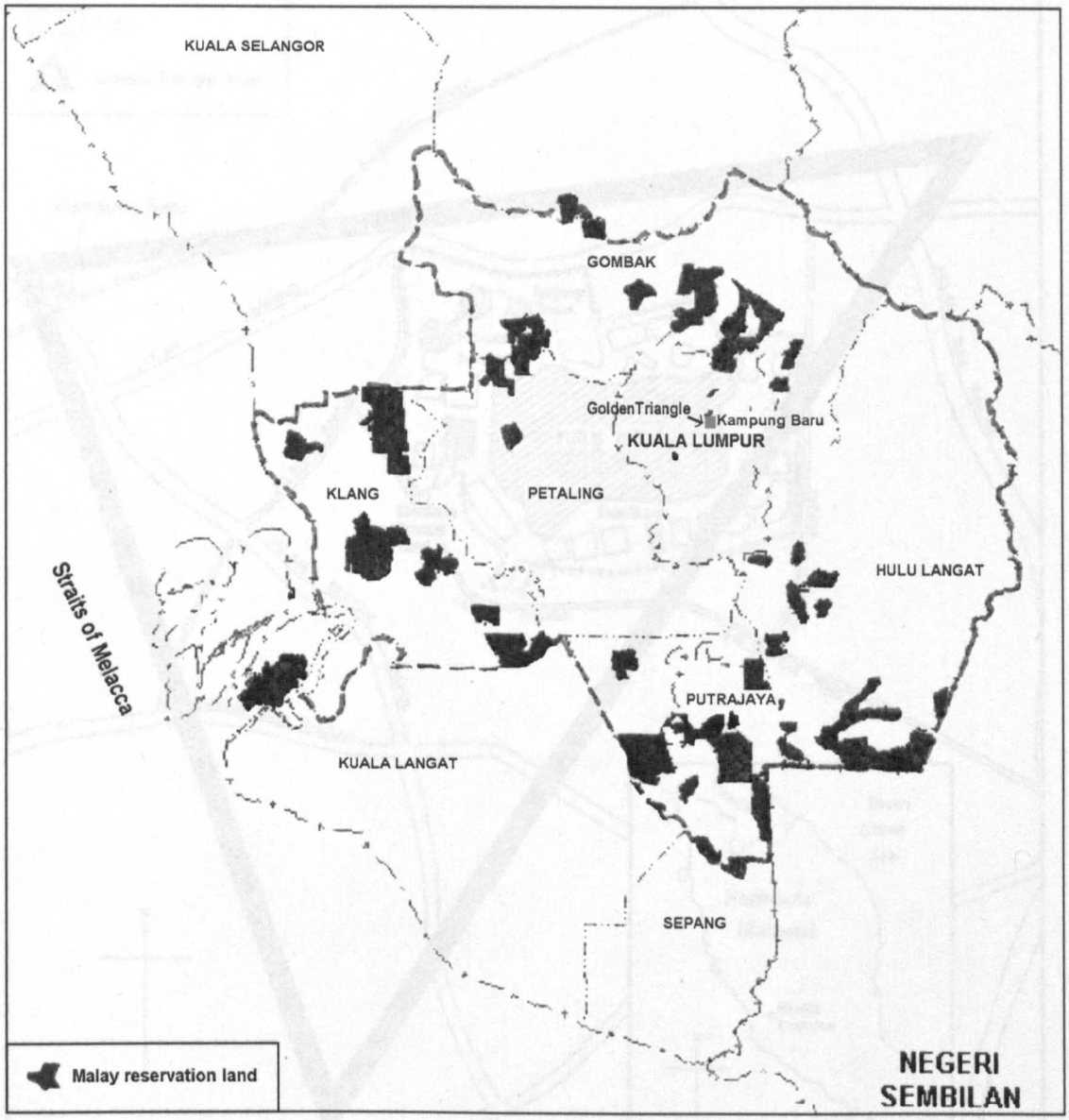

Source: Modified from Draft Selangor Structure Plan (2005:108).

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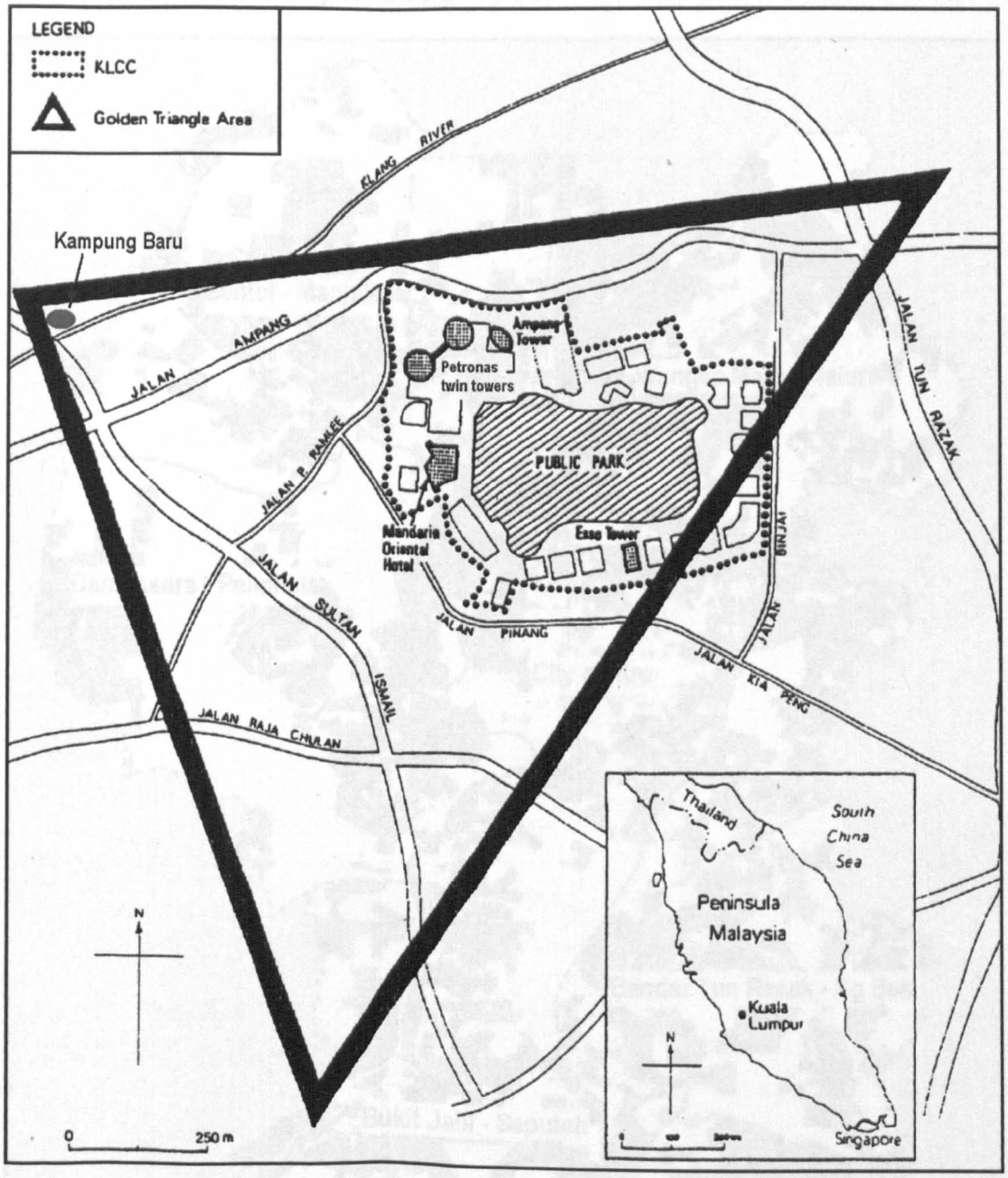

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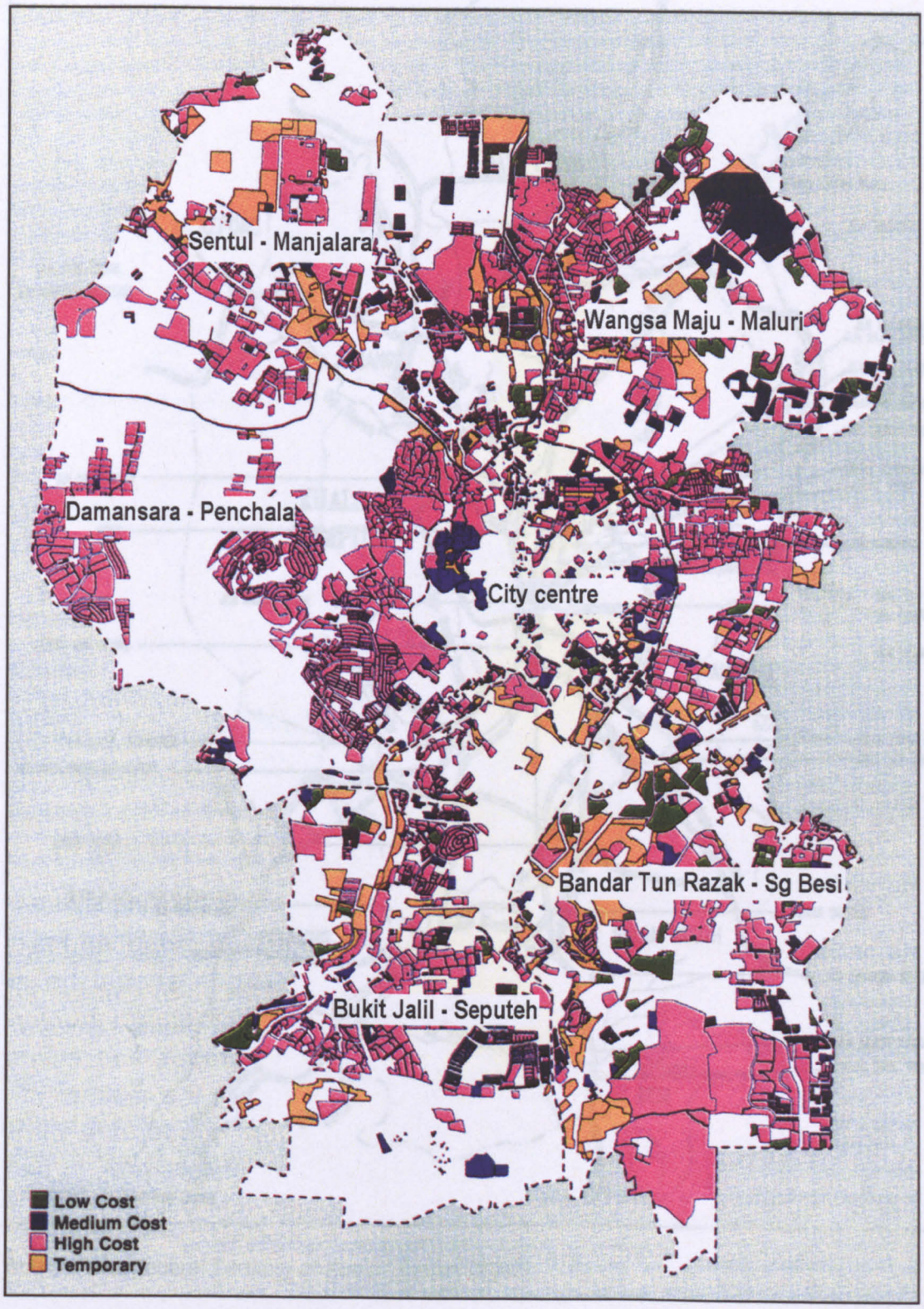

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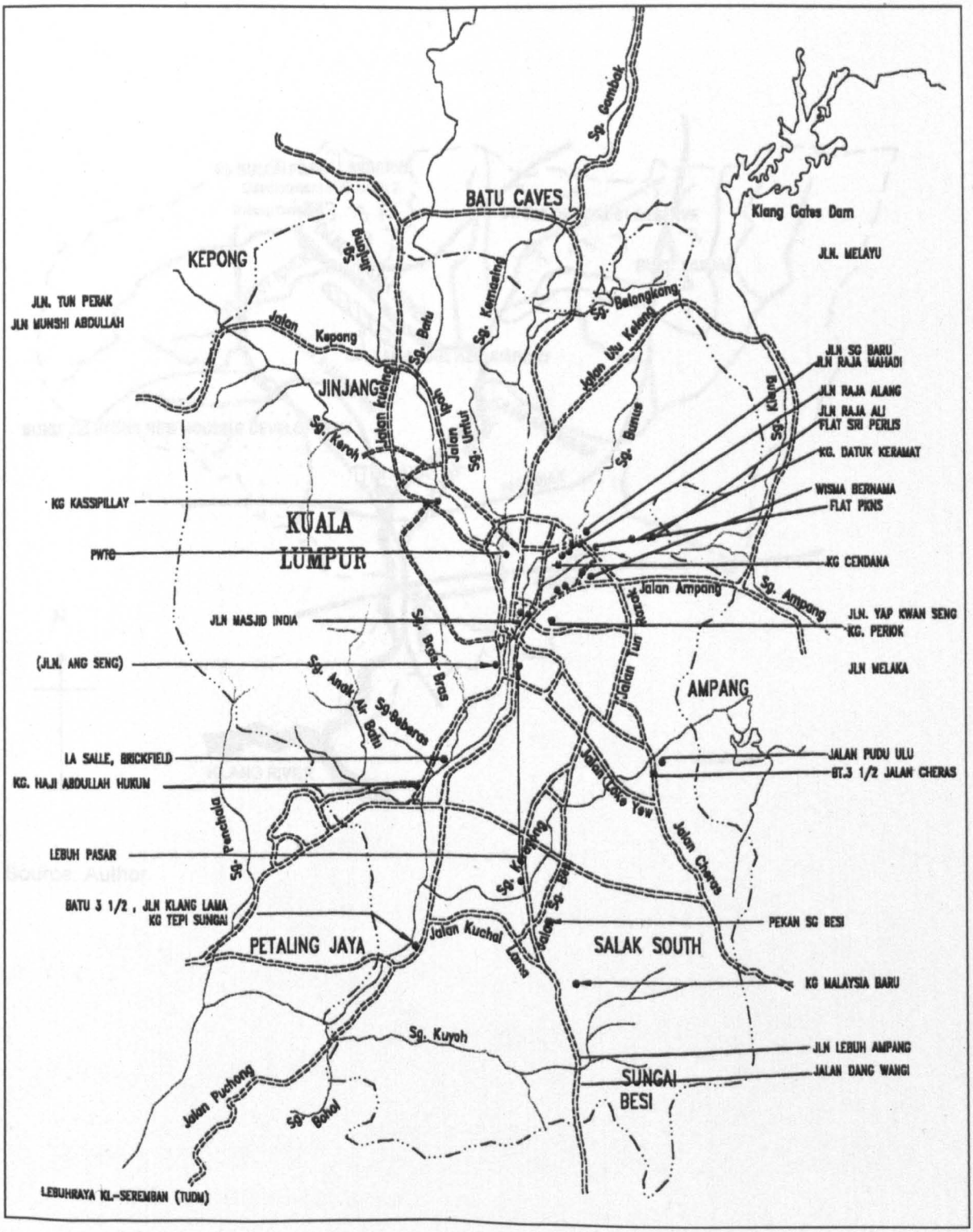

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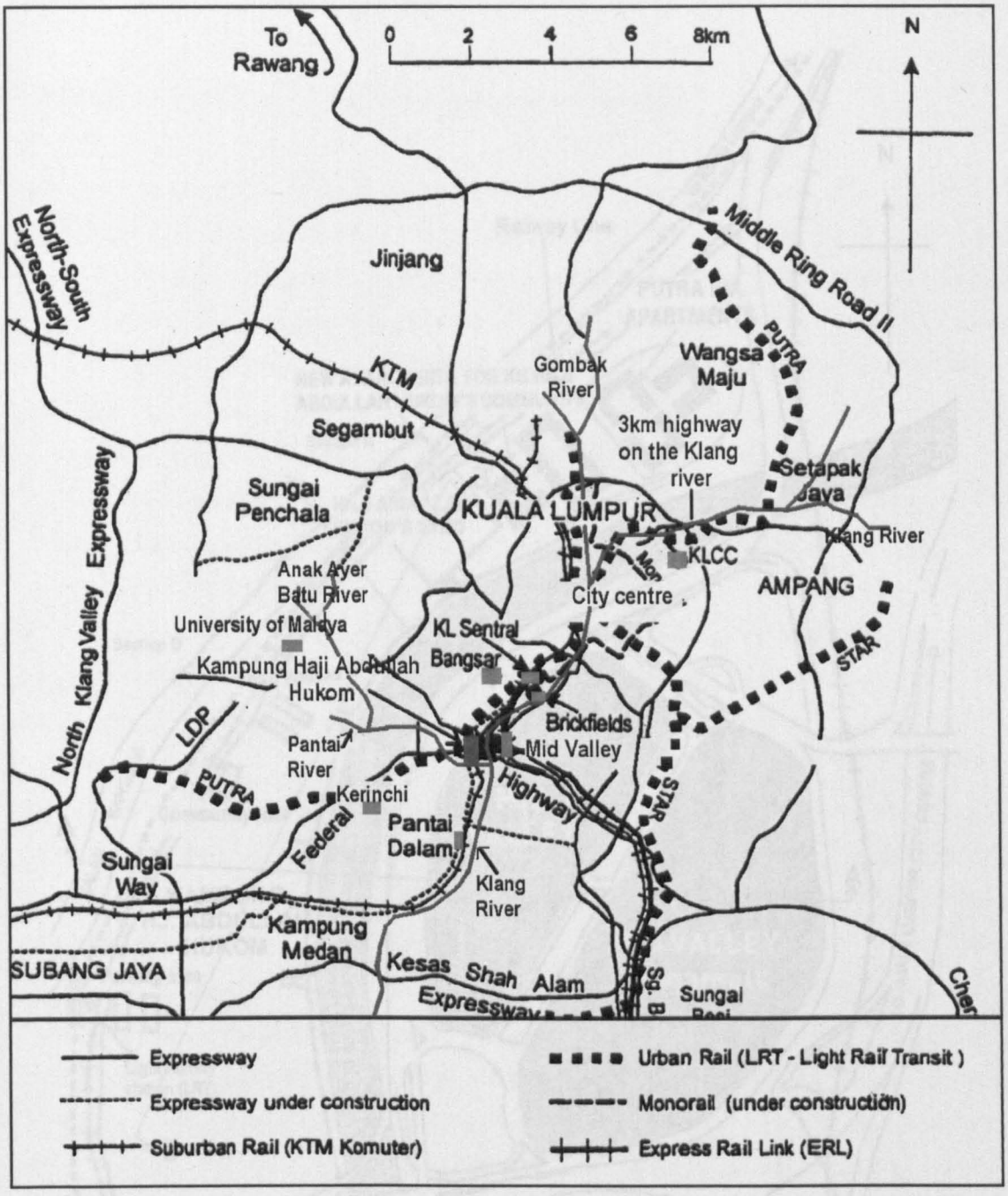

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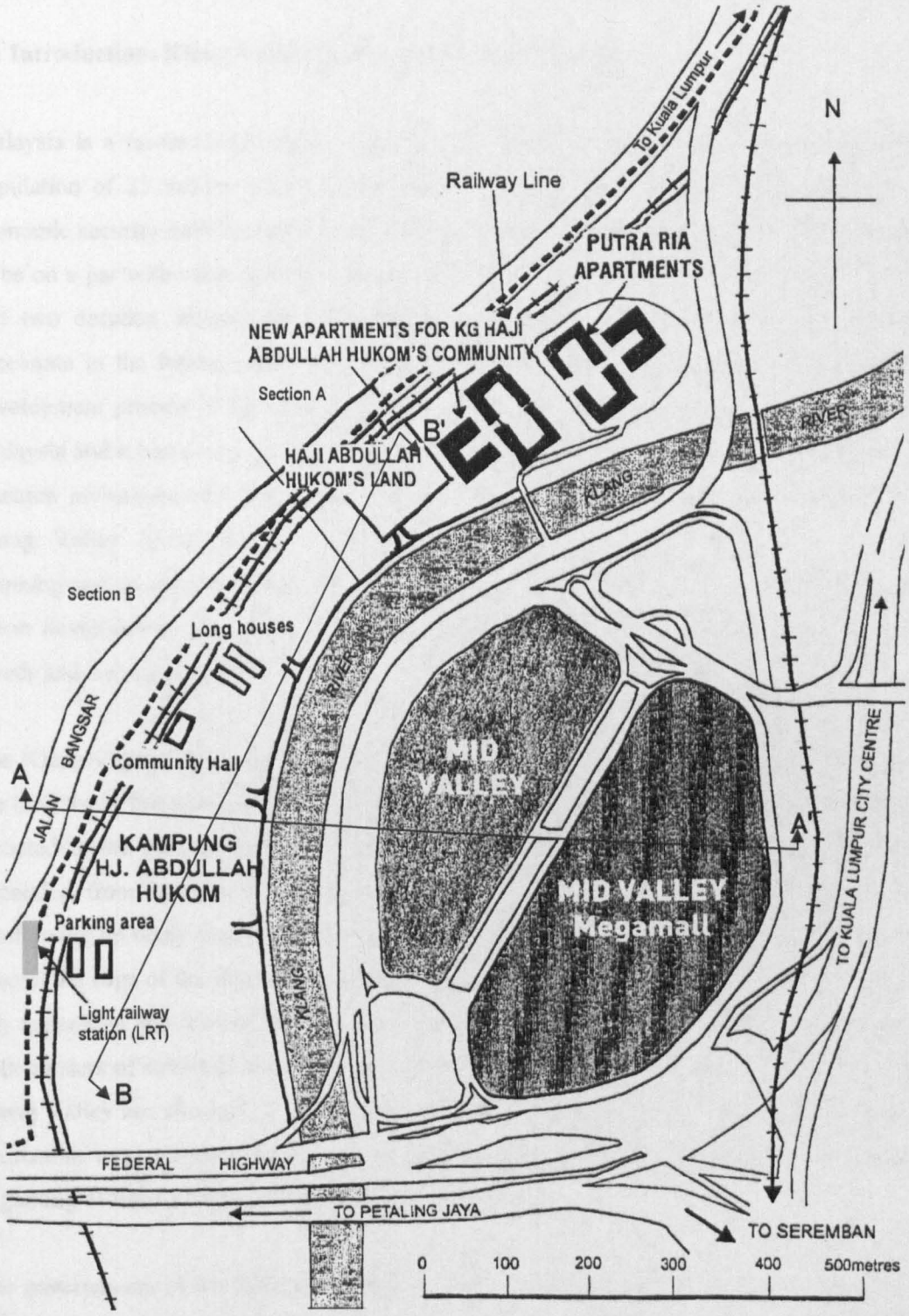

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CHAPTER 1

INTRODUCTION: MALAYSIA, KLANG VALLEY AND RESEARCH ISSUES

1.1 Introduction: Klang Valley, Kuala Lumpur and Selangor

Malaysia is a resource-rich small to medium-sized country in South-East Asia, supporting a population of 23 million within a total land area of 330,000 sq km. Political stability and economic security have brought Malaysia onto the global stage and it is now widely considered to be on a par with other developing countries in Asia like South Korea and Taiwan. Over the last two decades, urbanisation in Malaysia has been growing rapidly and is expected to accelerate in the future, particularly in the central development area: the Klang Valley. The development process of the Klang Valley Region is dynamic compared with other regions in Malaysia and it has a long history leading up to its current status as a Mega-Urban Region. This research investigates the impact on the environment of the rapid urban development of the Klang Valley. Urbanisation creates opportunities; however, without proper development planning and an understanding of the linkages among the various elements of the environment, urban development can cause severe environmental problems, for example landslides, flash floods and water pollution.

The Klang Valley offers clear evidence of the vast changes to environmental resources, chiefly the land itself, following the implementation of the government's development planning policy. Situated in the eastern part of the Klang Valley, Malaysia's federal capital, Kuala Lumpur, expanded from being a small town in the 1920s to become a 'mega-city' in the 1980s, swallowing up many small Chinese mining areas (Brookfield *et al.*, 1991:3) and Malay villages around the edge of the original city centre (Hamzah, 1976). The demand for land resulted in the city expanding into the rural areas of Damansara in the late 1950s, which then became crowded with clusters of suburban housing estates (Brookfield *et al.*, 1991). Hence, the landscape of the Klang Valley has changed, with modern concrete vistas replacing natural vegetation and estate plantations as the primary feature of the landscape. This new development era has marked the beginning of further land use conflict in the Klang Valley.

The governments of the State of Selangor and the Federal Territory of Kuala Lumpur oversee urbanisation in the Klang drainage basin and should in theory ensure that land use development is conducted in an environmentally sustainable way within the drainage basin system. However, their inability to understand the equilibrium of the drainage basin system has led to the

emergence of environmental problems, especially related to the river itself. Douglas (2004:344) stated that Kuala Lumpur has to cope with 'heavy, intense rainfalls, frequent nuisance local flooding, unstable hillsides, complex foundation conditions and the impacts of mining and construction activities'. However, rapid development, particularly in Kuala Lumpur, has led to an intensified demand for land without respect for the environment. With Kuala Lumpur's continued growth, in line with government aspirations that the national capital should become a world-class city, development has spread increasingly into the hill slope and the flood plain areas of the Klang Valley. This has put parts of the urban community at risk. This dissertation attempts to demonstrate how the most developed area in Malaysia, the Klang Valley, deals with urbanisation, in order to create a good quality of life without environmental degradation and, in particular, without the problem of flash floods.

1.2 Urbanisation in Peninsula Malaysia: process and development

The modern state of Malaysia was formed in 1963 and Kuala Lumpur became its administrative centre. The development process of Malaysia has passed through a few phases since independence and resulted from many factors. The country has been led by five prime ministers, each of whom has had his own principles and policy for developing the country. Even though there have been changes in administration, the country is still ruled by the same coalition of parties (Barisan Nasional) that has been in power since independence. As a result, the development process has continued smoothly from one administration to another without too many complications and only changes in emphasis. For example, the National Economic Policy (NEP), adopted in 1970 by the administration of the second prime minister, Tun Abd. Razak, with the aim of distributing equal economic growth, was transmitted smoothly under two subsequent prime ministers and ended in 1990 under the fourth prime minister, Dr Mahathir Mohamad, when it was replaced by a broadly similar National Development Policy.

In Malaysia, economic activity has traditionally been identified with race. Historically, Chinese and Indians were brought to Malaya by the British colonial administration to promote economic activity. Foreign labour from China was recruited to work in mines, while the Indians were imported to work on rubber plantations in 1905 and also to work on the railways required by the expanding economy (Aiken, *et al.*, 1982; Brookfield *et. al*, 1991; Rigg, 1994). Malays were left dependent on peasant agricultural activity. Within a few decades, the once overwhelmingly Malay population in Malaya had become multi-ethnic (Young *et al.*, 1980; Brookfield *et al.*, 1991; Jomo and Gomez 1997; Jomo and Gomez, 2000).

In the early stages of development, most of the urban centres were established in the western part of Peninsula Malaysia. Several factors can explain this phenomenon. Particularly, in the geographical context, the western landform is characterized by a coastal plain, while the east coast is more uneven, and the main range that runs down the spine of the peninsula has always posed a formidable barrier to trans-peninsula movement from the west coast to the east coast. This distinction made the west coast easier to penetrate and better suited as a focus of settlement. With the discovery of tin reserves in Perak and Selangor in the 19th century, it became a focus of economic activity and settlement areas that later evolved into urban centres. Following the introduction of the rubber industry on the west coast, migration to the area gradually increased.

By the late 19th century (1891) four large urban centres were emerging. These were Penang (85,000), Kuala Lumpur (19,000), Melaka (16,000) and Taiping (13,000) (Aiken *et al.*, 1982; Khairulmaini and Fauza, 1998). Between 1947 and 1970, the number of urban centres increased five fold from 8 to 49, and this increase continued until the 1990s (Khairulmaini and Fauza, 1998). With the onset of the NEP, urban centres in other parts of the country emerged. As described by Lee (1999), the level of urbanisation between 1970 and 1980 rose from 26.7 per cent to 34.2 per cent, giving an annual rate of growth of 5.3 per cent, or 2.2 times faster than the national population growth rate.

According to the Eighth Malaysia Plan, the level of urbanisation in Malaysia increased from 55.1 per cent in 1995 to 61.8 per cent in the year 2000 and was projected to reach 66.9 per cent by 2005. In 2000, the highest growth is in the Federal Territory of Kuala Lumpur, with a 100 per cent increase, followed by Selangor with 88.3 per cent and Penang with 79.5 per cent. The main contribution to population growth in the urban areas is through migration from other member states of the Malaysian federation. According to the 1999 migration survey report by the Department of Statistics (2003), from 1994 to 1998 Selangor State recorded a net gain of 25,400 migrants, the State of Penang gained 14,700 migrants and Johore State 10,600 migrants. Additionally, with the shortage of labour, large numbers of foreign workers, especially from Indonesia, have taken up residence in the country. A total of 749,200 foreign workers with work permits were recorded in the year 2000.

The definition of an urban administrative area in Malaysia is a place of at least 10,000 people. Lee (1999) identifies three categories of urban areas: metropolitan areas with a population of at least 75,000, large towns with 10,000 to 74,999 and small towns with a population of 1,000 to 9,999. Based on this classification, there are 13 metropolitan areas, and 46 towns with a

population of 10,000 to 75,000 in Peninsula Malaysia. Average urban population density is about 110 persons per km sq.

Since the 1980s accelerated urbanisation has seen a changing spatial pattern in urban growth resulting in the formation of Mega-Urban Regions. There are three established major Mega-Urban Regions in Peninsula Malaysia: a northern Mega-Urban Region with Penang as its centre; a central Mega-Urban Region with Kuala Lumpur as its focus; and a southern Mega-Urban Region whose central point is Johore Bahru (see Map 1).

1.3 Contemporary political economy of Malaysia

In order to co-ordinate development planning, an integrated Five Year Plan was drafted in 1966, and was formally known as the First Malaysia Plan (1966-1970). Planning at the federal level was co-ordinated by a new body bringing together the Central Bank and existing institutions (Kaur, 1999:159). Generally, this policy is recognised as a turning point in the evolution of the modern Malaysian economy. In 1971, the National Economic Policy (NEP) was announced and the Second Malaysia Plan (1971-1975) was introduced to deliver the policies of the NEP. As a result of the National Development Policy (NDP) the ethnic Malay proportion of the urban population rose from 14 per cent in 1970 to 43 per cent in 1991 (Dasimah, 2001:8).

During the century of colonial rule, the Malaysian economy developed as a primary commodity producer. The subsequent turn towards industrialisation as a growth strategy is similar to the strategies adopted in other extended metropolitan regions in Southeast Asia (McGee, 1991). There are two major factors that can be defined as turning points in this transformation. First, the declining price of rubber in the world market affected the rubber producers and therefore also affected the rubber tappers themselves. Secondly, the transition to an industrialised sector created more opportunities for the people and led towards the participation of all in the development process. The shift from agriculture to manufacturing resulted in a dramatic growth in manufacturing output from 1970 to 1990.

In the mid 1970s, petroleum production began in Malaysia. Through the Petroleum Development Act of 1974, the federal government also has a share of oil royalties alongside state governments (Jomo and Gomez, 2000:288). Therefore, oil rents contribute to the financing of prestige projects, especially in the Federal Territory of Kuala Lumpur. Meanwhile, the federal government established a large number of public enterprises in all sectors, sometimes in collaboration with private capital. The public sector's share of the Gross National Product

(GNP) increased from 29.2 per cent in 1970 to a peak of 58.4 per cent in 1981 (Jomo and Gomez, 2000:288).

Malaysia is one of the New Industrial Economies (NIEs) of East and Southeast Asia. Within the last two decades, the country has joined the group of High-Performance Asian Economies (HPAEs), led by Japan, which exemplified several common characteristics such as very rapid export growth and a sustained record of economic growth, with the Klang Valley contributing one-third of the country's GDP (World Bank, 1998; Kamalruddin, 2003). In the 1970s an industrial Free Trade Zone (FTZ) was designated at Sungai Way near Port Klang, close to the existing industrial area at Petaling Jaya (Brookfield *et al.*, 1991). To stimulate further exports and foreign investment, the government developed Export Processing Zones (EPZs). There are currently 11 EPZs in Malaysia, of with Shah Alam, in the Klang Valley, is the largest and receives most of its investment from foreign firms (Lo and Marcotullio, 2000). The government has been successful in attracting foreign investment. It increased tenfold from 1981 to 1990 (Lee, 1999:346). During this period, 6,138 industrial projects were approved, many of which involved trans-national corporations (Lee, 1999:346). The most significant investment is in electronics, by Motorola and Hitachi, both located in Petaling Jaya. In the late 1980s, Siemens built its fourth megachip factory, which also operates in Petaling Jaya (World Bank, 1994). Japan ranks as top foreign investor in fixed assets, with Ringgit Malaysia 2,573.9 million,[1] or 26.7 per cent of the total in 1990. A huge explosion of new employment in the industrial sector in 1990 alone created 79,900 jobs (Malaysia, 1991).

With the transformation of the economy, in conjunction with land use restructuring and the development of new towns, Kuala Lumpur has entered a stage of development through what might be understood as its global reorientation (Dick and Rimmer, 1998:2302; Bunnell, *et al.*, 2002). By the 1980s, Kuala Lumpur was also recognized as the commercial and industrial core of Malaysia, and the development of the Klang Valley Region has continued to reaffirm Kuala Lumpur's national centrality (Bunnell *et al.*, 2002: 361).

[1] See note in front matter for currency conversions.

1.4 Background of the Klang Valley

1.4.1 The geographical background

The Klang Valley Region, which has conventionally ascribed borders but no political or administrative significance, covers approximately 2,843 km sq (see Map 2). The Klang River, which gives its name to the region, originates in the highlands about 25 km northeast of Kuala Lumpur. It is about 120 km long and drains a basin area of about 1,288 sq km. It flows from its source in Gombak and Hulu Langat districts in the State of Selangor through the Federal Territory of Kuala Lumpur and then again through Selangor (Petaling and Klang districts) to its mouth in the Straits of Malacca, near the old Selangor State capital of Klang (now superseded by Shah Alam) and Port Klang. In this dissertation the Klang Valley is used to refer to the entire drainage basin, including the Klang River's eleven main tributaries, among them the Gombak, Batu, Kerayong, Damansara, Keruh, Kuyuh, Penchala and Ampang rivers, which total 700 km in length. Two major dams in the upper part of the Klang Basin, the Klang Gate Dam and the Batu Dam, serve two main purposes: flood mitigation and water supply (Drainage and Irrigation Department, 2005a). Geologically, the Klang Valley comprises a variety of igneous, sedimentary and metamorphic rocks such as granite, Kenny Hill formation and Kuala Lumpur limestone.

1.4.2 The historical background and the emergence of the Klang Valley as an urbanised area

The growth of urban centres in the Klang Valley started with the development of Kuala Lumpur in the mid-19th century, a settlement located towards the eastern end of the Klang Valley. With Malaysian independence, the Federal Government formed the Federal Territory of Kuala Lumpur as a federal administrative region (the adjacent new city of Putrajaya, Malaysia's administrative capital, was made a federal territory in its own right in 2004).

The Klang River has an important place in the history of the Malayan peninsula and more specifically of Kuala Lumpur. The early founding of tin mines at the confluence of the Klang and Gombak Rivers in the 1870s was inextricably linked to the history and development of Kuala Lumpur as a small trading post serving several tin mines. The success of the tin mines attracted traders to the area to sell provisions to the miners in exchange for tin. Under the colonial administration, commercially based activities were expanded and transportation became more important. Gradually the colonial authorities started to construct roads and

railways to connect the mining areas to the administrative centre (Aiken *et al.*, 1982). Thus, Kuala Lumpur received intensive input of capital and labour to generate the development process. The colonial authorities introduced the basic governance framework within which the economy continued to flourish (Jomo and Gomez, 2000: 274). Indeed, the tin mines became the first element to trigger the development process in the Klang Valley Region.

The Klang Valley Region grew rapidly from the end of the 19th century to independence. By the 1920s, 60 per cent of the Klang Valley was characterised by rubber and oil palm plantations. The mixture of two economic sectors, mines and plantations, accelerated the economic potential of the region. Due to the concentration of economic activities, the population of the Klang Valley soared dramatically and contributed to the rapid urban development process of the region.

Planning for what Lee (1987) has termed the first 'true' town in Malaysia began immediately after the Second World War. The founding of Petaling Jaya, the first satellite town to Kuala Lumpur, extended urban development down the Klang River by about 11 kilometres to the west of Kuala Lumpur (see Map 2). The second new town in the Klang Valley was Shah Alam, developed in 1964 and soon to take over as capital of Selangor. Shah Alam, which is located down the Klang River 28 kilometres west of Kuala Lumpur and 15 kilometres west of Petaling Jaya, formed a link between the emerging urban region around Kuala Lumpur and the city's port at the mouth of the Klang. In 1968, the founding of Kelana Jaya as a satellite town to Petaling Jaya and of Ampang/Ulu Kelang in the upper catchment of the Klang River increased the convergence of development activities on the Klang Valley (Dasimah, 2002). The earlier development of Bangsar and Petaling Jaya had been influenced by the British new-town planning tradition (Lee, 1987).

The establishment of the new towns led each urban centre to experience internal growth in its population and physical structures. The emergence of the new towns was fuelled by a growth in the middle class community. For example, the new town of Subang Jaya merges middle and upper income residential areas. The construction of a federal highway connecting Kuala Lumpur, Petaling Jaya and Port Klang created a central link for the towns of the Klang Valley. Taken together, these developments eventually caused a state of congestion, with all its concomitant problems (Aiken *et al.*, 1982).

The Klang Valley did not actually have any proper planning during the early stages of its development. Urbanisation resulted from the increasing growth of Kuala Lumpur in the early

1960s, bringing the capital city's population beyond half a million. Therefore, as a result of the growth of the Klang Valley, a confidential plan known as the Klang Valley Planning Report was prepared by a group of planners in the early 1970s (Shakland Cox Partnership, cited in Brookfield *et al.*, 1991). The report sketches the contours of development planning for the Klang Valley until 1990 (Aiken, *et al.*, 1982).

The Klang Valley Region's population has grown with incredible rapidity: from about 1.2 million in 1970, to 2.0 million in 1980, 2.5 million in 1985, and 3.9 million in 1990 (Khairumaini and Fauza, 1998). In 2004 the area had a total population of more than 4 million and in 2006 the population is estimated at 6.5 million. The population of Kuala Lumpur itself has shown an equally remarkable increase, from about 176,000 in 1947 to 316,200 in 1957 and 451,700 in 1970; with the formation of a larger Federal Territory the population reached 977,000 in 1980 and around 1.2 million in 1985. In 2003 it stands at just under 1.501 million (Department of Statistics, Malaysia, 2003). The slower population growth in the Federal Territory of Kuala Lumpur is partly due to shortage of affordable housing and not a result of lack of employment opportunities (Kuala Lumpur City Hall, 2003). The population in the Klang Valley Region consists of three major ethnic groups -- Malay, Chinese and Indian. In Kuala Lumpur, by the year 2000, the proportion of Malays was expected to be 35 per cent, Chinese 51 per cent and Indian 14 per cent (Lee, 1999).

1.5 The research issues

The Klang Valley Region has been selected as the location of this study for a number of reasons. First and most important is the powerful combination of rapid economic and urban growth alongside a fragile natural environment, a combination that has led to frequent and damaging floods. In addition, the author knows the area well and has undertaken several earlier studies based on hydrological research. Probably better than anywhere else in Malaysia it tells a stark story of the dangers of loosely planned urbanisation in a tropical terrain.

Flash floods occur in the Klang Valley when there is unusually intense rainfall over a short period of time. However, intense rainfall conspires with other factors, such as drainage characteristics, which involve rock and soil types, vegetation and land use, all of which contribute to the occurrence, location and intensity of flash floods.

Many studies have been carried out on the problem of flash floods in the Klang Valley, both by academics and by government. However, in crude terms the problem has tended to be discussed

from the perspective of its physical geographical characteristics, and human geography factors have often been excluded from analysis. Understanding the general causes and processes of these events does indeed involve dealing with physical elements of the environment. But to solve the problem of flash flooding in urbanised areas, dealing primarily with physical issues is not the whole solution, as the urban environment also consists of the social and built environments. The research conducted by Low and Leigh (1972, 1978), Gregory and Walling (1973), Newson (1975), Ward (1978), Smith and Tobin (1979), Douglas (1983, 1985, 1988), Gupta (1984), Cooke and Doornkamp (1990), Hamirdin (1988, 1989 and 1992), Sham and Jamaluddin (1990) and Khairulmaini (1994) stimulated the author's interest in flash flood problems in the Klang Valley, and led to her conducting her own research on a number of occasions from 1994 to 2000. This research, carried out principally in Kampung Haji Abdullah Hukom, Flat Seri Perlis in Kuala Lumpur and Kampung Padang Jawa in Klang, was designed to contribute to discussion in the field of physical geography.

However, the author felt that at this point, in order to move her work onwards and contribute to the search for solutions to the problem of flooding in the Klang Valley, she needed to cast her net wider and seek to understand ways in which social factors such as conflict over land use, particularly in environmentally sensitive flood plain areas, exacerbate flooding and the damage it causes. A further reading of Douglas's book *The Urban Environment* (1983) gave the author ideas relating to intervention in the urban environment to overcome the flash flood problems in the Klang Valley. Indeed, flash flood problems are indicative of a strong connection between physical and human structures and processes, and the author came increasingly to suspect that only careful land use planning management can offer a solution to the problem of flash floods in the Klang Valley, especially as nowadays, increasing numbers of planned settlements are affected by flash floods, as well as unplanned settlements. This investigation was designed at least in part to provide more solid academic support to these ideas that had developed over a period of time.

In recent years, the government's vision of Malaysia becoming a developed country by 2020 has resulted in an emphasis on bringing more land into use for non-agricultural economic activities. However, this extended development agenda and the plans drawn up by the government are still focused on the west of Peninsular Malaysia. The concentration of development in west Peninsular Malaysia has brought the problem of flash flooding not only to the Klang Valley, but also to the other main growth centres, Georgetown in Penang, Malacca and Johor Bahru, although nowhere is it as serious as in the Klang Valley.

In the Klang Valley, the authorities have found that what were previously 50-year occurrences of flooding are now occurring with alarming frequency, almost every year (Ahmad Fuad and Norlida, 2004). Flash flood issues are repeatedly highlighted in the local newspapers, and the Klang Valley has become synonymous with flash floods in many people's minds as late afternoon heavy rain is so frequently followed by flash floods. An investigation of newspaper reports by the author shows that, if one includes all levels of event (micro as well as macro), flash floods in the region occurred more than four times a year in the period from 1994 to 2005. Newspaper reports frequently mention people returning home from work in a state of shock to find their cars covered in flood water and sometimes floating down the street. Traffic congestion due to flash flooding is a common feature in the Klang Valley and people sometimes do not get home from work until 11pm. The press is full of reports along the following lines:

> Each time it rains heavily, we know what to expect -- traffic jams and flash floods. We even know where flash floods will hit.
>
> It took me five hours to travel from Kuala Lumpur to Shah Alam (from 5.20 pm to 10.50 pm), all because of flash floods.... Why haven't the authorities done something about it?
>
> (Malaysian.net, 2004)

Making a nonsense of the various programmes introduced by the government, the most disastrous flash flood suddenly washed through the lower catchment of the Klang Valley on 26th February 2005 and seriously affected five settlement areas in Shah Alam (The Star, 27/2/2005). Flash floods in the Klang Valley have reached the critical limit beyond which some of the urban communities appear no longer willing to tolerate such events.

Despite the continuing flash floods, land use development in the Klang Valley demonstrates ignorance of the natural system and a blind priority to economic development, and approval is regularly granted for development projects in hazardous and sensitive areas such as flood plains. Therefore, communities who settle on these flood plains will be exposed to the risk of flooding, and if flooding occurs, it will have unexpected impacts on the residents. Hence, these three elements -- development planning, flash floods and the affected society -- are inextricably linked together and have become the key issues of urbanisation in the Klang Valley. However, in this new millennium, development continues. More land changes its status, and plans are

being made for further increases in the population of the region, and yet the problem of flash floods has not been resolved.

In order to prevent the repeated occurrence of flash floods, suitable flash flood management is urgently required, with a combination of 'hard' (engineering-based) and 'soft' (legislative and organisational) measures implemented by public authorities working in a co-ordinated way. However, these few methods have revealed that such techniques cannot prevent flash floods in the Klang Valley. Existing flood control mechanisms can only deal with the lower magnitudes of overflow from the river and the affected communities are far from satisfied. The case studies of TTDI Jaya and Kampung Haji Abdullah Hukom in Chapters 6 and 7 respectively offer a picture of the extent of the problems of flash floods and their impacts in two contrasting built-up areas of the Klang Valley.

1.6 Research aims

The general area in which this study operates is the examination of development planning and policy in the Klang Valley, particularly the relationship with flash flood problems, and the impact of flooding on urban society. Within this overall framework, there are five aims, which take a multi-dimensional approach to exploring and understanding conflict associated with the development of the Klang Valley, which has led to the problems associated with flash floods. The specific aims are:

1. To investigate development planning and policy issues concerning urbanisation and flash floods in Malaysia.

2. To understand the implications of rapid growth for the urban environment in the Klang Valley with particularly reference to flash floods.

3. To explore the social impact of flash flooding on the inhabitants of two selected study areas.

4. To examine the government response to the problem of flash flooding in the Klang Valley and the coping strategies of those directly affected.

5. To propose planning and policy remedies that protect urban society from flooding.

The findings of the research demonstrate how development planning has led to urban populations settling in vulnerable areas and how the current flood mitigation programme has not been able to control flooding of these affected settlements. The results allow tentative recommendations to be made for possible improvement of the current flood management in the Klang Valley in the context of rapid urbanisation.

1.7 Chapter outline

The following chapter, Chapter 2, reviews the literature in relation to the key themes of this dissertation. It focuses on three main topics, namely urbanisation in Southeast Asia, urban environments and vulnerability, and flood impacts and flood control management. The chapter contains an exploration of the literature examining the ways that urban development processes relate to the problems of flooding, the key issue on which the following chapters are based. The section on urbanisation in Southeast Asia addresses the literature on rural to urban migration, the formation of spontaneous settlements and the emergence of extended metropolitan regions in Southeast Asia. This chapter introduces Terry McGee's idea of *desakota* (1991) and the argument put forward by Dick and Rimmer (1998) of globalisation as a contributor to rapid urbanisation in Southeast Asia. Reviews of the urban environment are discussed in the context of the urban environment as an integrated system, of urban vulnerability and of urbanisation as an agent of disaster. Integration of the process of urbanisation with environmental issues will later be developed with regard to planning strategies for the Klang Valley. The literature on the impacts of flooding are explored in the light of flood problems that have arisen as a result of rapid urbanisation. The chapter concludes with a review of the literature examining different types of flood control management strategies.

Chapter 3 presents the contextual background of urbanisation in the Klang Valley. It focuses on the development of Kuala Lumpur and the State of Selangor, with a discussion of Kuala Lumpur's and Selangor's Structure Plans. This chapter also discusses issues regarding the urbanisation process, including the problems of Malay reserved land, housing security and environmental problems, with a focus on the disturbance of sensitive natural resources that has led to increasing problems of flash floods in the Klang Valley. Chapters 2 and 3 cover the conceptual and geographical setting within which this study expands and develops.

Chapter 4 discusses the methodological approach used for this research, which includes participant observation, surveys and interviews to collect qualitative and quantitative data on two settlement areas. The sampling method used in the household survey in the two study areas

enhances the survey results. Structured questionnaires and in-depth interviews were conducted, with the feedback given enabling some major questions to be tackled, and the answers provided will be discussed further in Chapters 5, 6 and 7.

Chapter 5 expands the coverage of the issues of development planning in the Klang Valley from a local perspective. The material in this chapter shows how the urbanisation process in the Klang Valley has proceeded and been managed when two different authorities, the Federal Territory of Kuala Lumpur and the State of Selangor, are involved with development.

Chapters 6 and 7 provide an insight into and discussions on the experiences of flash floods of the residents of two communities in the Klang Valley, TTDI Jaya and Kampung Haji Abdullah Hukom. The repeated problems of flash floods in both study areas are examined against a background of the history and the socio-demographic characteristics of the areas. This is followed by an investigation of how the resident community of each area has experienced the hazards, what impacts they have suffered and how they have coped with the frequent flash floods. These chapters also explore why people are still living in these areas even though they are at such risk of flooding. They also investigate the development of nearby areas and the impact of these developments.

Finally, in Chapter 8, the major findings from the two study areas are brought together, and brief summaries and conclusions are presented. In addition, this chapter recommends possible improvements to development planning in the Klang Valley in connection with the problem of flash floods, and suggests directions for further research.

1.8 Thesis organisation

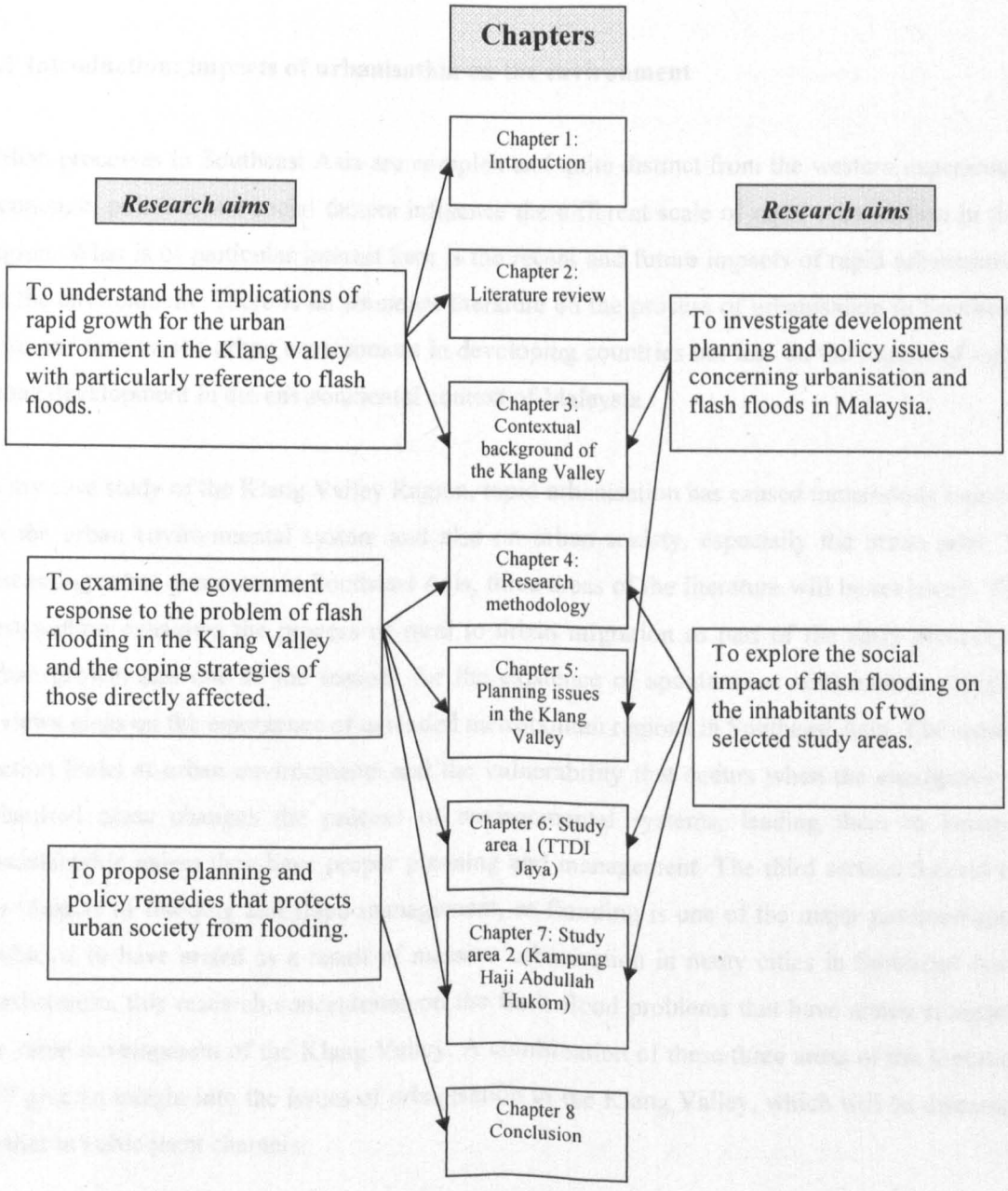

Figure 1.1. Research aims and thesis content.

CHAPTER 2

PROCESS OF URBANISATION IN SOUTHEAST ASIA: AN EXAMINATION OF THE LITERATURE

2.1 Introduction: impacts of urbanisation on the environment

Urban processes in Southeast Asia are complex and quite distinct from the western experience. Economic, political and social factors influence the different scale of rapid urbanisation in this region. What is of particular interest here is the recent and future impacts of rapid urbanisation on the environment. There is an abundant literature on the process of urbanisation in Southeast Asia and also on the urban environment in developing countries but less on the impact of rapid urban development in the environmental context of Malaysia.

In my case study of the Klang Valley Region, rapid urbanisation has caused tremendous impacts on the urban environmental system and also on urban society, especially the urban poor. In discussing urban processes in Southeast Asia, three areas of the literature will be reviewed. The first section considers the process of rural to urban migration as part of the early process of urban growth and one of the reasons for the existence of spontaneous settlements, and also reviews ideas on the emergence of extended metropolitan regions in Southeast Asia. The second section looks at urban environments and the vulnerability that occurs when the emergence of urbanised areas changes the process of environmental systems, leading them to become unsustainable unless they have proper planning and management. The third section focuses on the impacts of flooding and flood management, as flooding is one of the major environmental problems to have arisen as a result of massive urbanisation in many cities in Southeast Asia. Furthermore, this research concentrates on the flash flood problems that have arisen alongside the rapid development of the Klang Valley. A combination of these three areas of the literature will give an insight into the issues of urbanisation in the Klang Valley, which will be discussed further in subsequent chapters.

These sections relate closely to the themes of the dissertation. Thus the Klang Valley has been the main site of rampant urbanisation in Malaysia. With its quick access to Kuala Lumpur, its rapid urban infill has been all but inevitable, and it reflects in interesting ways urbanisation patterns in other parts of Southeast Asia. Terry McGee did not, however, include Kuala Lumpur as one of his original *desakota* areas, perhaps because urbanisation in the Klang Valley has been that much more recent. Rapid urbanisation brings with it all sorts of problems. This is

particularly the case in the geographical and morphological setting of so many of the largest Southeast and East Asian cities, built on alluvial flood plains between mountains and sea. In this review of the literature, I will relate and reflect on discussion about vulnerability to hazards and how the most vulnerable segments of society are normally those worst placed to cope with hazards. This is true in the Klang Valley in Malaysia as it is in other parts of Southeast Asia and beyond. Vulnerability and risk is one of the themes that are examined more closely in the context of the Klang Valley. So too is that of flooding and flood risk management. In setting the scene for later discussion in this dissertation, this chapter reviews a selection of the literature on different approaches that have been adopted to flood risk management. Some of the issues and problems that are thrown up by this literature are later shown to be relevant to settlements in the Klang Valley.

2.2 Rural to urban migration and spontaneous settlements: a discussion of the literature in a global and Southeast Asian context

2.2.1 Rural to urban migration, accelerator to urban growth

Large-scale urbanisation is still a relatively recent phenomenon in Southeast Asia. In 1940, no city in Southeast Asia had a population of over one million, and as recently as 1960, no Southeast Asian city had reached a population 3 million (Jones 1997:241). However, in parallel with rates in many other parts of the developing world, urban growth rates since then have been accelerating in Southeast Asia, with peak rates reached in the 1970s and 1980s.

2.2.2 Rural to urban migration: trends and patterns

The low rates of urbanisation in Southeast Asia that existed in the 1950s are generally attributed to the experience of colonization, and in a number of countries including Malaysia this is seen as having led to under-urbanisation (Murphey, 1996). A variety of forces conspired to keep urbanisation low in the colonial period. These included the exclusionary policies of colonial powers, which, as was the case in Jakarta and the Dutch East Indies, took measures to forbid residence to certain groups of people. More generally, the absence of an industrial base in colonial cities, and especially in capital cities, acted to keep urbanisation rates down. This is not to say that there was no rural to urban migration at all. In some colonial cities, colonial policies resulted in complex demographic patterns (Drakakis-Smith, 2000:43). For example, in the 20th century only one third of the population of Yangon was made up of native Burmese; another third was Indian and the rest was divided equally between Chinese and Europeans (Drakakis-

Smith, 2000:43). Similar situations existed in Malaysia in the 1870s with the migration of Chinese workers brought into the country, followed by the movement of indented labourers from India to work in the plantations, a migration decreed by the British colonisers. This functional distinctiveness was reinforced by ethnic spatial separation within the cities, for example the ethnic groupings in Singapore.

A number of geographers have contributed to our understanding of the urbanisation process in Southeast Asia, in particular Terry McGee (1967) and David Drakakis-Smith. Drakakis-Smith (2000:31) has conceptualised the process in terms of the conventional Marxist-derived classification of capital into mercantile, industrial and consumer, although, as Drakakis-Smith points out, not every country experienced the same process of imperialism and colonialism. As British, French and Dutch colonial rule was consolidated through the 19th century, most Southeast Asian cities were influenced by the European model of the city (Dick and Rimmer, 1998:2307). The economic structure of colonial urbanisation created some new employment opportunities for the indigenous community, but this was almost entirely in the service sector.

In the early years of independence, jobs were relatively scarce, as commercial activity had previously been controlled by the Europeans. Besides, in the process of restructuring and building the countries, Third World cities continued to be dominated by the same economic activities in primary exports and manufactured imports and by the same expatriate firms. It was simply another form of colonialism. Socially, the major transformation was the emergence of a huge sub-sector of urban poor who were unable to acquire waged employment and who were excluded by their poverty from acquiring adequate housing, education and health care for themselves (McGee, 1967; Drakakis-Smith, 2000:53). Between 1950 and 1960 Southeast Asian cities, faced with growing rural to urban migration and spontaneous settlements, began to spread out. In Indonesia, for a variety of reasons principal among which was overcrowding in Jakarta and Java more generally, the government undertook its transmigration programme, as a result of which, since independence in 1950, over five million migrants have been relocated to the so-called outer islands (Drakakis-Smith, 2000:71).

For Malaysia after the Second World War, there is an additional element to consider. Besides being socially and economically reframed, Malaya's rural population was beset by communist insurgencies and, consequently, a period of Emergency was declared from 1948 to 1960 (Hamzah, 1976:80; Lee, 1987:154). Therefore, to protect civilians from the communist insurgents, large numbers of dispersed rural dwellers were gathered into so-called Resettlement New Villages, which led to a disproportionate increase in the urban population. Besides,

because of the insecurity of rural areas and also to avoid resettlement, the majority of rural dwellers who were not in the affected areas were pushed to migrate into the cities. As a result, the urban population increased rapidly. Between 1947 and 1951 the population of Kuala Lumpur had swollen by almost 100,000 persons. As a result, there was a serious shortage of housing in the capital city. Hence, the burgeoning of urban populations led to the growth of squatter settlements within the city. In 1953 that there were 21,851 families living in 14,089 squatter shacks in Kuala Lumpur (Lee, 1987:154).

During the 1960s and 1970s, many countries in Southeast Asia were in the phase of new town growth. However, the problem of affordable housing in accessible locations for the urban poor persisted as a crucial issue for cities in Southeast Asia (Barter, 2002:268). As a consequence of the breakdown of colonial political and economic control and the installation of indigenous administrations, newly independent Southeast Asian governments had to overcome various types of administrative problems, including the overwhelming weight of rural to urban migrations. Therefore, migrants to the urban areas were faced with the problems of a shortage of convenient housing. Thus, these migrants created new settlement areas located on any vacant land within the city. Squatter settlements or spontaneous settlements form an important feature of cities in Southeast Asia.

During these decades, a number of governments resorted to often fairly brutal slum clearance measures. For example in Manila in 1962, the government decided that urban squatting was causing the city to deteriorate and leading to a breakdown in standards of urban life. Hence, the government created a Slum Clearance Committee to relocate urban squatters from the City of Manila (Juppenlatz, 1970).

The first industrial revolution was the catalyst for rural to urban migration in industrialised countries. Since the 1970s, industrialisation has been the driving force behind rapid urbanisation in Southeast Asia, and new industrial producers have emerged such as Malaysia and Thailand. Consequently, Southeast Asia presents the same result as developed countries in terms of rural to urban migration in the early stages of urban development. In early 1970s, internal migration and urban boundary reclassification resulted in more than half the urban growth in Indonesia, Malaysia and Thailand, with 55 per cent, 51 per cent and 61 per cent respectively (Jones, 1997). During this stage the rural to urban migration flow consisted of two distinct streams: one group migrating to the informal sector where incomes were competitively determined and the other group to the formal sector with jobs mostly prearranged, for example working as an operator in

a factory, with rural to urban migration not contributing to an increase in unemployment in any meaningful sense (Bhattacharya, 2002:952).

Resettlement of the urban population became the most common problem affecting the urban authorities. As a result of pressure from a number of quarters, as well as the apparent failure of slum clearance projects, an increasing number of governments, with support from international agencies, funded upgrading projects for kampung improvement and squatter settlement areas within cities (Abeyasekere, 1987; Hardoy and Satterthwaite, 1997:268; Drakakis-Smith, 2000:70). By 1972, for example, the World Bank's urban development programmes were expanding. It was involved in funding the Kampung Improvement Programs (KIP) in Indonesia, with an emphasis on community preservation and security of land tenure (Agrawal, 1999; Abeyasekere, 1987). Land consolidation, which had been a successful strategy for urban development in Japan, Taiwan and Korea, was also introduced, but it had its limitations due to the restricted availability of urban land (Agrawal, 1999).

Slowly improvements in transportation and communication ended the isolation that was a common feature of many rural areas in Southeast Asia, and improved transportation brought rural areas closer to cities (Jones, 1997). Hence, more services and economic activity could be channelled easily to the countryside, and this improvement helped to curb the flow of rural to urban migrants.

In Malaysia, for example, rural development policy was set out in the National Economic Policy (NEP), with the aim of improving the standard of living of rural communities. The rural regional development programme aimed to lift not only standards of living but also the status of people living in rural areas. The government of Malaysia subsidised rural people who engaged in agricultural activity in order to protect livelihoods and ultimately increase crop yields. The NEP became a catalyst for the rural development process. Additionally, in the 1970s, the government of Malaysia encouraged large numbers of rural migrants, mainly Malays, to settle on state land (Syed Husin, 1998). The settlement areas were provided with basic services and facilities such as electricity and water, and were recognised by municipal authorities, and the migrants were labelled "urban pioneers" instead of squatters (Barter, 2002).

Even though the kampung situation has improved to some extent, the migration process from rural to urban areas continues throughout Southeast Asia. The existence of spontaneous settlements remains a critical issue in Southeast Asian cities. The cost of housing in the city has become prohibitive for the urban poor. Spontaneous settlements are often located around

environmentally degraded zones and trash landfill sites. Bangkok currently has more than 1000 slum areas with a total population of 1.5 million (Douglass, 2000:2327).

Spontaneous settlements have become a threat to urban development processes, as they are perceived as high-risk areas in terms of health and sanitation. During the 1980s environmental concerns came to dominate development debates and the ways in which development should centre on meeting people's needs (Hardoy, Mitlin and Satterthwaite, 2001:343). Some governments have as a result made an effort to resettle low-income residents in low-cost housing. According to Pugh (2000), in his studies on squatter settlements, the World Bank played the most important role in 87 programme allocations between 1983 and 1992 in developing countries. However, the low-cost housing provided was not enough to meet the needs. In Shanghai, for example, the number of migrants rose tenfold in one decade from 0.26 million in 1981 to 2.81 million in 1993 while at the same time the government assumed that rural migrants would not settle permanently in cities (Wang and Zuo, 1999:276).

Moreover, by 1999 long-term strategies to reduce poverty had been initiated in many developing countries. Poverty Reduction Strategy Programmes (PRSPs) were institutionalised, with most third world countries seeking IMF and World Bank loans for stabilisation and structural adjustment in building sustainable urban development (Rakodi, 2002:91). These efforts continue to lead to the demolition of spontaneous settlements.

2.2.3 Rural to urban migration: the formation of spontaneous settlements

Having talked in general terms about squatter settlements, we move on to discuss the literature that is relevant to one of the study areas, Kampung Haji Abdullah Hukom, which is itself a squatter settlement. It is important to understand why squatter settlements exist and why they have an impact on the urban environment. Spontaneous settlements are complex to define, as they differ from one country to another. The term itself is generally used to refer to poor accommodation built on any vacant land without permission from the land-owner and built hurriedly using cheap and available materials, for example, zinc, plywood and hardboard. These settlements have also in different times and places been referred to as slums or squatter areas. "Slum" refers to the conditions of a settlement, while "squatter" refers to the legal status of a settlement. Squatter settlements are typically characterised by lack of legal status, inadequate levels of physical and social infrastructure and people living in poverty (UNESCAP, 2003:4). Bad housing is a major index of squatter conditions, and is referred to as urban slums. Safer sites are too expensive and any attempt to occupy these illegally and develop housing on them

would result in eviction (Satterthwaite, 1997:1674). According to Srinivas (2004a:2), there are three essential characteristics that help to understand squatter settlements: the physical, the social and the legal, with the reasons behind them being interrelated. Physical characteristics refer to services and infrastructure below the adequate or minimum levels. Services include both network and social infrastructure. They include water supply, sanitation, electricity, roads and drainage, schools, health centres and market places. Social characteristics refer to the areas favoured by lower income households. Squatters are predominantly migrants, either rural to urban or urban to urban, but many are second or third generation squatters. Legal characteristics are the lack of ownership of the land on which the houses are built. Government or public vacant land and risky areas such as hill slopes and flood plains are often appropriated by squatters for building houses.

Some of the local names for squatter settlements are, for example, favelas in Brazil, bastee in India, setinggan in Malaysia and chumchaon bukruk in Thailand. Whatever they are called, these squatter dwellers increased substantially during the 1990s in Asia and the Pacific even though the development of formal residential areas has boomed in the last decade. However, in general, urban populations, especially in Southeast Asia, grew faster than the capacities of cities to support the whole population of urban dwellers, so spontaneous settlements increased (UNESCAP, 2003:5).

There are three types of spontaneous settlement in the urban areas, namely squatter settlements, inner city slums and illegal housing subdivisions (UNESCAP, 2003:6). Squatter settlements are commonly found on vacant land which is hazard prone, for instance on flood plain areas near the urban centre, beside railway tracks, near and under transmission lines, on government land, or on land with vague tenure status. Inner-city slums are located in the older sections of the cities and are characterised by a low standard of infrastructure and high person to floor space ratios. Inner-city slums are usually rental tenements, which have deteriorated through lack of proper and regular maintenance or repair. Illegal housing subdivisions refer to private owners who subdivide their land illegally on the urban fringe. The land is then leased either for rent or purchase at an amount affordable by the low-income group. Generally, basic infrastructure such as a water supply and electricity are provided. The land is also sometimes subdivided and sold. These plots of land can be sold at prices affordable to the low-income group.

The areas settled by the urban poor are often environmentally fragile, and the high concentration of population there contributes to their degradation. Rio de Janeiro and Sao Paulo in Brazil, for example, often experience flooding and landslides with many victims coming from the urban

poor who live in the many spontaneous settlements within the cities (Mueller, 1995:72). In Jakarta, for instance, only about 55 per cent of urban households are served by some form of garbage collection (Lee, 1997:141). Indeed, in these circumstances, it is the vulnerable urban poor who suffer most from environmental decay and inadequate service provision.

Most significantly, these spontaneous settlements are located in hazardous areas. Combined with degradation of living conditions, this will increase risk, and the possibility of hazards is higher. An example is the case of the landslide disaster in Manila where the settlements were located in a dumping site. A large rain-soaked mountain of rubbish collapsed and covered a highly populated settlement, killing 205 urban poor inhabitants (Hardoy, Mitlin and Satterthwaite, 2001:1).

The relocation of squatter settlements is one of the ways of improving conditions for the urban poor. However, in Manila, the resettlement of slum dwellers from river banks to other locations has not been a success. Living on the edge of town, far from urban amenities and from areas where work is located, most of them returned to the original settlements within a few months (UNESCAP, 2003:9).

It is important to note that rural to urban migration and cooperation between rural and urban areas are amongst the factors that create new forms of urbanisation in Southeast Asia. The next section will discuss in more detail the emergence of extended metropolitan regions in Southeast Asia.

2.2.4 The emergence of extended metropolitan regions in Southeast Asia: definition and parameters

The development of Kuala Lumpur has had an impact on the development of the Klang Valley. Kuala Lumpur's status as national capital has encouraged people from outside of the city to live there in order to achieve a better quality of life due to increasing job opportunities in the early 1970s in comparison to other towns in the country. Therefore, with Kuala Lumpur as a centre point, development spread to the whole Klang Valley region following development strategies set out by the government when the Klang Valley needed to support the rapid development of Kuala Lumpur. The emergence of extended metropolitan regions in Southeast Asia needs to be explored in a way that allows us to understand and relate the phenomenon to the emergence of the Klang Valley as an urbanised region.

The next section of this chapter reviews ideas on the emergence of an extended metropolitan region in Southeast Asia. Much of this discussion has been stimulated by the work of Terry McGee, who has advanced the argument that Southeast Asian cities present a distinct type of urban process and form that should not be seen through a western lens (McGee, 1991). In particular, he coined the term *desakota* to refer to a certain type of urban area that he claimed is prevalent in much of Southeast Asia. *Desakota* comes from *bahasa* Indonesian/Malay and merges the meanings of the words for village *(desa)* and town *(kota)*. McGee argued that it is more appropriate to use local terms instead of western categories to reflect the nature of Asian urbanisation. In addition, the term *desakotasi* conveys the concept of rural and urban activities occurring on the same geographic territory, and the suffix *si* indicates that this is a process.

McGee sees the process of *desakota* in Southeast Asia as occurring in many different geographic locations. McGee writes that extended metropolitan regions often stretch along corridors extending upwards of 100 kilometres from metropolitan centres. According to McGee, the characteristics of *desakota* lie in a mixture of features of rural land use, agriculture and urban activities. Distinctive areas of agriculture and non-agriculture exist adjacent to and between urban cores. This idea is accepted by Kelly (1999), whose research on Manila's extended metropolitan region provides evidence of the dynamic relationship between agriculture and non-agricultural activities operating side by side.

McGee's was one of the first of several attempts to illustrate a distinct experience of urbanisation in Southeast Asia, generally based on the incorporation of the urban and rural sectors. McGee (McGee, 1997) appears now to prefer the term Extended Metropolitan Region to *desakota*, while Mike Douglass (2000) uses the term Mega Urban Region. Rapid change in economic activities in the last few decades has led to a transformation of the spatial economy. This is reflected particularly in an expansion of non-rural activities on urban peripheries and in the corridors between cities leads to the blending of town and village economic activities (Chia, 2003:13). Therefore, administrative boundaries are increasingly irrelevant in studying this rapid growth.

According to McGee (1991), western patterns of urbanisation are insufficient explicators of urbanisation in Asia in three respects. First, in the Asian context, urban transition, which assumes that the widely accepted distinction between rural and urban will persist as the urbanisation process advances, needs to be re-evaluated. Urban development in Southeast Asia is different, and has its own elements. According to Wu (2000), urban transition in the

Southeast Asia region is an urban development process achieved to some extent by blurring the distinction between rural and urban areas.

Secondly, an assumption was made that an urban transition will result from agglomeration of economies, leading to concentration of the population in urban areas. But in the Southeast Asian context, large cities have been juxtaposed with highly populated rural areas based on peasant agricultural activities, and especially concentrated on wet-rice cultivation. There is a very dense population in these rural areas, providing a large potential of workers for industrial and service sectors in the urban area. The mixture of activities in rural areas has created densities of population that are frequently higher than in suburban areas in the West. The varied modes of transportation -- for instance motorcycles, buses, vans and small boats (for example down *Klong* [canals] in Thailand) -- facilitate people's commuting, and also the circulation of commodities and capital. This promote the incorporation of outlying villages into the city and can be seen as a distinct form of urban transition (McGee, 1991). Thus, the western assumption that urbanisation comes from agglomeration economies would seem inappropriate in the Southeast Asian context.

Thirdly, western theories of urban transition, which are based on a specific historical experience of urbanisation, are not neatly transferable to the urbanisation process of developing countries. During the colonial intervention in Southeast Asia, in most countries wet-rice cultivation developed fast, particularly around large cities. However, this process is perceptibly different in Malaysia, as populated rice bowls are distant from the capital and there are limits to the establishment of mega urban regions in the Peninsula.

Jones (2001), in his recent studies of extended metropolitan regions in Southeast Asia, used the official metropolitan area as the core, with boundaries for inner and outer zones using different criteria in different cases. The inner zone is the area where population growth is rapid, and migration is contributing massively to this growth and market for urban expansion. In the outer zone, migration is less prevalent and the area is more in a state of "incipient urbanisation" (Jones, 2001:3). For instance, in the case of Bangkok, the recognition of zones follows planning conventions. Five *changwat* or provinces were include in the inner zone together with the city centre (Bangkok), and are referred to in planning circles as the Bangkok Metropolitan Region (Jones, 2001:2). For Indonesian cities such as Jakarta, Surabaya and Medan, measures derived from population density, proportion of employment in primary industry and presence of urban facilities were used to determine which *desa* (villages) should be included in the inner zone

(Jones, 2001:2). As discussed by Jones (2001:6), the urban sprawl activities ignore existing urban boundaries (see Appendix 7).

However, the concept of *desakota* has been criticised by Dick and Rimmer (1998:2304). They argue that globalisation has had the greatest influence on the process of urban transition in third world cities, including Southeast Asian cities. The urban transition process in the Southeast Asian region should not be seen as distinct from its counterparts in a global context. In addition, Douglass (2000:2318) also argues that these recent global transformations have direct relationships with contemporary trends in urbanisation in the Asian region.

Increasingly, development in the form of mega projects is taking place in East and Southeast Asian countries. In particular, according to Leaf (1996), the "superblock" is creating a distinct fragmentation of the urban landscape. Superblocks are:

> large, self-contained mixed-use developments which typically comprise at least one high-rise office building, retailing targeted at affluent consumers and accommodation for high-income residents, often including serviced apartments for expatriate employees of foreign multinationals (Chia and Perry, 2003:13).

Superblocks encourage a "city within a city". Superblock development triggers the displacement of inner city residents to the urban fringes. Research by Bunnell (1999) and Chia and Perry (2003) suggest that Kuala Lumpur city centre (KLCC), which is a city within a city, and the Petronas Twin Towers in Kuala Lumpur, are prime Southeast Asian examples of mega projects. These forms of development are features of the lightly regulated mega urban region.

Urbanisation is one of the major transformations effecting social change, and in particular it has provoked a strain on the physical environment. The urban and industrial development process within the *desakota* region is subject to socio-economic, cultural and environmental change. Environmental degradation and the lack of social welfare for the unskilled segment of the workforce that cannot afford to live in the middle class or luxury housing estates has lead to the creation of a dual society in *desakota* regions. Social processes in the extended metropolitan region will definitely shape future development, especially in terms of the balance between agriculture and the urban industrial sector (Kelly 1999). The work of McGee, Douglass, and Dick and Rimmer raises the issue of the environmental damage that is contingent on the development of extended metropolitan regions. Douglass (2000) relates this to larger themes that are widely discussed in the literature concerning urban environments. These situations

present the challenge of finding a balance between agriculture and industrialisation as two basic foundations for economic growth; and together with the social environment, of developing the quality of urban life.

2.3 Urban environments and vulnerability

2.3.1 The urban environment as an integrated system

According to Douglass (2000), for many urban dwellers and especially the urban poor in many developing countries and Southeast Asia, the modern urban environment is potentially life-threatening. Furthermore, the natural environment has frequently played an active and even destructive role in the life of cities (Tarr, 2004). Just as urban studies have developed as a field in reaction to a growing societal focus on and awareness of urban problems, so have urban environmental studies grown with the evolution of the environmental movement (Tarr, 2004).

This second section of the literature review introduces the concept of the urban environment and focuses the discussion on urban vulnerability and also urbanisation as an agent of disaster.

The relationship between man and the environment in the city is extremely complex. Cities can be portrayed as living organisms, which need support from natural ecosystems to sustain them. Marcus and Detwyler (1972) define ecosystems as the living organisms of a locality together with their related environment, considered as a unit, and show how cities interact with and shape the natural environment. Goudie (1993) asserts that through urbanisation, man has created new ecosystems within which humans, their works and nature interact. Douglas (1983) explores the interrelated roles of water, air, land, energy, human ecology and urban geomorphology.

"Urban environment" refers to a form of complexity and dynamics between the human system (built form and socio-cultural structures) and the environmental system (Stern *et al.*, 1992; Haughton and Hunter, 1994; Hardoy, Mitlin and Satterthwaite, 2001). For Douglas (1983), the urban environment is an amalgam of social encounters and physical experience. Srinivas (2004b) adds that the urban environment consists of resources from the natural environment while the built environment and socio-economic environment can be referred to as processes that convert these resources, within the urban space, into a wide range of useable products and services. Built environments encompass the forms of resources, processes and effects related to the fabric of buildings and infrastructure such as roads, railways, energy, water supply; socio-economic environments are associated with resources, processes and effects related to human

activities: education, health, arts and culture, economics and business activities, heritage and urban lifestyles in general.

Urban environmental challenges vary among cities depending on their setting and their own individual history. Urban environmental problems in Southeast Asian cities have been largely generated by rapid urbanisation: the increase in population within the urban area (Sham, 1993).

2.3.2 Environmental change in the city: Urbanisation as an agent of disaster

2.3.2.1 Environmental change in the city

According to the United Nations Urban Populations Study (UN, 2000), the urban growth rate in most developing countries has been stable at nearly 4 per cent per year and the level of the urban population has continually increased over the last 50 years, and is projected to do so over the next 30 years as well. Rapid urbanisation presents opportunities for initiating innovative programmes for economic transition in many Asian cities, and many large cities have become too large compared with other cities and towns (Nguyen, 2003:1). Therefore, this has brought marked urban expansion and demographic change. The number of mega cities increased from 9 in 1980 to 12 in 2003 it is likely to rise to 18 by 2015 (UNESCAP, 2003:15). These rates of urban growth are unprecedented. The population of New York took 150 years to grow to 8 million, but Jakarta reached the same level in less than 15 years (UNESCAP, 2003:15).

The binding factor in the relationship between the urban ecosystem and environmental systems is natural resource development. On this matter, Khairulmaini and Fauza (2001), in their research on environmental hazards, comment that whether based on a deterministic or probabilistic relationship between man and his environment, man either exposes himself to natural process events or abolishes natural process regimes that are detrimental to his prosperity. Thus, the human system is no different from other ecosystems, in that it is subject to the principle of environmental unity and equilibrium. This concept states that all the elements and processes of the environment are interrelated and interdependent, and that a change in one component will lead to changes in the others.

Urbanisation is often cited as one of the major agents that have led to the transformation of the four main components of the natural environment -- land, water, air and biological aspects. These components play an important role in an urban environmental context. As Douglas (1983) shows, modification of one of these natural components for the construction of a new

landscape for a city will soon lead to massive modifications in the circulation of energy, water and biological aspects. Jackson and Jackson (1996) discusses the fact that changes induced by man tend to be massive, and that in a previously undisturbed natural environment, the effects are usually more dramatic. The increase in the size of cities for example, has affected the local climate (Sham, 1993). Rising numbers of motor vehicles and industries have led to increased pollutant emissions affecting air quality, health and the biosphere (Sham, 1993).

According to Goudie (1993), three self-evident interactions are apparent within the urban ecosystem: first, urbanisation involves a modification of the environment; second, the natural environment may influence the form, functions and growth of the city; and third, continuous feedback occurs in the city between man, culture, and the physical environment.

Researchers such as Huggett (1993) and Burton *et al.* (1993) point out that the city, as well as being an ecosystem, is also an open system. This means that a city cannot function independently and in isolation from other parts of the world. The city cannot emerge without changing its environmental components. As an open system, urbanisation is thought of as a box that receives inputs, throughputs, and outputs of energy and mass (Chorley, *et al.*, 1984). Most of the inputs are transformed or stored within the city, although some move through the system with little alteration or resistance. Generally, a portion of the transformed products and waste is sent out from the city as output. The balance between various inputs and outputs provides a simple measure of the city's metabolism; it indicates whether the city is in the state of growth, equilibrium or decay.

Urban environmental systems are extremely complex. As Thomson *et al.* (1986) and Chorley *et al.* (1984) demonstrate, the interaction between urban components shows numerous feedback loops. According to Thomson *et al.* (1986), in a loop the influence of an element comes back to itself through other elements. In a broad sense, the overall urban environment consists of natural resources, human and other processes, which show a variety of feedback loops which may be positive or negative.

In other words, positive feedback is the phenomenon sometimes referred to as a "vicious circle" whereby changes occur in the same direction at a compounding rate. Many urban processes tend to produce positive feedback and so disturb the existing balance of the natural environment (Gregory, 2000; Goudie, 2001).

In the context of environmental change in terms of urban development, a city actually provides both opportunities and risks to urban residents. The existence of extended metropolitan regions in Southeast Asia and the rapid movement of rural people to urban areas poses a tremendous risk for urban foundations in some countries, especially in terms of housing. Metro Manila, with 16 million people, has one-quarter of the population of the Philippines; Bangkok metropolitan region has 11.6 million inhabitants; and the Kuala Lumpur metropolitan region, with 4.2 million people, hosts one fifth of the national population (Douglass, 2000:2319). The result is that the built environment of mega cities has had a deeply intrusive effect on urban living. Pelling (2003:167) shows that "planned and unplanned developments were seen to have contributed to increased city-wide environmental risk" by manipulations and adjustment that have been made to natural resources such as land.

When the population increases, the need for land and other resources also increases. The sudden increase in the rate of development growth has resulted in a significant change to the land use patterns of urban areas. In recent years, ever more forests are being converted into built-up areas and natural resources are being over-exploited (Huong, 1999:219). Land has become the most sought-after commodity for the development of all kind of economic activities. Economic restraints have increased the demand for land. Land clearance for housing, commercial areas and industrial development has led to severe erosion and mass movement processes, leading to massive sediment loss (Khairulmaini, 1995). When changes occur in one component of an environmental system, this will naturally cause changes in another component of the system, which will react in order to return to equilibrium. Hence, natural processes that have been altered by human mismanagement will eventually lead to the risk of environmental change and disaster, either directly or indirectly (Eden and Parry, 1996:216). These are the results of natural resource development and population encroachment into process-event systems such as flood plains and mountainous terrain.

Moreover, urbanisation can be thought of as being reflexive, contributing towards its own increasing risk, at local, regional and global levels (Hardoy, Mitlin and Sattrethwaite, 2001). The rapid development and expansion of industries and transportation systems in urban areas has also led to an increased risk of air pollution, thus affecting air quality. Together with population pressure for development areas, land resources are declining due to uncontrolled forest loss, soil erosion and the disruption of hazardous areas such as hillsides (Huong, 1999:217). Furthermore, in the context of development, new landforms are created. Hillsides may be cut or bulldozed into new shapes, adding risk to already hazardous sites, while valleys

and swamps may become filled with waste materials, and soil and ground water will be modified in many ways.

In the process of development, disturbance from human activities further aggravates the soil erosion process, especially on hillsides. The soil erosion process produces a huge amount of sediment, which is brought down the slopes and causes sedimentation in the river channels. Sedimentation processes have secondary impacts such as floods, low water quality, low water supply and deterioration of aquatic life.

Hardoy, Mitlin and Satterthwaite (2001:5) point out that urban developments also greatly affect the operation of the hydrological cycle, including changes in total run-off and an alteration in peak-flow characteristics. A combination of the sedimentation process and the hydrological cycle affects stream channels and flood plains, causing water to flow through cities at a high velocity.

In sum, serious conflicts have arisen because of the interaction between man and the environment. Pelling (2003), for example, found that rapid urbanisation in developing countries of the Caribbean as well as Southeast Asia, where a convergence of population into built-up areas combined with the use of manifold technologies in cities, has modified the urban environment and made it more vulnerable to a greater range of hazards. Srinivas (2004c) adds that most of the burgeoning cities are expanding into fragile ecosystems.

2.3.2.2 Potential of the city

According to Redclift (1984:122) and Eden and Parry (1996:215), man acts upon the natural environment in constructing the material world, and cities have the potential to combine safe and healthy living conditions. There are five advantages of cities (Devas and Rakodi, 1993:25; United Nations Centre for Human Settlements, 1996:418; Hall and Pfeiffer, 2002:108). The first advantage is that high population densities in cities mean much lower costs per household for providing infrastructure such as water and electricity and also costs for health care and education. The second advantage is the concentration of production and consumption, which means more opportunities and the possibility of more efficient use of resources, for example, land reclamation and recycling materials. The third advantage is that high population concentrations in cities lead to a reduced demand for land relative to population. For example, in most countries, urban areas take up less than 1 per cent of the national territory and the whole world's urban population would fit into an area of 200,000 square kilometres, which is

approximately the size of Senegal. The fourth advantage of cities is their considerable potential for the transformation of waste products into renewable energy, either for heating or cooling, as the concentration of production and settlements allows for easy management. Finally, the fifth advantage of cities is their potential to reduce the use of vehicles, as most amenities are within relatively small areas and can be reached through walking and cycling. This action can reduce the use of fossil fuels; furthermore, the degree of air pollution will also be reduced.

2.3.2.3 Urbanisation as an agent of disaster

The significance of the urban environment is illustrated by the fact that most of today's environmental problems are directly or indirectly related to urban areas and urban lifestyles which have become a matter of choice for some of humanity. According to Hardoy, Mitlin and Satterthwaite (2001), the trend in studies of disasters continues to be focused on large cities, and studies by Pelling (2003) on the vulnerability of cities" for example suggest that an increasing number of environmental hazards are emerging in the cities of developing countries.

Hall and Pfeiffer (2002:108) argue that cities are a problem because the high concentration of people, services, consumption and trade creates tension between the local and global environment. According to Mitchell (1999:27), urbanisation is an agent of disaster, with urban development increasing disaster-susceptibility in a number of ways. First, cities are commonly located at naturally risky sites, for example, flood plains and seacoasts. As Hall and Pfieffer (2002:106) assert, "no city is well prepared for a sustainable future". There is no doubt that this rapid urban development will lead to the use of dangerous locations either for settlements or commercial buildings. Seoul's metropolitan area, for instance, is sited on the banks of the Han River in a mountain-rimmed basin close to the edge of the western coastal plain, which regularly suffers from flooding problems (Kim, 1999:94).

Secondly, built-up areas have formed a new dimension of landscape that exacerbates existing environmental risks. Since the beginning of industrialisation, people have exploited natural resources such as land for building, which has had a devastating effect on the landscape and destroyed many natural areas. Modern urban environments are agglomerations of buildings. Generally, people have created material developments, for example networks of highway systems connected to most of the important centres such as the commercial centres, factory areas, and housing settlements (Hall and Pfieffer, 2002:108). Consequently, paving over the land surface reduces infiltration, increases runoff and therefore speeds the runoff into the channels and expedites peak discharge, which leads to flash floods. The case of Bangkok, for

instance, is discussed by Mitchell (1999:27), who points out that Bangkok *klong* that used to hold overflow from the Chao Phraya River have been modified into streets. Hence, the part of Bangkok which contains many *klong* is now chronically flood-prone. The emergence of new towns and urban sprawl without proper planning in the development process will accelerate the loss of natural resources and unspoilt areas. The changes in the environmental parameters are dependent on human health threshold values and create a situation of impending risk to people (Khairulmaini and Fauza, 2001:3). Consumption of natural assets such as trees, sand and gravel and the over-exploitation of natural services, for example the water system and air, have modified the environment (Pelling, 2003:27). In other words, man's habitat is becoming a hazardous environment.

Thirdly, cities increase disaster potential by concentrating people, buildings, investment and technologies. High concentrations of population and technologies have transformed and shaped urban life, and bolstered geographies of vulnerabilities and environmental risk in urban areas (Pelling, 2003). Hardoy, Mitlin and Satterthwaite (2001) discuss the fact that environmental hazards become particularly serious where there is a rapid expansion in the urban population and production with little or no consideration for the environmental implications. The increase in the size of urban built-up areas has, for example, affected the local climate and hydrological regimes and created areas that are at high risk of hazards, for example flash floods. According to Douglas (1983), heat island effects, for instance, associated with an increase in temperatures during the night, are attributed to temperature absorption of urban materials such as concrete, glass, asphalt and bitumen during the day and re-radiation effects overnight, and this is clearly a man-made hazard.

When an extreme event occurs, urban losses are often very high if compared with areas that are not crowded; for example, hurricane Andrew, which moved through the Miami metropolitan area, imposed urban losses of over US$20 billion (Mitchell, 1999:27). Furthermore, the destruction of the World Trade Centre Twin Towers by terrorists on the 11th September 2001, a man-made disaster, also illustrates how high concentrations of people are particularly vulnerable.

Fourthly, many urban areas, especially in developing countries, contain populations that are vulnerable to disaster; principal among these are the urban poor who are lacking in many material aspects needed to develop a comfortable lifestyle in the cities (Mitchell, 1999:27). Several factors are responsible for this situation; for example, the cost of housing in the city has become prohibitive, leading them to coalesce around environmentally degraded sites and trash

landfill areas (Douglass, 2000:2327). Furthermore, inequalities in settlement development in the cities between the urban rich and urban poor are higher in developing countries.

Urban environmental challenges depend on the stage of urban development (Hall and Pfieffer, 2002:111). For most developing countries including Southeast Asian countries, rapid development, urban poverty and unhealthy living go together in today's urban environment. Growing income and globalisation in Southeast Asian cities call for the construction of a certain type of built environment, thus leading urban communities to upgrade their living style (Douglass, 2000:2318). However, this situation poses a risk to the environment, as these communities will be using more cars that will emit more carbon dioxide (CO_2), use more energy and create more traffic, while the need for more housing will lead to greater demand for space and increased consumption of energy for cooling, and there will be excessive demand for facilities and limited fiscal capacity to fulfil these urgent needs (Devas and Rakodi, 1993:28; Hall and Pfieffer, 2002:111).

In general terms, rapidly growing cities often include all of the ingredients for disaster, either natural or man-made, with heightened risks, concentrated exposure and increased vulnerability (Smith, 1992; Mitchell, 1999). Therefore, intensified urbanisation clearly creates the potential for a quantum leap in disaster vulnerability (Mitchell, 1999:28).

2.3.3 Environmental hazards, risk, disaster and urban vulnerability

Before further discussion of urban vulnerability, it is important to understand the meaning of hazard, risk, disaster and vulnerability. Many researchers have attempted to define these words. According to Smith (1992), a hazard is a naturally occurring or human-induced process, generally seen as a source of danger and an inescapable part of life. Hazard (or its cause) may be defined as "a potential threat to humans and their welfare", such as deep water, large waves and steep mountains (Smith, 1992:5). More specifically, environmental hazards can be described as natural phenomena that are potentially harmful to man and his welfare. As humans place value judgments on natural processes as part of general environmental appraisal, environmental hazards represent the extremes of a distribution of processes that, in a slightly different context, would be regarded as a resource (Khairulmaini and Fauza, 2001).

In the context of environmental systems, each of the environmental components such as land, water, air and biological aspects (flora and fauna) has its own associated hazards. Environmental hazards can be attributed to natural events, such as the impact of periodic river

floods, hurricanes or earthquakes, and there are also hazards that are induced by man, such as air pollution. In relation to this, White (1974) and Smith (1992) have discussed the fact that environmental hazards result from the conflict of geophysical processes with people, and they lie at the interface between what has been called the natural event system and the human use system.

Smith (1992:6) points out that, "risk is sometimes taken as synonymous with hazards but risk has the additional implication of the chance of a particular hazard actually occurring". Risk is the actual exposure of something of human value to a hazard, and is often regarded as the connection of probability and loss. It is also viewed as "the probability of a specific hazard's occurrence" (Smith, 1992:6); for example, the risk when people build a house on a steep slope is the probability that the house will be exposed to a landslide.

Disaster may be seen as the realization of hazard, where there is loss of life and other forms of impact. Disaster, according to Smith (1992:22), generally, "...results from the interaction, in time and space, between the physical exposure to a hazardous process and a vulnerable human population". Disaster could be portrayed as resulting from interactions between several subsystems in the geophysical and climatological environment (Hilhorst, 2004:54). However, it could also be caused by human action, such as the case of Hiroshima and Nagasaki being hit by the atomic bomb during World War II. On the other hand, disaster can be the interaction between man and his environments. Furthermore, the failure of human society to understand and address the relationships between social, material and natural systems can lead to disaster (Oliver-Smith, 1999).

The concept of vulnerability implies a measure of risk combined with a degree of social and economic ability to engage with a disaster that occurs (Smith, 1992). According to Hilhorst and Bankoff (2004:1), vulnerability is the main element to an understanding of risk that attempts to characterize relationships between human systems and their environments. According to Oliver-Smith (2004:10), "vulnerability is fundamentally a political ecological concept". Puente (1999:296) in his research adds that, "vulnerability can be defined as the propensity to incur loss". While social vulnerability, according to Adger (2000:739), is "...understanding of the human use of and access to resources, which determines the ability of any society to cope with and adapt to stress".

However, socio-economic processes or political forces generate unequal exposure to risk by making some people more vulnerable to disaster than others, and this has the potential to

increase over time (Adger, 2000: 740; Pelling, 2003:50). Bankoff (2004) adds that vulnerable societies are those at risk, not just because they are exposed to hazard, but as a result of marginality that makes people's lives a "permanent emergency". This marginality is determined by a combination of variables, for example, class, gender, age, ethnicity and disability (Bankoff, 2004:30). Several factors are responsible for this situation; foremost among these is that for the urban poor, the cost of housing in the city has become prohibitive, leading them to coalesce around environmentally degraded sites and trash landfill areas (Douglass, 2000:2327).

The consequence of such rapid urbanisation in some developing countries is the inability of the authorities to provide adequate infrastructure facilities and services to keep pace with population growth (Sham, 1993). This results in the creation of spontaneous settlements that accelerate environmental deterioration.

Environmental degradation poses a serious threat to urban society in general, but more so to the urban poor, most of whom are settled in squatter settlements in hazardous areas where the degree of environmental hazards is higher than in other parts of the city. These areas lack sewer systems, clean water and proper drainage systems, all of which leads to these areas becoming vulnerable. As a result, health hazards emerge; for example, conditions arise that aggravate the spread of contagious diseases (Khairulmaini and Fauza, 1998:17). Air pollution levels in the city are without boundaries; thus, squatter settlements become vulnerable sites, as they are located in areas of decreased air quality. For the urban rich or urban middle class, the city is a work place, and their residential areas are generally located in suburban areas, away from the city centre.

In the case of the Bangladesh cyclone disaster in 1970, more than half of all children aged ten and under in the afflicted areas were killed, while most males between 15 and 45 escaped (Smith, 1992). This situation clearly shows that very young people are more exposed to risk and more vulnerable, and the same of course can be said of the old. Nevertheless, as Smith (1992:25) stresses, the most vulnerable people are the poorest, who have little choice in the location of their settlements, inevitably tending to locate in unsafe areas such as urban squatter settlements because they are unable to compete for a more favourable location. Therefore, to resolve problems of environmental hazards in urban areas, it may be necessary to reform fundamental aspects of urban society, for example, by making attempts to eradicate poverty.

Pelling (2003) divides vulnerability into three elements: exposure, resistance and resilience, while according to Smith (2004), most tendencies to decrease system-scale vulnerability can be

seen as expressions of either resilience or reliability. Exposure to vulnerability is dependent on physical location and the character of the built environment and natural environment (Pelling, 2003). For instance, the urban poor who live in flood plain areas with poor housing conditions will be highly exposed to flooding. In order to reduce the exposure, it is necessary to upgrade the housing situation by moving the houses to higher levels or building them on stilts (Pelling, 2003).

Resistance is one of the most important components; it reflects the capacity of humans to defend themselves against the impact of a hazard as it relates to economic, psychological and physical health and their systems of maintenance (Pelling, 2003). Resilience is a measure of the rate of recovery from hazard stress or resistance to change, for example, planned preparation or premeditated adjustments to the hazard (Smith, 1992; Handmer, 1999; Pelling, 2003). In this situation, as Smith (2004) discusses, most developing countries are using these strategies to cope with disasters, as they are often accepted as natural phenomena and a "normal" part of life.

According to Bankoff (2004:36), "Vulnerability and local knowledge as concepts have proven useful as a means of assessing disasters within their socio-economic, political and environmental context that was previously sorely lacking", and these concepts have also certainly provided a helpful guide in formulating approaches and policies in preparedness for hazards and relief provision (Bankoff, 2004:36). However, different cities in the world will perceive different vulnerabilities, different potentials for loss during disasters and different ways for recovery. Hence, different types of planning and management are required in order to minimise the environmental hazard in cities.

In summary, interaction between hazard and vulnerability can be graphically illustrated in the pseudo-formula of Disaster = (Risk + Hazard + Vulnerability).

2.4 Impacts of flooding and flood management

2.4.1 Defining flash floods

Before exploring the impacts of flash floods, the nature of flash flooding should be explored in order to understood why the impacts of flash floods are sometimes greater than other types of flooding and have longer-term implications for the affected society. According to Smith and Ward (1998:125), a flash flood occurs when:

> intense storm rainfall or rapid melting, or [...] a storm has occurred on steep, bare, impermeable surfaces such as a narrow mountain valley or heavily built-up urban area, or in a small catchment through which the resulting flood peak passes too rapidly for adequate flood warning to be given.

However, in defining flash floods, we must be aware of differences in the use of the term. The normally accepted European definition refers to a sudden wall of water that rushes destructively down steep valleys carrying away everything before it. In this context, whether it be the wetter environments of northwest Europe or the semi-arid terrains of the south, flash floods result from exceptional rainfall in what is often a fragile catchment environment (Smith and Ward, 1998). Additionally, in desert regions flash floods take the form of 'walls of water', or flood bore, with the bore being portrayed as steep and noisy and its peak stage attained within 10 minutes (Smith and Ward, 1998:128). Nevertheless, it is important to bear in mind that the term 'flash flood' is used here in this study in the specific Malaysian sense of a rapid flood peak increase following two to three hours of heavy rainfall. This produces a different speed, intensity and rhythm to the flood than is the case with a flash flood in the sense in which the term is normally used in a European context.

In the European context, flash flooding is associated with a very limited time to prepare for the event; normally, few people are able to save their belongings unless they are ready for such an event because their area has repeatedly suffered from flash flooding and has been acknowledged as a high-risk area for flooding. Because of the greater time available, a flash flood, as the term is used in Malaysia, often (but not always) allows residents time to rescue some of their belongings and make a safe evacuation.

Flood impacts in general do have some beneficial effects; for example, siltation is brought to agricultural areas and nourishes the land for subsequent cultivation activities (Smith and Ward, 1998). However, the negative impact of floods is overwhelming when the disaster occurs in populated areas and causes damage and loss to property, and even more so if the event is a flash flood.

2.4.2 Human vulnerability to floods in the city

Flooding is the most common of all environmental hazards. Smith (1992:256) has calculated that over 20,000 lives every year are affected by this event. The cause of this impact is the widespread geographical distribution of river flood plains and low-lying coasts, and the fact that

some of these sites have become areas for human settlements (Smith, 1992:256). A flood can only be described as a hazard if it threatens human life and property (Smith, 1992:263). Flood events are associated with environmental fluctuations such as rainfall, snowmelt, tidal phase and tsunamis. However, according to Smith (1992:264), the size of drainage basin has important implications for the origin of flash floods in many areas.

In the context of flooding, some urban societies have become potentially vulnerable to flood hazards and their impacts. According to Pelling (1997:205), human vulnerability to flooding is determined by location of the house in a flood prone area and a few household characteristics such as low wages, a big family and various pressures in life. Vulnerability, Pelling writes (1997:204), is a concept that is commonly used to describe a household's position relative to poverty and economic stress. Furthermore, institutions and culture also have a role in constructing perceptions of vulnerability, as disempowered households perceive increasing risk because of the trend toward individual decision-making (Adger, 2000:739). The extension of poverty in various parts of the world has increased household vulnerability to flood impacts from environmental stress (Pelling, 1997).

For example in the case of flooding in the Philippines and Bangladesh, human and environmental relationships were known to be factors that contribute in terms of magnitude and frequency of hazards and vulnerability of its peoples (Bankoff, 2003b:161). Therefore, the human-environment interaction in the urban environment needs to be understood in order to decrease the vulnerability. Research by Pelling (1997) on flooding in Georgetown, Guyana, has shown that housing shortages are likely to increase vulnerability to floods among specific social groups in that city. An excess of housing demand over supply has forced many households to live in squatter areas without proper infrastructure. Furthermore, housing problems in the city have encouraged house owners to sub-divide properties, leading to the creation of vulnerable "bottom houses". Thus, and because of the poor physical environments in most settlements sites, these people are more exposed to vulnerability and risks.

Human perceptions of flood plains have always been ambivalent (Smith, 1992:268). In earliest times settlers were aware of the dangers of flood plains. However, the early twentieth century saw urban areas in developed countries rapidly extended into flood plains. For example in New South Wales, Australia, over 200 major towns and cities have been built in flood plains (Smith, 1992:268). Besides the increasing population and economic growth, one of the factors that has increased the rate of flood plain encroachments are technological innovations such as the construction of flood wall and flood dam reservoirs as part of a flood plain strategy for safer

development. Hence, once flood plains become urbanised, this creates risks not only because of the absolute numbers of people crowded onto flood plains but because the replacement of natural surfaces by hard surfaces exacerbates the tendency for local flash floods (Smith and Ward, 1998).

2.4.3 Impacts of flooding

Floods can have economic, social and environmental impacts. However, in the case of flash floods, damage and losses from these events are sometimes higher than from other ordinary floods (Poesen and Hooke, 1997). For example, as reported by Bryant (1991), the flash flood that occurred in Sydney in 1985 caused losses that ran into millions of dollars when it damaged business premises and the Sydney Stock Exchange. In another case, more than 80 people were killed in the Spanish Pyrenees on 8th August 1996 when an intense thunderstorm resulted in the occurrence of flash flooding (Smith and Ward, 1998). Flash floods have the potential to be disastrous because of the suddenness of the situation: for example, a dam failure, localised thunderstorm or glacier outburst can kill people and cause a collapse of economic activities in the affected areas (Smith and Ward, 1998).

As mentioned by Smith and Ward (1998), the impacts of floods can be divided into direct and indirect and further divided into tangible and intangible impacts, separated into primary and secondary categories (see summary in figure 2.1). Direct tangible impacts are the immediate effects of physical contact with floodwater, such as damaged property in the first category and the cost of rebuilding in the second category. Direct intangibles are the impacts that follow flooding, which are generally linked with the affected society, such as loss of human life in the first stage and illness, anxiety or mental stress suffered by the victims. Anxieties, for example, during flash floods, are related to safety and property protection. Indirect tangible impacts, the second aspect of flood losses, are connected to the time-scale of flooding, which in the first stage, for example, could result in congested traffic, breakdown of road linkage systems caused by flash floods occurring at another location, and in the second stage, could weaken spending ability in the affected society. Indirect intangible impacts are the long-term impacts; for example, in the first stage, the flood event will increase the hazard vulnerability of the community, and in the second stage, for those people who cannot tolerate the phenomenon, it will cause out-migration and degrade the quality of the affected area (further discussion in Chapters 6 and 7).

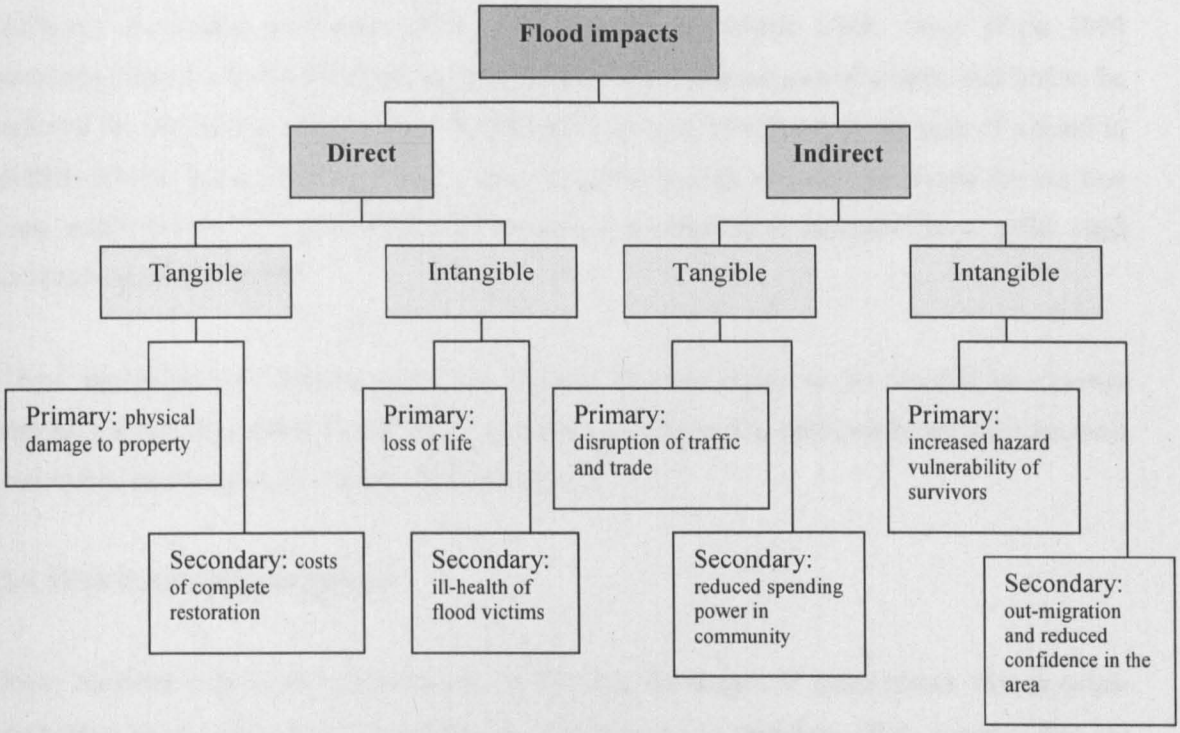

Figure 2.1. The categories of potential flood impacts.
Source: Modified from Smith and Ward (1998:35).

It is widely recognised that communities which survive natural disasters such as floods, volcanoes, earthquakes or landslides tend to experience long-term psychological impacts following these disasters (Ward, 1978; Smith, 1992; Smith and Tobin, 1982; Smith and Ward, 1998; Johnes, 2000:2; Tobin and Whiteford, 2002:29). These psychological impacts could be either direct or indirect intangible impacts of incurred in overcoming flood losses. For example, with regard to floodwater, the impacts of drowning are direct intangible effects and the impacts of floods on houses and livelihoods are indirect intangible effects. Intangible impacts caused by environmental disaster are anxiety, stress, mounting pressure and increasing tension. These can be sensed before, during and after the event (Ahern and Kovats, 2006:28). There could be long-term silent impacts that will be suffered by the victim. According to studies conducted by Smith and Ward (1998), psychological impacts can be experienced before and after the event, while the ratio of flood death to injury is 1 to 6, compared to 1 to 3 in earthquakes. Smith and Ward (1998) add that flood phenomena in China have probably killed more people than any other natural hazards and flooding has often been termed "China's sorrow". Floodwater contamination of high velocity and magnitude will lead to psychological impacts such as severe emotional stress and create long-term mental health problems among its victims due to the

strain of economic and sentimental losses (Smith and Ward, 1998; Tapsell and Tunstall: 2006:91). According to Bennet (1970, cited in Smith and Ward, 1998), many of the 3000 property owners affected by flooding in Bristol in 1968 suffered mental trauma and had to be referred for psychiatric care because of difficulties faced after a flood. In the case of a flood in Buffalo Creek, West Virginia, USA, a court accepted psychic impairment claims for the first time, and US$6 million were distributed because of psychological damages (Stern, 1976, cited in Smith and Ward, 1998).

These psychological impacts show that serious attention needs to be focused on disaster management as they affect their victims' long-term quality of life, particularly amongst the most vulnerable groups such as children and the elderly.

2.4.4 Flood hazard management

River flooding is the most common form of flooding and occurs in many places. Due to urban expansion many towns have expanded into floodplains and therefore urban communities are increasingly exposed to flooding. In order to design suitable flood hazard management systems, the causes and intensifying factors of river flooding need to be understood (figure 2.2). The aims of flood hazard management are not only to reduce flood damage but also to achieve social welfare by hazard reduction. However, Ward (1978:132), explained that it is impossible to have absolute control over flood-prone areas because there are "often conflicting, political, social and economic pressures to develop such areas". He adds that high magnitude flood characteristics cannot be controlled in the physical sense unless the correct estimates for future flood prediction can be designed.

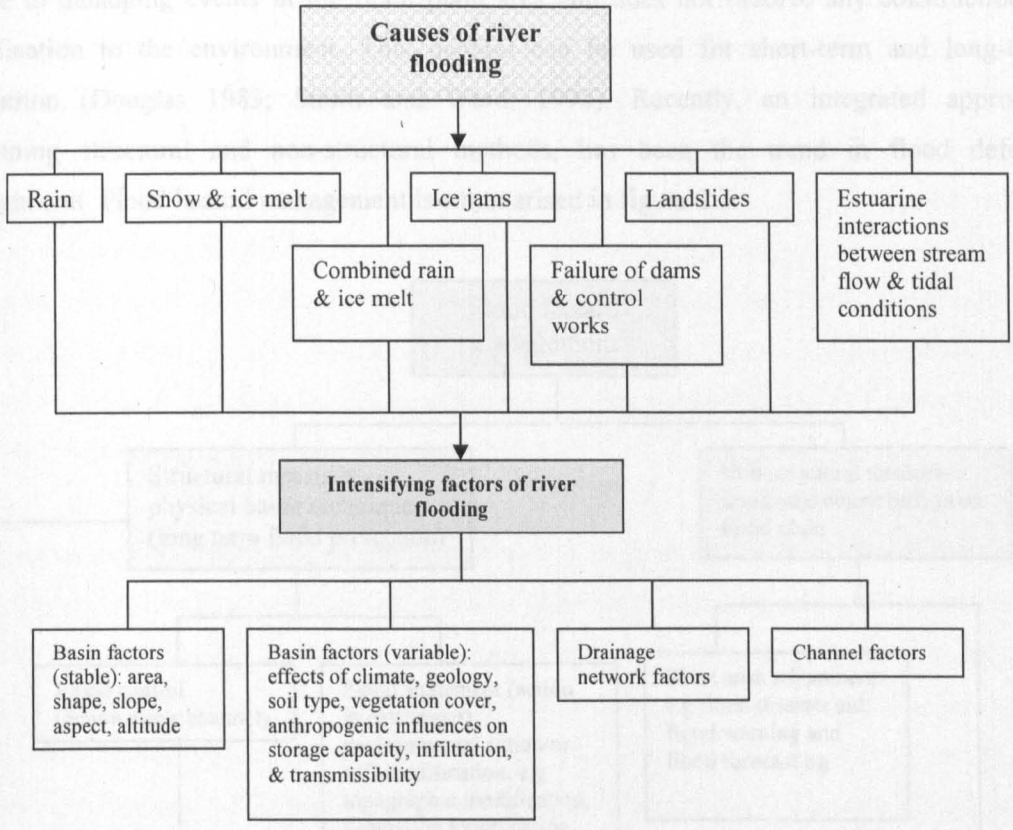

Figure 2.2. Causes and intensifying factors of river flooding.
Source: Modified from Smith and Ward (1998:11).

In dealing with flood management, many different strategies have been recommended by different researchers using different terms but all with the aim of managing flood problems. Ward (1978) suggested that there are three basic components to the system's terminology that may modify responses to flood hazards, namely, physical processes, socio-economic processes, and the characteristics of the decision-maker. The interaction of these three aspects leads to different actions being taken, which traditionally are known as protection, abatement, and adjustment (Ward, 1978). Douglas (1983), Penning-Rowsell, *et al.* (1986), Handmer (1987) and Smith and Ward (1998) divide flood management into structural and non-structural measures, each of which gives different objectives. According to Smith and Ward (1998), structural methods cover physical-based techniques that attempt to adjust to floods as natural events in the area along river channels. This approach includes "hard" engineering techniques and "soft" control methods for flood protection in the river basin. Flood abatement incorporating environmentally friendly solutions that seek to modify certain physical land characteristics in the catchments also belongs to the category of structural measures and generally aims for long-term flood control. On the other hand, non-structural flood relief is the process of adjusting

people to damaging events in the flood plain area and does not involve any construction or modification to the environment. This method can be used for short-term and long-term prevention (Douglas 1983; Smith and Ward, 1998). Recently, an integrated approach, combining structural and non-structural methods, has been the trend in flood defence management. Flood hazard management is summarised in figure 2.3.

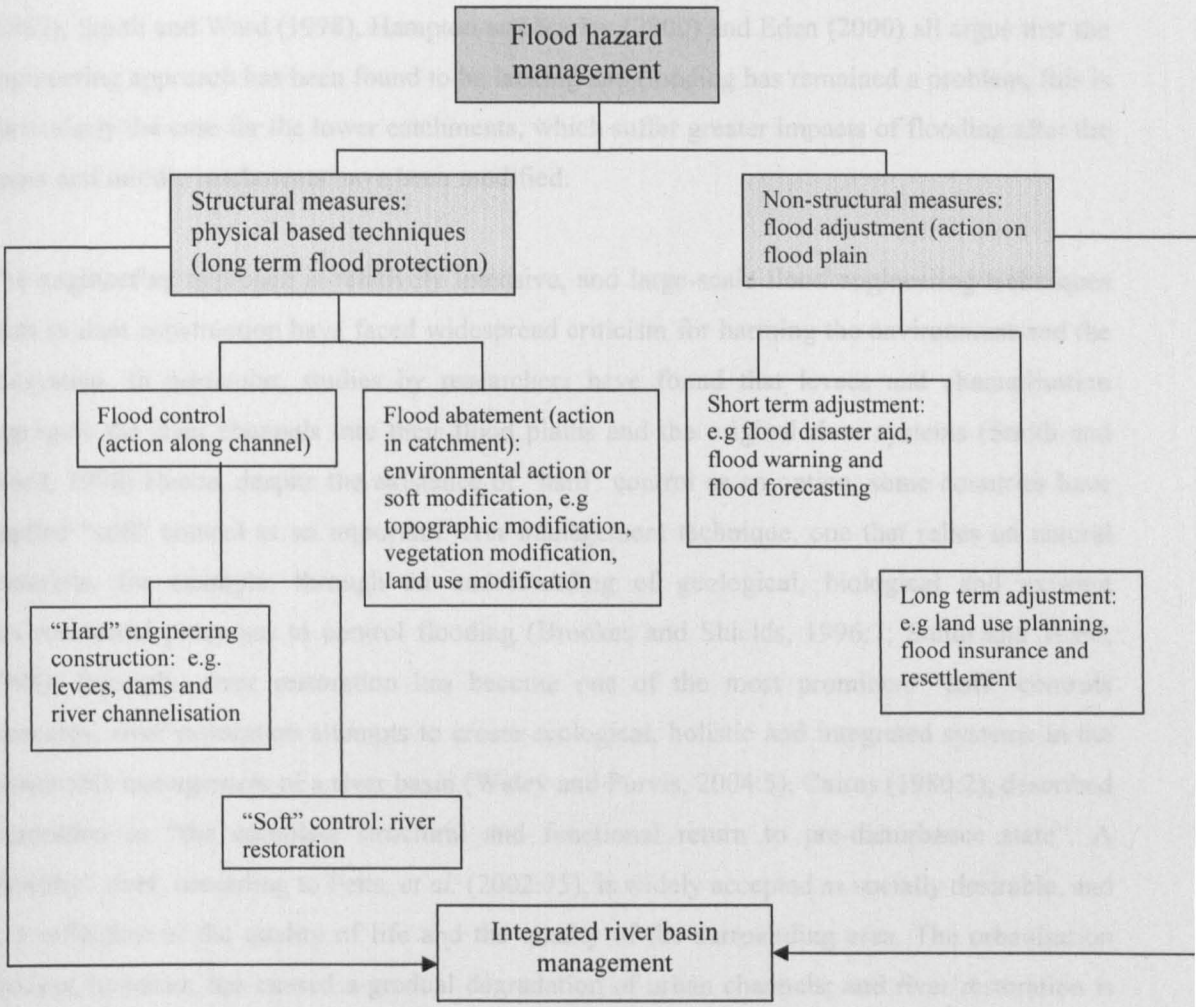

Figure 2.3. The division of flood hazard management.

Source: Modified from Ward (1978:115) and Smith and Tobin (1998:32).

2.4.4.1 Flood protection: engineering and "soft" control techniques

Flood protection that depends on the use of engineering modification or "hard" control techniques with artificial materials -- for example, concretising river banks and beds, embankment, widening and excavating channels, and constructing dams to protect urban areas or farmland from flooding -- offers protection that is frequently costly (Ward, 1978; Perry,

1981; Smith and Ward, 1998). Engineering approaches represented the most popular technique for many years; for example, 98 per cent of Danish rivers and 96 per cent of channels in river catchments in lowland Britain like the river Exe in Exeter have been modified, concretised and protected by levees (Douglas, 1983; Brookes and Shields, 1996:2). Smith and Ward (1998) mention that this "hard" engineering solution, with its classic straight concrete channel, creates a more uniform flow and is designed to push water faster downstream. However, Douglas (1983), Smith and Ward (1998), Hampton and Varley (2000) and Eden (2000) all argue that the engineering approach has been found to be lacking and flooding has remained a problem; this is particularly the case for the lower catchments, which suffer greater impacts of flooding after the upper and middle catchments have been modified.

The engineering approach is relatively intensive, and large-scale flood engineering techniques such as dam construction have faced widespread criticism for harming the environment and the ecosystem. In particular, studies by researchers have found that levees and channelisation segregate the river channels into their flood plains and the original river systems (Smith and Ward, 1998) Hence, despite the existence of "hard" control as an option, some countries have applied "soft" control as an important river management technique, one that relies on natural materials, for example, through an understanding of geological, biological and existing environmental processes to control flooding (Brookes and Shields, 1996:7; Smith and Ward, 1998). Recently, river restoration has become one of the most prominent "soft" controls measures; river restoration attempts to create ecological, holistic and integrated systems in the sustainable management of a river basin (Waley and Purvis, 2004:5). Cairns (1980:2), described restoration as "the complete structural and functional return to pre-disturbance state". A "healthy" river, according to Petts, *et al.* (2002:75), is widely accepted as socially desirable, and is a reflection of the quality of life and the quality of the surrounding area. The urbanisation process, however, has caused a gradual degradation of urban channels; and river restoration is seen by many as central to the regeneration of the urban environment. According to Brookes (1996a:235), the integration of river restoration into land use planning is a key sustainable approach. Besides, as Brookes and Shields (1996:5) state, river restoration is needed where it might save degraded river systems from being concretised or modified for flood control, and relies on natural processes for primary inputs of energy and material. The use of rocks, logs, and the planting of vegetation, for example, to control river bank erosion allows the environment to be maintained when the input of water has the ability to infiltrate naturally and return to a sustainable situation. Furthermore, according to Brookes (1996b) it is important to consider integrating a restored river with its flood plain in managing flood hazards as flood plains are a part of the characteristics of river morphology.

Flood plains can be interpreted in various ways according to different fields of study. For the geomorphologist, the term "flood plain" refers to an area characterised by forms and deposits; to the hydrologist, a flood plain is the area generally covered by floods; while for planners, it is the area defined by statute (Cooke and Doornkamp, 1990). Normally, flood plains capture both flood waters and sediments and store them. Therefore, flood plains are categorised as hazardous areas where habitation is risky. According to Burch (1986:89), flood plains can effectively be divided into two categories, flow-plains and washlands. He adds that "flow-plains are that part of the flood plain over which flood water may flow, washlands are areas of the flood plain where flood water may be stored and apart from flood water flowing into and out of the washlands water would not flow across them".

There are various problems that result from adjustments to the flood plain. Development intervention in the flood plain leads to modification of its basic function for overflow from the river during floods. Transmit flows from rivers to flood plains differ from one season to the next depending on river conditions; for example, either transmit flows are choked with debris or sedimentation or the input of water received from the rain can vary. In some situations, when interruption occurs in flood plains as a result of intense development, the area of a flood plain will expand as the flood water spreads because the area covered by buildings cannot absorb the water into the soil system. Before human use, the action of the flood plain was a natural phenomenon; however, with human intervention, flooding becomes problematic (Cooke and Doornkamp, 1991). Hence, when people choose to develop a flood plain primarily for economic purposes, the natural function of the area and how it works together with the river system and the whole drainage basis process needs to be clearly understood in order to ensure that flooding does not pose a threat.

2.4.4.2 Flood abatement: environmentally friendly solutions or "soft" modification

The second approach to flood management is the adoption of flood abatement strategies using structural measures. Flood abatement, as described by Ward (1978), represents a more extensive approach, also known as "soft" modification of flood control management. Flood abatement started due to awareness of the ecological destruction caused by unwise land use development when deforestation had accelerated soil erosion leading to flash floods in the European Alps (Marsh 1864, cited in Smith and Ward, 1998). Therefore, it offers a variety of techniques that protect large areas by working with the environment, techniques such as topographic manipulation, gully control, and vegetation cover management (Smith and Ward, 1998). By modifying land characteristics, a more pre-emptive method of flood abatement at the upper

catchment can be deployed, with regulated runoff to the lower basin. However, Smith and Ward (1998:221) argue that "flood abatement is only effective in reducing floods with return intervals of 10 or 15 years rather than the larger events of 50 years or longer"; in the largest event, contouring and afforestation and terraces have less effect on flood flows.

2.4.4.3 Flood adjustment: non-structural measures

In managing flood problems, flood adjustment, or non-structural measures are also important and are needed as well as structural measures. For example, short-term solutions include flood forecasting, flood warning systems, temporary evacuation and flood relief aid by the government, while long-term solutions include flood proofing, land use regulation, statutory control of building on designated flood plains and flood insurance (Ward, 1978; Perry 1981; Douglas 1983). Described by Penning-Rowsell, *et al.* (1986), human adjustment to flooding is a solution particularly related to experience, wealth, the capacity to undertake adjustments and the fact that people are clear that floods will occur in the future. Where there is time to issue a warning and act on it, emergency measures can be taken by removing people and property from the affected area. On the other hand, in flash floods, warnings can only be given a few minutes or even seconds before the flood actually enters the area. Thus, the emergency evacuation process is less effective for flash floods. Additionally, following flood losses, flood relief aid by the government can reduce the financial burden of flood victims.

Knowledge of the physical ground where buildings are constructed encourages floodproofing: the adoption of appropriate structural design standards to reduce flood hazards. Floodproofing techniques include temporary emergency action due to flood warnings, such as sandbagging, and permanent actions, which involve structural implementations for use as flood storage. However, when flooding afflicts urban areas, as Douglas (1983) reminds us, non-structural methods of land use regulation or zoning, which essentially act as long-term flood defence strategies, are more important than short-term procedures.

Gilbert F. White (1974) studied the consequences of heightening the socio-economic awareness of flooding; he saw "adjustment" to flooding action taken on a flood plain as a possible way to protect people from floods and as an alternative to flood control. When the economic advantages of the flood plain become more important than the sensitivity of the area, the location tends to be developed, leading to people living there permanently. Perry (1981) agreed that land should be developed according to its vulnerability to floods, and so improved flood plain management and the designation of areas of flood risk was needed. The crux of the matter

was, wrote Ward (1978: 114), that "flood hazard must therefore be considered not simply as a physical but also as a socio-economic phenomenon". Therefore, land use regulation on flood plain areas needs to be designed to prevent encroachment on the floodway and carelessness in maintaining the river. The speed and intensity of land use changes on flood plains from agricultural to urban areas has meant that the need for land use regulation in order to protect communities from flood hazards is relatively high (Perry, 1981:94).

Ward, writing in 1978, saw the early history of planning developments affecting flood plain regulation and flood plain zoning as having been achieved effectively in the United States. In the United Kingdom, Ward argued that successive Town and Country Planning Acts had been effective in ensuring satisfactory regulation of most flood plains (Ward, 1978). Perry (1981:94) suggested that land should be developed according to its vulnerability to flooding. However, flood plain regulation works slowly in already developed areas unless redevelopment is carried out. It should be noted that, according to Hampton and Varley (2000), in Australia, appropriate land use planning and management have provided more cost-effective solutions to problems of flooding. Indeed, a "*living with floods* philosophy is increasingly important if flood plain communities are to survive into a future where the financial and environmental costs are minimized" (Smith and Ward, 1998:294). Douglas (1983) adds that if hazardous areas have to be developed, the buildings constructed should be able to resist the stresses put upon them by the hazard. Therefore, building design criteria are necessary for all developments on the flood plain in order to avoid vulnerability to flooding.

2.4.4.4 Integrated River Basin Management (IRBM)

When a particular standard is needed for flood management, a combined approach will increase the potential for successful flood management when single techniques cannot give a satisfactory result. Petts, *et al.* (2002) mentioned that trying to prevent floods is an intervention in a natural process and very high costs are involved in constructing and maintaining flood protection works. Therefore, recently, integrated river basin management has been given more attention as a new solution for water and flood management, and has been successfully adopted in some countries in Europe as well as in North America and Australia.

Integrated river basin management can be defined as the coordinated management and development of resources in the natural environment (air, water, land, flora and fauna) based on the river basin as a geographical unit in order to maximise the economic and social benefits and to find a balance between human needs and the sustainability of natural resources, and where

necessary, the restoration of freshwater ecosystems (Mitchell and Gardner, 1983:3; Mitchell, 1990:8; Keizrul, 2006). Integrated river basin management is geared towards integrating and coordinating policies, programmes and practices with the basic principle of a long-term river basin management programme (Mitchell, 1990:9). Integrated river basin management can be regarded as a human activity aimed at achieving and balancing a possible range of short- and long-term objectives (Lein, 2003). However, Downs and Brookes (1994:299) add that "the dynamics of river channels provide an interesting dilemma to those developing integrated river basin management schemes". Indeed, Bajard (1990:63) and Ramadas, *et al.* (2000) suggest that integrated river basin management must be sought in the area of concepts and processes and must incorporate the importance of ecological and natural resources rather than tightly focus on engineering technologies in solving flood problems. This is also where river and flood plain restoration programmes in managing floods are important.

When integrated river basin management is proposed as an approach to flood control, the nature of the river basin system and the impact of human modification need to be understood. Studies by Cooke and Doornkamp (1990:179) show that drainage basins are integrated systems where there is a close link between "cause and effect, or between different components of the system, and any human interference generally results in a response by the system". Through an understanding of the process of the drainage basin system, any development planning conducted in that area should have some tolerance of nature, comprehending the impacts of the natural processes if one of the interlinked aspects of the system is prevented from functioning well. Brookes and Sear (1996:100) and Kondolf and Downs (1996:132) suggest that understanding the geomorphological aspects of the drainage basin and incorporating them into a river restoration project will achieve more successful results in flood control management in the context of integrated river basin management.

There are plenty of issues and challenge regarding integrated river basin management. In particular, there are usually complexities in combining public involvement and education, the political boundaries of the management areas, and the administrative machinery for the implementation of projects according to visions set out in plans (Bolstad, *et al.*, 1983:260). However, as Keizrul (2000) argues, political will and commitment are vital to ensure the success of any programme of integrated river basin management.

2.5 Conclusion

A wide range of literature has been explored in order to understand the general issues regarding three major themes: rural to urban migration, the urban environment and the impacts and management of floods. In general, from the literature review, it has been discovered that as a consequence of the rapid urbanisation of Southeast Asian cities, complications have arisen in the urban environment itself, and one of the major consequences of this urbanisation is the problem of encroachment onto hazardous areas such as flood plains, which puts the urban community at risk from flooding. The first point to come out of this review is that in order to promote urban development in Southeast Asian cities, governments have encouraged rural to urban migration. However, the migration has had a significant impact on urban development, as governments (including that of Malaysia) were not fully prepared to provide settlements for the different levels of the community, particularly for the urban poor. Partly as a result, many Southeast Asian cities are facing problems with the encroachment of squatter settlements into hazardous areas such as flood plains and hill slope areas.

At the same time, the increasing population leads to an increasing demand for social and economic development. Therefore, the second point coming out of this review of the literature is that the greatest problems occur when there is a combination of high levels of urban population and a high proportion of poor people living in informal settlements, and these urban conditions exist where geomorphological and climatological conditions maximise the chances of hazardous conditions. The Klang Valley is an area where these conditions apply.

Thirdly, following increased development on the sensitive flood plain areas, the urban community is now becoming increasingly vulnerable to flooding. Therefore, a variety of ideas on flood management have arisen, and these have been discussed here. Integrated river basin management, which takes a more environmental approach by understanding the geomorphological aspects of the drainage basin in combination with river restoration and land use regulation, has recently become one of the preferred methods of flood prevention in areas that are undergoing rapid development.

CHAPTER 3
DEVELOPMENT AND ENVIRONMENT IN THE KLANG VALLEY

3.1 Introduction

The aim of this chapter is to present the contextual background to the development of the Klang Valley. It is necessary to examine how the Klang Valley has grown and the issues involved in its development before the study can further discuss the environmental problems, particularly flash floods, which have affected its urban society. The chapter consists of three main parts. The first of these discusses the explosive pattern of urban growth in the Klang Valley. National policies have led to the rapid economic growth of the region. With Kuala Lumpur, the national capital, located in the Klang Valley, the region has been given particular attention by the federal government, keen to develop it into an attractive location for businesses and potential residents. This chapter explores, therefore, the results of the massive development that has occurred in the Klang Valley and the patterns of urban development that have become evident, particularly the upper and middle reaches of the valley. As a result of the government's strategies to promote the Klang Valley as a central development area, property development has shown a rising trend in order to support the increasing population. This activity has been primarily focussed on the needs of the middle classes.

The second part examines the development vision of the Federal Territory of Kuala Lumpur and the State of Selangor. Realising that the Klang Valley was prey to rapid urbanisation, the Federal Territory of Kuala Lumpur has adopted two structure plans, the Kuala Lumpur Structure Plan 84 in 1984 and Kuala Lumpur 2020 in 2003. Later, in 2005, the State of Selangor compiled the Draft Selangor Structure Plan with the aim of managing the developments that emerged in the Klang Valley and guiding Selangor in a sustainable way. These documents have had both positive and negative impacts on development in the Klang Valley. An examination of these structure plans is important for this study for the light they shed on how the Federal Territory of Kuala Lumpur and the State of Selangor see the Klang Valley developing.

Finally, the third part explores some issues that have arisen with regard to the rapid urbanisation of the Klang Valley. Despite planning in the Klang Valley, some problems have emerged: for example, the development of the Klang Valley has faced problems where Malay reservation lands have created islands in the city that cannot be developed. Security of tenure in housing has become an issue with less attention being given to housing developments constructed for the

urban poor. Recently, less suitable land for development in the Klang Valley has become available, and sensitive areas such as hill slopes and flood plains are being used for both large and small projects.

3.2 The exploding growth of the Klang Valley Region

The growth of the Klang Valley Region into a mega urban region (see Chapter 1) has resulted from various factors. A major factor has undoubtedly been policy under the fourth prime minister, Dr Mahathir Mohamad, and in particular the adoption of Vision 2020. The catalyst for this exploding urban growth lies in the country's industrialisation policies. The Look East Policy, which was introduced by Dr Mahathir in late 1981, led eventually to a joint Malaysian-Japanese venture to develop the local automotive industry; by 1985 the first national car, Proton Saga, had been produced (Kheng, 1998:115). Nevertheless, to accelerate the development process, the government introduced its privatisation policy in 1983. Under the slogan "Malaysia Inc.", the policy of privatisation, which was part of the New Economic Policy, led to increasing local participation in corporate ownership (Kheng, 1998:115; World Bank, 1994:302). Under this privatisation policy, private investment drives, working alongside the public sector, shoulder greater responsibilities in fulfilling society's rising expectations. The whole philosophy is to promote the private sector as a partner in building the nation (Ataul, 1997).

The present trend in urban growth is the development of mega-urban projects in the Klang Valley region such as the recently opened Kuala Lumpur International Airport (KLIA) in Sepang, a new administrative centre in Putrajaya, the city of Cyberjaya, an airport city in Salak Tinggi and also the F1 motor racing circuit in Sepang, adjacent to the KLIA. Putrajaya is the new government administrative centre for Malaysia; it has now become a third federal territory alongside Kuala Lumpur and the Federal Territory of Labuan in Sabah.

Kuala Lumpur Structure Plan 2020 (Kuala Lumpur City Hall, 2003) includes a development strategy for the Federal Territory of Kuala Lumpur. Due to the personal interest in the development of Kuala Lumpur and the Klang Valley shown by the then Prime Minister Mahathir Mohamad, the Federal Territory was made the direct responsibility of the Prime Minister's Department. The new urban landscape of Kuala Lumpur presents a spectacular landscape. The most spectacular of all is the Kuala Lumpur City Center (KLCC) project, a city within a city which includes one of the world's tallest building, the Petronas Twin Towers (Bunnell, *et al.*, 2002:357). The building of the skyscraper bears the symbolic function of putting Malaysia on the map and marking Kuala Lumpur as a world city. The other projects are

Kuala Lumpur Telecommunication Tower and communication infrastructures associated with inter- and intra-city commuter train communication, monorail and light rail transit (LRT).

The political vision and planning aspirations for the city of Kuala Lumpur and the Klang Valley Region have become increasingly globally oriented. Bunnell (2002a), suggest that the globalisation of Kuala Lumpur is closely bound up with the emergence of the extended (and newly named) Kuala Lumpur Metropolitan Area (KLMA) including the new high-tech Multimedia Super Corridor (MSC) zone with its emphasis on information and communications technologies (ICTs), transport and housing. The MSC is a 50 km long and 15 km wide high-tech zone for the use and development of information technology, stretching from Kuala Lumpur to the KLIA. The MSC has become a southern extension of the mega urban region of Kuala Lumpur (Bunnell, 2002a).

As mentioned in Chapter 1, the development of the Klang Valley has created a development corridor from Kuala Lumpur to Klang -- from east to west. Currently, the most significant growth in the Kuala Lumpur region is, as we have just seen, spread along a north-south axis and not, as was the case in earlier years, east-west along the Klang Valley (Douglas, 2004:344). This new development trend is particularly evident from the CBD towards Putrajaya and Kuala Lumpur International Airport in Sepang. One of the major factors encouraging development to spread along the north-south axis is the new highway constructed to link Kuala Lumpur with these two important places. Land clearance for development is evident along the highway, but developments between CBD and Kuala Lumpur International Airport are still sporadic, while facilities such as public transport and shopping centres remain to be completed (see Map 3).

3.2.1 Patterns of urban development in the Klang Valley Region

Land use change in the Klang Valley Region has been dramatic. Rubber and oil palm estates have been converted to urban land use in one fell swoop, often by the plantation corporations themselves. Expanding cities have been swallowing up rural communities, including "in-situ urbanisation" of formerly rural villages in certain areas (Brookfield *et al.*, 1991). An example is Kampung Baru, which is located in the "golden triangle" area, the densest commercial area in the Klang Valley Region (further discussed in section 3.4.1).

According to the KL Structure Plan 2020, more commercial areas are to be regularised and created into special precincts. Medium and high cost accommodation were deemed suitable for Kuala Lumpur in an effort to achieve world-city status. International zones are to be created in

the Damansara-Penchala area, while in early 2003 the largest IKEA in South East Asia opened in the Damansara-Penchala zone (see Map 4). The Klang Valley Region has already for many years been equipped with shopping malls, high rise buildings either for commercial or settlement use (houses, condominiums and apartments), expressways and interchanges. Nevertheless, most of these projects had been undertaken on an ad-hoc basis (Kuala Lumpur City Hall, 1984).

In terms of spatial distribution, the urbanisation of the Klang Valley Region is occurring based more on the Kuala Lumpur structure plan than on the Draft Selangor Structure Plan. As part of Kuala Lumpur's structure plan, there has been some urban boundary re-drawing, which has turned much of the area into an urban district. For instance, the Federal Territory of Kuala Lumpur was enlarged four times before independence and a further four times after independence. For instance, the inner core of Kuala Lumpur itself has grown from 3.1 sq km in 1901 to 13.9 sq km in 1957 and to 36.3 sq km in 1970 (see Table 3.1). These boundary changes have necessitated the preparation of a new development plan (Kuala Lumpur City Hall, 1984).

The pattern of development in the Federal Territory of Kuala Lumpur has for some time presented a strategy of controlled development of the city centre, with development being directed to the new growth areas, with at the same time an accommodation of prevailing market forces (Kuala Lumpur City Hall, 1984).

Table 3.1. Boundary re-drawing in the inner core and population growth in Kuala Lumpur, 1901-1970.

Year	Area (km sq)	Population
1901	3.1	32 380
1911	3.1	46 718
1921	6.6	80 424
1931	6.6	111 418
1947	7.0	174 961
1957	13.9	316 230
1970	36.3	677 800

Source: Modified from Sen (1989) in Lee (1999).

The tremendous economic growth has brought a marked change to the city of Kuala Lumpur itself. The Kuala Lumpur City Centre (KLCC) has emerged as a new CBD, as there were serious limitations to the growth of the old core (see figure 3.1). KLCC is the preferred location for the international service sector (Morshidi 1998:233). With the high concentration of amenities located in the so-called Golden Triangle Area, this district is in high demand and its commercial space is offered at very high rental costs. Subsequently, Shah Alam and Putrajaya have provided new locations for lower rental costs, and this has led to the expansion of the city fringe and the integration of separate towns (Morshidi, 1998). The pattern of urban sprawl in the Klang Valley Region in the last decade has been particularly closely connected with industrialisation. For example, all the 11 Free Trade Zones are located near urban centres. And in the last decade communication technology has been the dominant form of industrialisation, both in terms of production and of control and command of capital.

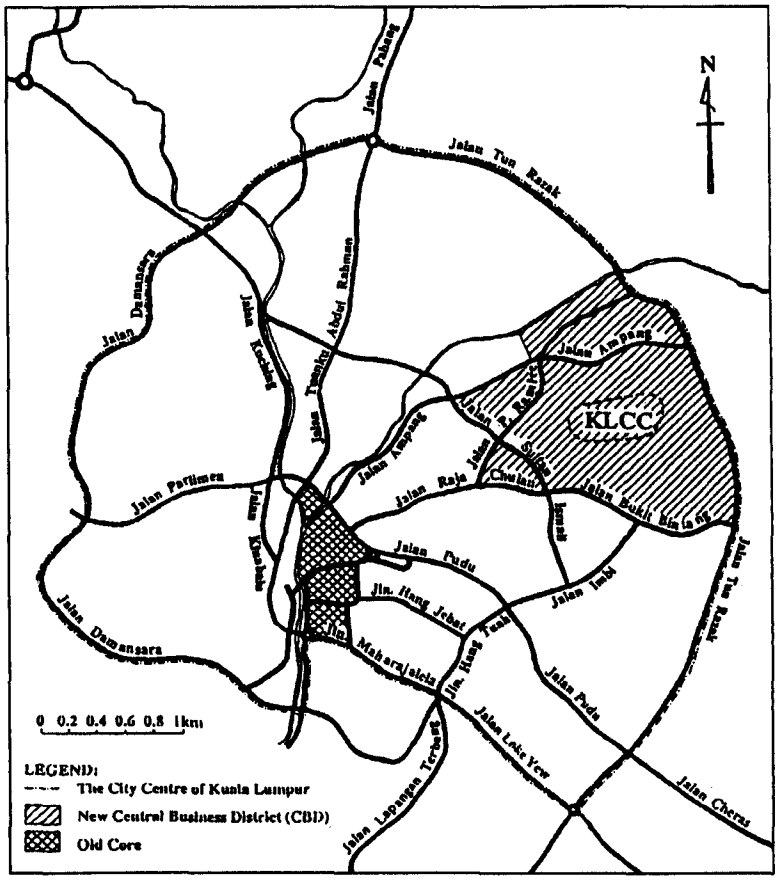

Figure 3.1. Kuala Lumpur's old core and new CBD.
Source: Bunnell (2000a:5).

3.2.2 Property development

Rapid urbanisation in the Klang Valley Region has gone hand in hand with a significant pattern of growth in property development projects, especially residential and commercial projects. Built-up areas in the Klang Valley Region have experienced mushrooming growth, and currently constitute more than 61 per cent of the region, compared to 17 per cent in 1985 (Kamalruddin, 2003:6).

The growing number of professional and other middle and upper-income people living in the Klang Valley Region has influenced patterns of housing demand, particularly of high and middle-cost housing. Developers are competing with each other to create attractive living environments with their own formula of housing estates. As a result, the price of land has reached very high levels, and any vacant land is in extremely high demand. Development projects for commercial and residential use tend to be squeezed into vulnerable areas such as the flood plain and hillsides; for example, the Mega Mall shopping centre is located on the flood plain of the Klang River, the Taman Tun Dr Ismail Jaya (TTDI Jaya) development on the Damansara River flood plain, and a high cost residential project site on the hillside and hill top in Bukit Antarabangsa.

In particular, according to the Kuala Lumpur Structure Plan 2020 three of the four new zones proposed in the Kuala Lumpur Structure Plan 1984 are now remarkably well-established: "Wangsa Maju, Damansara and Bandar Tun Razak are now well established while other areas of the city have also stabilised and established their own distinct characters" (Kuala Lumpur City Hall, 2003:6-21). These new-town areas were planned to boost economic development, and were designed to draw ethnic Malay people into urban areas in line with the National Economic Plan (Malaysia, 1976) (see Map 4). They have become popular as residential areas and compete with new-town growth areas in Selangor, for instance Bandar Kinrara, Serdang, Subang and Shah Alam.

Alongside the growth of residential and commercial developments and the increasingly multi-centred urban structure, the transportation system is also continuing to expand. The road linkages range from elevated highways, including one over the Klang River, and double decker flyovers (at Puchong/Sg. Way) to underground and elevated railways that cover almost all the vacant land in the city centre and over the urban fringe to the north and south. Frequently, settlement developments, hypermarkets, office buildings and schools are located along these highways. This form of urban development mitigates strongly against the creation of a feeling

of neighbourhood and contributes to a featureless and unattractive urban landscape (Kamalruddin, 2003).

3.3 Development vision of Federal Territory of Kuala Lumpur and the State of Selangor

As we have seen, the explosive growth and rapid urbanisation of the Klang Valley have influenced the authorities of the Federal Territory of Kuala Lumpur and the State of Selangor to adopt some guidelines and plans, the Kuala Lumpur Structure Plan 84 (Kuala Lumpur City Hall, 1984) and Kuala Lumpur Structure Plan 2020 (Ministry of Federal Territories, 2003) and the Draft Selangor Structure Plan in 2005 (Town and Country Planning, 2005). With both Kuala Lumpur and Selangor now having guidelines for the development of their jurisdictions, this has also given a sense of direction to the future development of the Klang Valley. However, the Federal Territory of Kuala Lumpur and the State of Selangor have two different visions of how to develop their territories as good environments to live and work in. Kuala Lumpur is aiming to achieve world-city status while Selangor is planning a more sustainable approach to development. This section will explore those structure plans in order to link consequences of development planning to the urban environment of the Klang Valley.

3.3.1 Development vision of Kuala Lumpur

3.3.1.1 Kuala Lumpur Structure Plan 84 (KLSP 84)

In 1984, Kuala Lumpur adopted the Kuala Lumpur Structure Plan (KLSP 84) to take the city forward 20 years. The KLSP 84 is the first formal documented strategic plan adopted by the city and drafted by the City Hall of Kuala Lumpur. It was the Federal Territory (Planning) Act 1982 (Act 267) that gave the legal basis for the preparation of the new plan. The saw Kuala Lumpur as an over-expanded small town, and stressed the importance of a plan to convert it into an efficient city. This was seen as being necessary due to the unique administrative status of the Federal Territory, the role of Kuala Lumpur as the national capital and the circumstances under which the exercise was carried out.

There were six factors identified in the report that contributed to its formulation: first, rapid population increase; second, inadequate housing; third, shortcomings in public and private transport; fourth, piecemeal development; fifth, inadequate facilities for leisure and recreation and sixth, declining environmental quality (Kuala Lumpur City Hall, 1984:11). The 1979 Socio-Economic Survey found that migration from rural areas to Kuala Lumpur was more a case of

urban pull rather than rural push, with employment opportunities in the city proving particularly attractive. The result of large-scale in-migration was housing shortages, especially for low-income groups, and the emergence of unplanned settlements (Kuala Lumpur City Hall 1984). In 1984, almost 40 per cent of Kuala Lumpur's population were not owner-occupiers (Kuala Lumpur City Hall 1984:12) and the Structure Plan efforts were geared to ensuring increasing rates of home-ownership especially for the urban middle income groups and urban poor.

Before the drafting of KLSP 84, Kuala Lumpur was developed intensively and in ad hoc fashion. The Structure Plan formulated 10 goals related to the roles and functions of Kuala Lumpur as set out in the New Economic Policy; these concerned housing, community facilities and transportation (Kuala Lumpur City Hall, 1984). The structure plan listed more precise objectives. These were:

1) To promote and regulate development to facilitate the implementation of the New Economic Policy.
2) To maintain and enhance the role of Kuala Lumpur as the seat of the Federal Government.
3) To facilitate the establishment of Kuala Lumpur as the centre for the promotion of national culture and religion and for the projection of the desired image of Malaysia.
4) To maintain and enhance the role of Kuala Lumpur as the commercial and financial centre of the nation and to encourage development towards the establishment of Kuala Lumpur as the centre for regional and international activities.
5) To maintain and enhance the city's economy and ensure that economically active residents of all community groups are given opportunities for gainful employment.
6) To facilitate and encourage the provision of adequate housing of acceptable standard for all income levels.
7) To provide adequate amenities and facilities for the social and physiological well-being of the city's population taking into cognisance the need to socially integrate the various community groups.
8) To achieve the best possible physical structure and arrangement for Kuala Lumpur and to be supported by an efficient transportation system.
9) To secure the most feasible environmental standards through a judicious balance between development, ecology and national heritage.

10) To ensure that future development, redevelopment and growth of the city is adaptable to changing circumstances in the long term.

(Kuala Lumpur City Hall, 1984:7-10)

However, the implementation of the Kuala Lumpur Structure Plan depended on national and regional policies adopted by the federal ministries and departments. The Structure Plan owed its flexibility to changes in socio-economic conditions and policies. In the years after the adoption of KLSP 84, Kuala Lumpur experienced rapid economic growth and development.

3.3.1.2 Kuala Lumpur Structure Plan 2020 (KL20)

In 2003, the Kuala Lumpur Structure Plan 2020 (Kuala Lumpur City Hall, 2003) was put together to address the fact that most of the policies of the KLSP 84 had been rendered obsolete by developments in recent years. KL20 was adopted in order that the national capital would be ready for a competitive international role in the world of the 21st Century (Kuala Lumpur City Hall, 2003). With the eventual transfer of all government departments and ministries from Kuala Lumpur to Putrajaya (the new administrative centre of Malaysia), Kuala Lumpur is set to become a business and commercial city -- the equivalent of Sydney's role in Australia (Azman, 2002).

As the premier city of the nation, the development of Kuala Lumpur must be consistent with Vision 2020 for the country, which sees Malaysia becoming a developed country by the year 2020. Therefore the vision for Kuala Lumpur is that it becomes "A World Class City" that, "... will strive to establish the highest quality living, working and business environment benchmarked against the best in the world" (Kuala Lumpur City Hall, 2003:3-1). Hence, Kuala Lumpur is expected to assume a major global or sub-global role. The intention of the structure plan is to elevate the city to an international platform where it will be able to compete with other world cities (The Star, 11/3/2003). To realise this vision of becoming a World Class City, an integrated road, port and airport transport and infrastructure system is planned for Kuala Lumpur.

According to the plan, there are four principal constituents of a world-class city: a world-class working environment, a world-class living environment, a world-class business environment, and world-class governance (Kuala Lumpur City Hall, 2003). In order to achieve World-Class

City status, five goals are identified -- as opposed to the 10 goals in the superseded Kuala Lumpur Structure Plan 84:

i. To enhance the role of Kuala Lumpur as an international commercial and financial centre;
ii. To create an efficient and equitable city structure;
iii. To enhance the city living environment;
iv. To create a distinctive city identity and image;
v. To have an efficient and effective governance.

(Kuala Lumpur City Hall, 2003:3-3)

According to the mayor of Kuala Lumpur, the KL20 strategies are based on the accomplishments of the KLSP 84, and they set the outline for the structure and development growth of Kuala Lumpur (Star, 11/3/2003). In KL20 there are ten development strategies that will guide development policies to the year 2020. These are:

i. Enhance the working, living and business environment of the City Centre;
ii. Designate and develop international zones;
iii. Designate and implement Comprehensive Development Areas;
iv. Encourage and facilitate the development of Malay Reservation Areas, traditional kampung and new villages;
v. Initiate and implement the redevelopment of blight areas;
vi. Ensure complete and integrated city linkages;
vii. Provide priority and incentives to development in areas around transit terminals;
viii. Ensure the functional distribution of centres and facilities;
ix. Consolidate the development and enhance the environment of stable areas; and
x. Consolidate the development and enhance the environment of major entry points.

(Kuala Lumpur City Hall, 2003:3-2 - 3-5)

These ten principal strategies are elaborated in two development strategy plans -- Development Strategies Plan 1 and Development Strategies Plan 2 (Kuala Lumpur City Hall, 2003). The Development Strategies Plan 1 illustrates strategies relating to the City Centre, international zones, comprehensive development areas, Malay reservation areas, traditional kampungs and new villages, blighted areas and stable areas (see Map 5). Development Strategies Plan 2

illustrates strategies relating to the distribution of urban centres and facilities, green networks, road and rail networks, transit terminal nodes and the enhancement of the main city entry points (see Map 6).

With ever more job opportunities created in the city, KL20 indicates the changing trends in migration, especially for the urban middle class living in the suburbs and outlying towns and commuting daily into the city to work. According to KL20, population and employment targets as projected in KLSP 84 have not been achieved. Migration to the city actually resulted in the growth of the Klang Valley Region as a whole. According to Lee (1995:323), Kuala Lumpur is a "super-induced" metropolitan region, meaning that the areas outside inner Kuala Lumpur began to experience rapid development as Kuala Lumpur became a centre for regional growth. Policies that have been adopted by the city of Kuala Lumpur, however, have led to continuing population concentration and growth in urban areas, especially in the Klang Valley.

Hence, with KL20, the City Hall is to promote a high quality residential environment and try to upgrade its amenities to encourage people to live in the city -- with one bonus being the consequent contribution to the city's income (Kuala Lumpur City Hall, 2003). In the year 2000, the population of Kuala Lumpur was approximately 1.42 million compared to 4.3 million for the whole of the Klang Valley Region which including Kuala Lumpur (Kuala Lumpur City Hall, 2003). Residential land use is the largest land use component in the Federal Territory of Kuala Lumpur, increasing from 3,822 ha in 1984 to 5,489 ha in 2000. According to KL20, there are still more than 5,000 ha -- 23 per cent of land -- that can be developed in the Federal Territory of Kuala Lumpur. However, squatter settlements are still an issue, with about 197 of them in the Federal Territory in 1998, although their number has since fallen (Kuala Lumpur City Hall, 2003). According to KL20, the squatter settlement issue needs to be solved immediately because the presence of squatter settlements in the city is unacceptable.

One of the main planks of KL20 is the creation of more commercial areas in order to enhance the position of Kuala Lumpur as an international commercial and financial centre. Benefiting from the proximity of the Multi-media Super Corridor, the city will be able to maximise the accessibility of the MSC by contributing complementary high-end services in finance, shopping, entertainment, education and recreation (Kuala Lumpur City Hall, 2003). The old centre of Kuala Lumpur is still seen as having an important role, and is to be developed as the city's main commercial centre. International zones will be created in the Damansara-Penchala area, which will be turned into a high end employment centre incorporating institutes of higher learning and research centres.

Because spatial transformation was not planned in the early stages of Kuala Lumpur's development it has resulted in irrational urban land use and traffic congestion. It is clear that the economic growth rate has put the country in the fast lane in terms of economic success, but at the same time this brings dangers, especially of Kuala Lumpur becoming increasingly dysfunctional (Lee, 1995).

3.3.2 Selangor State's development planning vision: the Draft Selangor Structure Plan 2020

The State of Selangor is the most developed state in Malaysia. As mentioned in Chapter 1, before Kuala Lumpur started to develop in late 1870s, the traditional capital was at Klang (Gullick, 1956). Afterwards, when tin mining started in the environs of Kuala Lumpur in the late 1880s and plantations became an important part of the economy in the early 1900s, Port Klang became the main export centre for resources from the central part of the peninsula. Port Klang and the nearby old Selangor state capital of Klang have grown towards each other. In those early days the population of Port Klang and its sister city increased from 81,592 in 1891 to 168,789 in 1901 (Gullick, 1960:97). Today, the country's main international airport is at Sepang, and the Sultan Abdul Aziz Airport (formally known as the Subang Airport) has lost its central role, but Port Klang is a shipping hub for the Asia Pacific region, and since 7 December 2006 has become, along with the rest of the Klang Valley, part of the extended Multimedia Super Corridor (see Map 7). In the national context, the State of Selangor is a catalyst for the development of the states that border it, Negeri Sembilan, Perak and Pahang.

The government of Selangor has realised that since the state became involved in rapid development, primarily in the Klang Valley Region, it has brought about some environmental problems that have affected the stability of the natural environment. Therefore, the state government has taken steps to adopt a development plan that could protect the environment from future disasters, while at the same time maintaining economic and social development. The Draft Selangor Structure Plan was prepared in 2005 in line with the provisions of the Town and Country Planning Act, 1976, and its 2001 amendments (State Selangor Town and Country Planning, 2005:1). The main aim of the plan is: "To create physical development that supports the vision of a developed Selangor, sustainable development and the establishment of a prosperous society" (Selangor Town and Country Planning, 2005:37). According to the state's formal Assessment Report[1] (Selangor Town and Country Planning, 2002), the objectives and

[1] The Assessment Report is a report that discusses the details of the survey for the preparation of the Draft Selangor Structure Plan.

requirements of the Draft Selangor Structure Plan are to standardise various development planning policies, strategies and research initiatives for the state of Selangor. Additionally, it becomes a guideline for planners and policy makers, and also replaces the many current local authority plans.

Future development planning for the state of Selangor will concentrate on a multi-focus development strategy, with an emphasis on sustainable development. The strategy will not only focus on economic development but also on activities to protect areas that are sensitive and are of high value for cultural, historic and scientific research. In order to achieve Selangor's development strategies, seven development zones have been introduced under physical development (see Map 8). These are:

i. Klang Valley Territory Zone
ii. Greater Klang Valley Territory Zone
iii. Multimedia Super Corridor Zone
iv. Port and Maritime Zone
v. Agricultural and Agro Valley Zone
vi. Limited Development Zone
vii. Protection Zone

(Selangor Town and Country Planning, 2005:87)

For the Klang Valley Territory Zone the focus is to be on infill development, as some parts of the Klang Valley need redevelopment because buildings are old and roads congested. The Greater Klang Valley Zone is the suburban area of the Klang Valley and will concentrate on self-contained development. This zone is also important as a support zone for the Klang Valley, where, for example, settlement development is restricted due to the lack of available land for development. The Port and Maritime Zone is the area that supports Port Klang as a trans-shipment hub in the Asia Pacific region. The creation of the Agricultural and Agro Valley Zone is specifically designed to develop agricultural activities in the State of Selangor; it is hoped that research on agricultural development will be increased and modern technology will help increase productivity. Not every part of the State of Selangor is suitable for development. Some areas have been set aside as Limited Development Zones; these are beachside areas, hillsides and highland regions. The two main objectives of the zoning of these areas are to control and protect them from environmental deterioration and at the same time to encourage tourism

activities. This development strategy, however, is designed to comply with the needs of environmental sustainability. As indicated in the Draft Selangor Structure Plan:

> Parallel with sustainable development strategy of the State of Selangor, the preparation of the Draft Selangor Structure Plan has ensured that all the principles of sustainable development have been included through Strategic Environmental Assessment (SEA) and Social Impact Assessment.
>
> (Selangor Town and Country Planning, 2005:28)

In developing the areas mentioned above, the Draft Selangor Structure Plan covers a number of aspects that are important in ensuring that the development of Selangor will be sustained from all perspectives. The aims and objectives of development have been laid out as falling in three main areas, economic development, physical and environmental development, and social development (Selangor Town and Country Planning, 2005). It is hoped that all these areas could be planned in an integrated manner in order to create sustainable development.

Economic development in the State of Selangor is strongly dependent on the secondary sector. In 2000, the GDP of the state was RM 44.7 million. However, the Draft Selangor Structure Plan (Selangor Town and Country Planning, 2005:2) draws attention to the imbalance in economic development in Selangor both among economic sectors and between districts, with Petaling District, located in the Klang Valley as the main area for economic development in the state and providing 50 per cent of GDP, followed by Hulu Langat District and Klang. This situation clearly shows that the household income for those who live in the Klang Valley Region is relatively high compared to less developed areas. In addition, social development is a great challenge for the State of Selangor, chiefly in terms of building houses for the increasing population. In 2010, the number of dwellings is expected to reach 1,224,948 and continue increasing, reaching 1,814,230 by 2020 (Selangor Town and Country Planning, 2005:2). This means that with suitable land for housing being available in less developed areas, the challenge for the government is to spread economic activity across the state and not allow it to be focussed exclusively on the Klang Valley. Thus, in order to practice sustainable development in every aspect and ensure that local communities are treated equally, the economic sector in the State of Selangor will need to be diversified in less developed areas, and will also need to focus on the primary sector, such as agriculture, and integrate it with tourism and the manufacturing industry.

Unsurprisingly, the rapid development of Selangor has been accompanied by environmental problems such as flooding, landslides and water pollution. In addition, in terms of physical and environmental development, the Draft Selangor Structure Plan estimates that from 2002 to 2020, the State of Selangor will need 43,300 hectares of land for the purpose of development (Selangor Town and Country Planning, 2005:14), while the most developed districts, including Gombak, Petaling and Hulu Langat, offer very limited land for urbanisation. According to the plan, there are almost 260,000 hectares of land suitable for development as urban areas, of which 26.53 per cent are in the Kuala Langat District, 22.26 per cent are in the Kuala Selangor District and 15.16 per cent are in the Sabak Bernam District, which are all outside of the Klang Valley region (Selangor Town and Country Planning, 2005:14). The Selangor government's plan to develop the region outside the Klang Valley is a positive way to balance the use of environmental components in the state of Selangor.

In line with its aim of protecting the natural environment, the Draft Selangor Structure Plan has produced a Strategic Land Use Plan. This consists of five major components: firstly, major land use areas, including urbanised areas, agricultural areas and forest; secondly, economic development centres; thirdly, environmentally sensitive areas; fourthly, transportation and other links; and fifthly, infrastructure and utilities. The identification of environmentally sensitive areas in Selangor is an important step leading towards environmental protection, and could help to further our understanding of the implications of development that encroaches on sensitive areas. The plan identifies the following environmentally sensitive areas which it says will be protected:

i. Highlands and steep slopes
ii. Flood-prone areas
iii. River reserves
iv. Reservoirs
v. Swampy areas

The major aim in protecting these areas is to ensure that the state can produce a sustainable policy of land use development avoiding sensitive areas (Selangor Town and Country Planning, 2005:43). However, the plan includes no details of how specific areas are integrated within the environmental system.

There are indeed some glaring omissions from the plan. For example, among the permanent forest reserves and areas that need to be protected for their biological diversity, stunning

landscapes and educational value, the Sungai Buloh forest reserve has been excluded, even though it has been identified as an environmentally sensitive area. This forest reserve is the location of one of the dams in Selangor, the Subang dam, in the Damansara catchment. The forest is therefore subject to changing land use status in the future (see Map 13). Policy statements in the Draft Selangor Structure Plan suggest that future development will be done in a more systematic manner and will not be influenced by developers. However, part of the Sungai Buloh forest reserve has already experienced massive development for housing projects (see Chapters 5.3 and 5.6 for further discussion). The Sungai Buloh Forest Reserve is important in sustaining the Damansara drainage basin and protecting local communities in that basin, but this has been ignored in the structure plan.

Nor does the plan discuss the flood plain and its importance for sustainable development. On the contrary, the Draft Selangor Structure Plan mentions that the Klang Valley will be maintained as a major development area, even though it plans to spread development to other parts of the state. Despite these problems, the Draft Selangor Structure Plan represents an improvement on the KL20 plan in its recognition of the importance of bringing the notion of sustainability into planning. As it states:

> While urbanisation is a positive thing, on the other hand, it should be ensured that the urbanisation process does not detract from the quality of life and decrease the environmental quality.
>
> (Selangor Town and Country Planning, 2005:48)

However, this development strategy can only succeed if everyone involved in development planning is prepared to take serious responsibility for all the matters discussed in the structure plan. Understanding from the Federal Territory of Kuala Lumpur is important, as Kuala Lumpur has a different vision and aims for its development, particularly for the development of the Klang Valley -- sustainable development in the Klang drainage basin needs an integrated approach.

3.4 Development and planning issues in the Klang Valley

In this section the situation of the Klang Valley is discussed in relation to the vision of Kuala Lumpur as a global city. Even though the central government gave special attention to the Klang Valley during the administration of Prime Minister Mahathir Mohammad (discussed

further in Chapter 5.3), issues have arisen that have affected its approach. Principal among these is the existence of Malay reservation lands in the Klang Valley. Alongside these issues have been environmental problems stemming from the massive scale of development in Kuala Lumpur and the Klang Valley.

3.4.1 Malay reservation lands in the Klang Valley Region

After independence the Malaysian government adopted a range of development policies to develop the country and create a national consciousness. Government policy concentrated on industrialisation in order in part to lessen dependence on agriculture as a source of income. The Klang Valley became a central area for manufacturing during the 1960s, and this inevitably created demand for land for housing and other functions. The consequent urban growth brought Malay[2] reservation land within existing urban areas. Brookfield, *et al.* (1991:40) mentioned that "often the reservation lands remained islands of underdevelopment within high-achieving areas surrounding them".

The Malay reservation land concept was proposed in 1910 and was formally introduced in 1914. This was a response to continued losses of Malay lands, even though a new land system was in operation under which Malays could register their land and obtain a *geran.* A *geran* (grant) was a certificate provided and recorded by the Land Office showing the location and size of the land, signed by the landowner to officially prove ownership of the land. However, not all Malay land had yet been registered legally. During the rubber crisis after the First World War, many Malay peasants faced financial ruin. This situation led them to sell their land to non-Malays such as Chinese merchants for quick cash to settle their debts. Moreover, the land price boom at that time increased the acreage of Malay land sold to non-Malays (Lim, 1977:74). This caught the notice of British administrators, who felt that there was a need to restrict the freedom to transact Malay land (Brookfield, *et al.*, 1991:36). Hence, after the British Residents met in 1911, a draft enactment to safeguard Malay title to land was prepared and agreed, and this became the Malay Reservation Enactment No. 15 of 1913.

Fundamentally, the idea behind Malay Reservation Land was to retain Malay land in the hands of Malays. Malay land in the reservation areas could not be sold to non-Malays. The act also contained rules connected to ownership, transaction and the power of the Resident; it defined

[2] A Malay is, "a person belonging to any Malay race who speaks any Malay language and professes the Mohammed and religion" (Tengku Elias Mahamood, 1992). Malays are Bumiputera. Bumiputera refers to all the indigenous inhabitants of Malaysia including the Ibans, Melanaus, Bidayuhs, Dusuns, Muruts, Bajaus, Penans, Sulus and Kenyahs of East Malaysia.

the Malays as people of Malay race and professing Islam as their faith. In 1931, in the Federated Malay States (FMS), there were over one million hectares of land that had been put in reservations, and District officers in the FMS agreed to increase the total area of the reservation from time to time (see Table 3.2).

Table 3.2. Malay Reservation Land in the Federated Malay States (hectares).

State	1931	1941
Perak	703 922	728 596
Selangor	86 961	108 793
Negri Sembilan	208 503	237 259
Pahang	275 587	299 393
Total	1 274 973	1 374 141

Source: Ahmad Nazri Abdullah (1985:92).

However, even though the land earmarked for Malay reservation was increased, the loss of Malay land continued. As the land could only be sold among Malays, land prices failed to rise, and the land remained generally underdeveloped. Hence, many Malay title-holders lent their names under private agreement to non-Malays hoping to profit from what they saw as an investment. Nevertheless, these illegal activities only benefited non-Malays as it was they who received the income from activities conducted on the land. There were also losses of reserve land due to mining activities with frequent adverse effects on the environment. Many traditional Malay villages located near the mines needed to relocate to new areas. The villages then lost their land and also lost suitable locations for agriculture (Brookfield, *et al.*, 1991:54). At the same time, more Malay agricultural land was converted to urban use. This happened in particular in the Klang Valley. Despite these losses, the stock of Malay reservation land remained substantial until recently (Brookfield, *et al.*, 1991:39).

Malay reservation land shows clear signs of poor housing and inferior standards of infrastructural facilities and urban amenities. However, the degree is different depending on the location and physical nature of the land (Kuala Lumpur City Hall, 1984:171). Within the built-up areas of the inner city, Malay reservation land represents only a small percentage of the total space. Kampung Baru, Kampung Datok Keramat, Kampung Pandan, Sungai Penchala,

Segambut, Gombak and Selayang are all built on Malay reservation land. Kampung Baru, the only Malay reserve land located in the centre of Kuala Lumpur, is surrounded by hotels, commercial buildings, office towers, high rise apartments and the Petronas Twin Towers (see Maps 5, 9 and 10). Many of the settlement's buildings are no longer compatible with their surroundings (Kuala Lumpur City Hall, 2003:16-2). The strategic location of Kampung Baru gives it the highest potential for development, but at the same time this Malay reservation land is protected by law from being sold. The inability of the owners to develop their properties reflects the stagnation of development on Malay reservation areas. An attempt was made to address this situation in KLSP 84, with City Hall setting goals and objectives for the development of Malay reservation areas in the Federal Territory.

The KL20 structure plan also concentrates effort on upgrading "rural settlements" in the middle of the city:

> While pursuing its vision to be 'A World-Class City', it is essential that Kuala Lumpur does not lose sight of its unique character and cultural heritage. In particular, the Malay Reservation Areas (MRAs), traditional kampungs and new villages, besides being of great historical importance in the development of Kuala Lumpur and the nation, also preserve a cultural continuum by maintaining traditional customs and ways of life.
>
> (Kuala Lumpur City Hall, 2003:6-16)

According to the plan, the Malay reserve areas should become Comprehensive Development Areas and at the same time centres for the collection, distribution, marketing and exhibition of Malaysian culture, arts and artefacts (Kuala Lumpur City Hall, 2003). It is too early to tell what the impact of these policies has been, but the indications are that they have a largely exhortatory value.

Alongside the Malay reservation areas, occupying similar spaces are Kampung like Kampung Hukom, many dating from the 1970s, when large numbers of Malays from rural areas arrived in the Klang Valley to settle on state land. They were labelled urban pioneers, *peneroka bandar*, in the urbanisation of the Malay population (Hamzah, 1976). However, they continued to live in the traditional Malay Kampung style, although they were tacitly recognised by municipal authorities and provided with basic services such as electricity and water, for example in Selayang and Gombak (Barter, 2002) (see Map 5).

3.4.2 Housing development and security in the Klang Valley

Increasing population levels in the Klang Valley mean the demand for housing is also increasing. Property has been developed by established housing developers such as the TTDI Developers, MK Developers and MetroKajang Developers. The housing development strategy in the Klang Valley has responded to labour market trends associated with the rise of middle class professional and managerial workers (Bunnell *et al.*, 2002). The new township areas have been planned specifically to combine housing developments with all the amenities for these groups of urban society (TTDI Jaya Sdn. Bhd, 2005).

However, the Klang Valley is facing a deficit in the provision of housing for low-income groups, particularly in Kuala Lumpur. A study carried out by the Pacific Department of the Asian Development Bank revealed that the planning process in the Klang Valley was suffering from a lack of coordination between the public and private sectors (King, 2004). This situation is illustrated by the fact that public companies that were involved in development projects did not follow the specific regulations and obligations laid down by the Ministry of Science, Technology and Environment and the Ministry of Housing and Local Government (King, 2004). For example, in an attempt to keep floods at bay, the Housing and Local Government Ministry developed a long-term plan in 2000, to eradicate flooding by restricting housing developments on the flood plain (see Chapter 5.7.2), but the plan can only be implemented after the Town and Country Planning Act has been amended, and this is yet to happen. The plan stipulates that new housing schemes should not be built on natural flood plains, but the plan appears to have been largely ignored.

The problems associated with a lack of affordable housing in accessible areas have forced the urban poor to live in squatter settlements (Barter, 2002). According to Barter, the urban poor and low-income households can try to live in inner locations, but they will be faced with highly insecure tenure. They also can live near the urban fringes, where the housing rates are more reasonable, but they will then be faced with long travel times and will sometimes encounter traffic jams. Therefore, many urban poor are choosing to live in squatter settlements as an alternative to the segregation of socio-economic groups and inflexible housing regulations (Barter, 2002). This is because the government's provision of houses for the urban poor in the city is insufficient and houses constructed by private developers are concentrated in the more profitable medium and high cost brackets. Therefore, even if the urban poor only wanted to rent houses, the rent is generally RM 600 and above, and they therefore tend to choose to live in squatter houses, which are definitely far cheaper both to build and to rent. Besides, living in

proper housing settlements means that residents are subject to council tax. Thus, living in squatter settlements reduces the financial burden of the urban poor.

The number of squatters in the Klang Valley (of the total Klang Valley population) remains significant, although it has been continuously falling from 21 per cent in 1980 to 16.8 per cent in 1985 and 9.2 per cent in 1997 (Bunnell *et al.*, 2002). Most of the squatter settlements are located in hazardous areas of the flood plain. There are 112 squatter areas located along the rivers in the Klang Valley. The fundamental social issue of why there are squatters in the city and how squatter communities could eventually be eradicated has not been addressed as a priority in the economic agenda (King, 2004). Kuala Lumpur City Hall has, however, made some attempts at various times to adopt a more sensitive approach in its dealings with the residents of squatter settlements. For some years, it has encouraged squatters to register their names with the local authority; those who register are entitled to be considered for government-assisted purchase of low cost housing if they have been living in a squatter area for a certain period. Part of the intent here is to bypass and then eliminate squatter landlords. The rejection of squatter landlords marked the start of an attempt to make squatters more responsible for their living areas, as set out in KLSP 84, thus making it easier for the government to provide a basic level of facilities and plan for the future of the squatter community and its settlement (Kuala Lumpur City Hall, 1984).

Continuous rapid development in the Klang Valley has led to a great demand for land. The Land Acquisition Act 1960 provides strong powers to acquire land for public or private objectives such as transport projects (Malaysia, 2003). Therefore, some of the squatter areas were demolished and replaced with new housing, provided by both government and private developers. The squatters affected by these developments were removed to transit houses, known as longhouses, while awaiting permanent low cost housing, which was generally a minimum of 20 kilometres away from the city (Barter, 2002). Consequently, many of them refused to relocate because it would have had an impact on many aspects of their lives, such as their journey to work, and for those with families, it would have involved considerable journeys for children who needed to go to school in the city. From the author's observation (2005) in the Sepang area, the development of low cost housing has occurred in an area of new urbanisation, where public facilities such as shopping centres and schools are a long way from the settlement area and it is necessary to use transportation to get to them. According to KLSP 84, however, schools will only be provided for communities with a population above 7,500 (Kuala Lumpur City Hall, 1984:50). This creates huge problems for those with children of school age, not least as a result of the poor standard of public transport. Hence, the urban poor and urban low-income

groups tend to live in unsecured living conditions in squatter settlements in the city (see Chapter 7). The lack of land for low cost housing in the Klang Valley has meant that most accommodation for the urban poor and urban low income groups is of the high rise type. This is an alternative and appropriate solution to the squatter problems in the Klang Valley, due to budget and land limitations -- so long as rents are kept to appropriate levels (Bunnell, 2004).

Efforts were made by the Kuala Lumpur City Council over a period of many years to replace the squatter dwellers od Kampung Haji Abdullah Hukom, the case study area examined in Chapter 7, as it was planning to develop that area. According to City Hall's statement in KLSP 84 the plan was to relocate the squatters into planned residential settlements (Kuala Lumpur City Hall, 1984). Three blocks of low to medium cost flats were built on an adjacent site on Jalan Bangsar, Kuala Lumpur. One block of these new flats was provisionally provided for the Kampung Haji Abdullah Hukom squatters. However, only 20 per cent of the community moved to the new flats, while 80 per cent remained in the squats (author's survey, 2000). The 80 per cent of squatters who refused to move gave their reasons, which included the fact that they were not used to living in high rise buildings (22 storeys), there was no sense of neighbourhood community, and the move would cause difficulties, especially for those with big families, if the lifts were out of order. Moreover, the size of the flats was also an issue -- they were often referred to as "pigeon hole" size (author's survey, 2000).

Bunnell (2002b) has shown how *Kampung* ("village") habits and traits have been used as "explanations" of inappropriate urban action among Malays, especially in the Klang Valley. An example given in the media to explain this characterisation is that of residents throwing rubbish through windows, with the rubbish sometimes containing dangerous materials such as glass and sharp objects. The contrast between low cost flats and high cost apartments is evident in that the low cost flats are lacking in services and suffer from poor maintenance. Hence, government rhetoric suggests that, in order to modernise the urban poor, good urban governance is important, and this must be done not just through reshaping the city sites but also the Kampung culture, which must be adapted to fit with urbanisation.

According to Bunnell (2002b), "the problematisation of kampong in the city landscape in the 1990s remained a matter of aesthetic and moral as well as of strictly economic (or political economic) calculation". Due to the constraints of economic pressure and land spaces in the Klang Valley, prices are high; the cost of one hectare of land is about RM 500,000 and the price is even higher for land in the city centre and inner city. Nevertheless, the development pattern for low cost housing shows a tendency towards areas to the south and southwest of the CBD,

probably accelerated by MSC-related development (Bunnell *et al.*, 2002; see Maps 3, 7 and 11). Besides, one of the reasons why low cost housing projects spread to the south is due to the availability of suitable land so identified by the government (see Chapter 5.4) and the potential of the area to create more job opportunities in the future.

Secure housing for the urban poor has been a constant issue in the Klang Valley since the emergence of squatter settlements in the early 1960s as part of arrangements that had been made by the urban poor themselves. The location of the urban poor over the last few decades has raised a range of environmental issues such as the continuing occurrence of flash floods, as many sites are located on flood plains. Furthermore, the rapid development of urban areas also shows similar patterns; even land use developments with proper planning permission have started to encroach on hazardous areas of the flood plain. Hence, in parallel with this rapid development of the Klang Valley, the incidence and severity of flash floods were also increasing and had a tremendous impact on urban society, especially the urban poor, who are more vulnerable than any other social group in the city.

3.4.3 The environmental impacts of development in the Klang Valley

As mentioned in Chapter 2, the relationship between urban environmental components (the community and built-up areas) and nature are extremely complex. Hence, the authorities who manage urban areas generally plan them so that they meet with the demands of society for housing and other facilities. Consideration of the natural environment of the Klang Valley is not just a simple understanding of what the natural environment is but also involves how the natural system works, what natural processes are involved, and how to deal with them. Indeed, it is vital to understand the whole Klang drainage basin process when planning new developments.

While the emergence of the Kuala Lumpur metropolitan region, which includes the Klang Valley, poses challenges of economic and social management, environmental degradation has arisen as a serious problem. Researchers such as Ian Douglas (1983) and Robert Aiken *et al.* (1982) have highlighted the existence of environmental problems in the Klang Valley, such as flash floods and soil erosion, since the late 1960s. In the last two decades, environmental problems in the Klang Valley have increased both in terms of frequency and magnitude, and have created much discomfort for the inhabitants. Three main components of the environment, namely land, air and water, contribute to environmental problems in the Klang Valley, and local climatic and hydrological regimes are being distorted, exacerbating environmental problems (Khairulmaini and Fauza, 2001). The increase in the size of the urban built-up areas in the

Klang Valley has, for example increased the heat absorption of urban materials like concrete, glass, asphalt and bitumen during the day and re-radiation during the night, and this has affected the local climate (Douglas, 1983:33). Sham (1993; 2004) writes that the heat from metabolism and various combustion processes in the city's atmosphere and the entire physical transformations all combine to create a climate which is generally warmer than that of the surrounding area. In the Klang Valley, temperature distribution patterns in Kuala Lumpur and Petaling Jaya between 1972 and 1985 reveal these increasing temperatures.

Over the last 20 years, the Klang Valley landscape has started to change, with a new skyline of high rise buildings and massive built-up areas. The intensity of building affects the redistribution of solar radiation in urban areas, and therefore, the city produces a heat island (Douglas, 1983:33). In Kuala Lumpur, the heat island produced by the city traps a massive volume of hot air and high rise buildings in the city centre and blocks the flow of the transpiration coming from the Straits of Malacca. This result in thick cloud formation called cumulus nimbus, which leads to heavy rain followed by lightning and thunderstorms, generally in the late afternoon (DID, Federal Territory of Kuala Lumpur, 1993). This situation leads to the Klang River and its tributaries receiving enormous amounts of precipitation, and if the rivers are unable to accommodate the huge volume of water, it will spill out from the system and flood the areas nearby. In the context of a drainage basin like that of the Klang River, reduced rainfall will occur in the upper catchments. If this phenomenon continues to occur in the Klang Valley, it will suffer from insufficient water supply and dams will fail to accommodate the demand (see figures 3.2a and 3.2b). Additionally, forest clearance for development projects has affected the hydrological process. Deforestation followed by the covering of surfaces with impervious materials retards infiltration and encourages surface runoff, and this can of course lead to flooding (Douglas, 1983; Walling, 1987)

Clearly, rapid urbanisation and industrialisation in the Klang Valley have, to a certain extent, contributed to the degradation of urban environmental quality. Sham Sani (1993) argues that several factors have contributed to the environmental problems in the Klang Valley, namely construction, factories and squatter settlements. Sham (2004: 382) adds that:

> Silting from construction and other land clearing activities within the Klang drainage basin has long been a problem to the Klang River and its tributaries. This has also affected the harbour area in Port Klang downstream, costing millions of ringgit for dredging works in the navigation channels.

According to Khairulmaini and Fauza (2001:2), environmental problems that occur in the Klang Valley are strongly related to environmental hazards which have a spatial dimension. They are present at the source of occurrence, pathways within the air, water, land and biotic subsystems and targets or sinks where pollutants or sediments accumulate. This spatial dimension makes the Klang Valley vulnerable locally, as it is a drainage basin. For example, flash floods have occurred in the city centre, which is located in the middle of the Klang drainage basin, as a result of heavy rains, but the lower basin has also been flooded even if the area itself has not experienced any precipitation.

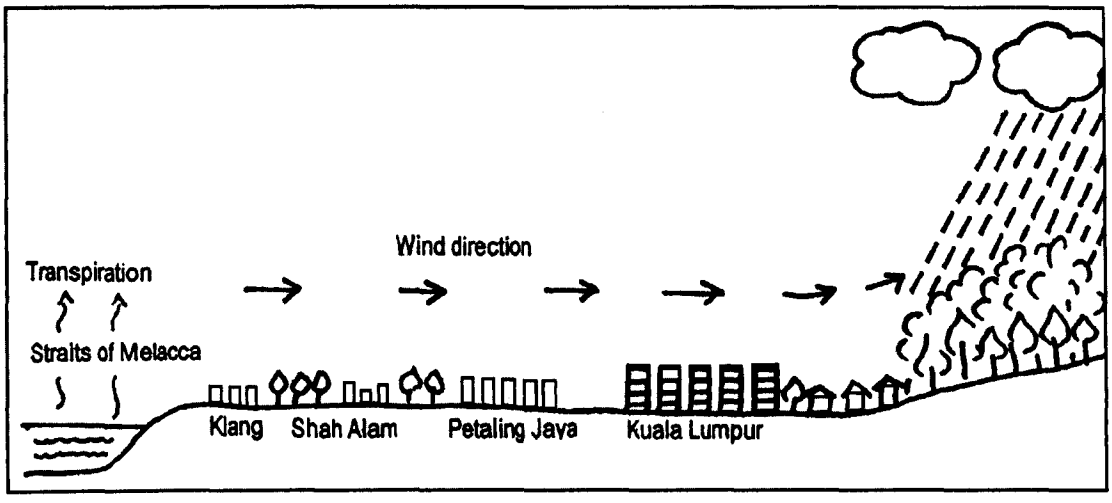

Figure 3.2a. The situation that prevailed more than 20 years ago, when Kuala Lumpur was sparsely developed, was one of more rain in upper catchments.

Source: Modified from Sham, 1980 after Oke 1976.

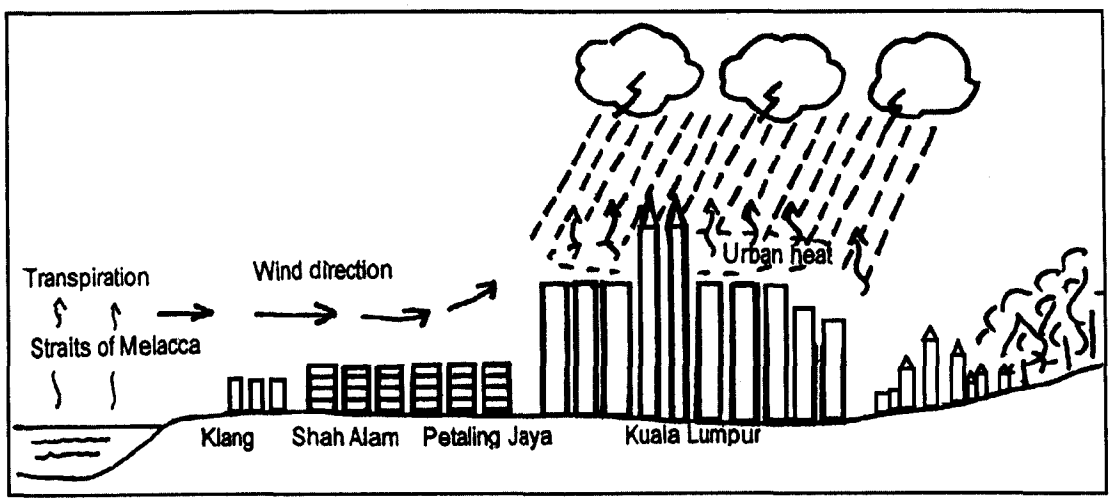

Figure 3.2b. The current situation is that there is more rain in Kuala Lumpur and less rain in upper catchments, as Kuala Lumpur is now covered with high-rise buildings that block the air flow to the upper catchments.

Source: Modified from Sham, 1980 after Oke 1976.

Since manufacturing became Malaysia's main economic activity in the 1970s, the Klang Valley has been the centre of industrial activity in Malaysia. Manufacturing has had an impact on environmental issues such as air quality, water quality and waste disposal. The Klang River, which flows through the Klang Valley, has been classified by the Department of the Environment as one of the three most polluted rivers in the country (Department of Environment, 1997; Department of Statistics, Malaysia, 2003). Industrial effluents and solid waste such as lead, zinc, copper and cadmium have been detected.

Douglas (1983) points out that economic pressure in Kuala Lumpur, primarily the desire to live close to one's workplace or business area, has led to residential sites being constructed on steep slopes in deeply weathered material. In some cases, this has led to environmental disaster -- as when the Highland Towers in Ampang collapsed in 1993 -- due to development projects being carried out on hazardous sites such as steep slopes. Disturbance from human activities further aggravates the soil erosion processes, and the heavy rainfall that has always occurred in the Klang Valley creates an even more critical situation that gradually changes the stability of the soil.

Flash floods are one of the most serious problems in the Klang Valley; they generally occur five to six times a year and sometimes more often. They have frequently been the cause of death,

damage to property, water pollution, road congestion and environmental degradation and have contributed to an average loss of approximately one million Malaysian Ringgit per year (Berita Harian, 28/4/2001b). In April 2004, five flash floods were reported within a month of each other, wreaking havoc in the Klang Valley. The event on 27th May 2004 was reported as "*KL banjir lagi* in Malay", or "KL flooded again", reflecting the sense of inevitability of flooding in the Klang Valley.

3.4.4 Flash floods and the development of sensitive natural resources

As outlined in Chapter 2, risk and disaster occur when people encroach on hazardous areas for their activities. This section follows on from the section above by illustrating how sensitive environments, such as hill sites, flood plains, rivers and wetland areas located in the Klang Valley, have been sacrificed in order to make way for development, thus leading to flood problems. The discussion will explore a few areas that have been involved with vast disruption to the environment.

In the upper part of the Klang Drainage basin, land on either side of a tributary of the River Pusu, which itself is a tributary of the Gombak River, became the site of the International Islamic University of Malaysia (IIUM), on which work started in 1992. The University covers an area of more than 2.8 km sq (see figures 3.3a, 3.3b and 3.3c) and its construction involved massive land clearance. The development changed the natural processes and thus disturbed the river process in the upper catchment, as the river was made to flow through the middle of the campus. Douglas (1988:77) has reported that "every new construction site, now increasingly close to the headwaters of small tributaries, is drained by concrete-line channels which feed urban runoff rapidly into major streams". The River Pusu tributary has created a scenic view for the university. However, from the author's observations in the 1990s, the River Chincin, which merge with the River Pusu about 500 metres downstream, has experienced massive sedimentation and this has degraded the river system. The section of the River Pusu tributary that flows through the campus also faced serious sedimentation during the construction. Villagers of Kampung Sungai Chincin who live close to the River Chincin reported that flash floods had become frequent occurrences, while in the past floods were neither so frequent nor of such magnitude. At the same time, since the early 1990s, the Klang Valley has also experienced more flash floods compared to a decade before (Mariney, 1995). This exacerbated a situation, which as Douglas wrote in 1968 (p. 15), already needed attention. As early as the 1960s, the Gombak River produced a high sediment yield flowing into the Klang bringing problems of flooding to the lower reaches of the Klang Basin.

Figure 3.3a. The International Islamic University of Malaysia (IIUM) located on the upper catchment of the Klang drainage basin.

Source: Author's photograph.

Figure 3.3b. Massive land clearance ready for second phase construction in IIUM in 1994 (see arrow).

Source: Author's photograph.

Figure 3.3c. The River Pusu tributary flows through the IIUM campus.

Source: Author's photograph.

Another development in the upper reaches of the Klang River, at Kampung Keramat, was the construction of a highway that used the riverbed of the Klang River for three kilometres as the base for its supporting pillars (Mariney, 2001; see figures 3.4a and 3.4b). According to information given by the settlers of Flat Seri Perlis, the closest settlement to the highway project, which is just about 20 metres from their settlement, massive muddy flash flooding occurred for the first time in 1997, after the project started, and these muddy flash floods frequently occurred until the project was completely finished in 2001 (Mariney, 2001). Before these devastating events occurred, the area had experienced flash floods, but they were totally different, with only a low water level reaching no higher than about 60 centimetres. However, during the construction work, it was reported that the water sometimes reached ceiling height (Mariney 2001). One of the main factors is that the river system has been completely distorted and lost its natural function as a river. After the construction finished, as can be seen in figure 3.4b, the Klang River lost its original river bed and the water now flows through a very shallow channel with high levels of sedimentation, and for three kilometres of its length the river has totally lost its riparian quality (Mariney, 2001). However, according to Kuala Lumpur City Hall, the flash floods that occurred at Kampung Keramat were due to the urban drainage system being full of rubbish, and the Department of Irrigation and Drainage was still in the process of river cleaning, which meant that the water could not flow smoothly downstream (Berita Harian, 28/4/2001a); no blame was ascribed to the development project.

Figure 3.4a. Construction work on the Klang River in 1998 opposite the Seri Perlis Flat at Kampung Datuk Keramat, Kuala Lumpur.

Source: Author's photograph.

Figure 3.4b. The construction of the new highway almost complete in 2000; the arrow shows the shrunken course of the Klang River.

Source: Author's photograph.

The question to be examined in Chapter 5 is how this kind of development can be allowed to occur in these very sensitive parts of the environment when the country has many government bodies responsible for controlling and monitoring planning, such as the Town and Country Planning Office and the Department of Irrigation and Drainage -- as well as the relevant offices in local government (see Chapter 5.2).

The amount of sediment yield produced by these and similar developments in the upper catchment area have not been investigated. However, two studies undertaken by the author in 1994 and 2000 (Mariney, 1995 and 2001) revealed that housing and other developments in the vicinity have suffered seriously from flash floods, as the river bed has become shallow and the river has shrunk from its original condition and has become incapable therefore of carrying sudden increases in water flow. Rivers are open systems which receive all input into them (Morisawa, 1985); therefore, developments close to the heads of small river tributaries, such the IIUM on the River Pusu and the highway development on the Klang River, have resulted in all the sedimentation from those developments entering into the river system. This will not necessarily affect nearby settlements on the flood plain, but as the river flows and follows its own pathway, problems that exist in the upper catchments will be passed on down to communities living in the middle and lower catchments, as the sediment is gradually carried to the lower catchments by the river flow. As Gupta (2004:245) states, "the huge increase in sediment load is reflected in bar formation, raising of channel bed, increased flooding, accelerated flood plain build-up and changes in channel pattern", and this situation can be seen in many rivers in the Klang drainage basin. Therefore, the Klang River, as the main river of the Klang drainage basin, is massively affected, and this is one of the factors that has contributed to the Klang River becoming one of the most polluted rivers in the country.

The Federal Territory is rapidly reaching the point where vacant land is developed wherever it is located. Recently, land located in the flood plain that has been cleared of squatter settlements has been earmarked for development (Interviewee D; see Chapter 5.5 and Appendix 5). The latest projects in the Klang Valley involve the development of a new business area together with a town house development project and other facilities, such as a hospital; these are all located on the flood plain of the Gombak River on the site of the Pekeliling Flats -- flats for the urban poor managed by Kuala Lumpur City Hall -- after the flats have been demolished. According to newspaper reports, the developer's plans make no mention of the potential impact of flash floods on downstream areas if the development goes ahead; the land will be more densely built up compared to the previous development, which consisted only of three blocks of flats and four

smaller blocks with shops (The Star Online, 19/5/2006). The developer is keen, however, to emphasise the benefit of the project to the urban community.

Lack of undeveloped land and easy accessibility to urban centres mean that the Klang Valley flood plain continues to be the focus of new development. A very clear example is the Rasau swamp, located in Shah Alam, which was proposed by JICA in 1985 as a natural retardation basin for the Klang River, a proposal that was accepted by the state government (Dr Nik and Associates Sdn. Bhd., 2005). However, due to urban development pressures, the area was approved for development. A telling summary of the current situation is provided by the development area map provided in KL Structure Plan 2020, where is no reference at all to the flood plain and other areas to be held free of development (Kuala Lumpur City Hall, 2003). All the map shows in this regard is the river corridor, which means the river channel and a few metres on either side of the river.

3.5 Conclusion

This chapter has outlined the trends involved in the urbanisation of the Klang Valley, including the benefits and impacts of development. Rapid development of the Klang Valley has shown a pattern that initially followed the route of the Klang drainage basin. Development has recently moved toward the south and is about to merge with the development patterns in the neighbouring state of Negeri Sembilan. The explosive growth of the Klang Valley has become an attraction that encourages developers to invest in more and more housing. As the region is the most developed in the country, the development of residential areas by the private sector tends to focus more on high and middle class housing. Government policy to privatise development in the country, as discussed in Chapter 1, has made private sector investment into one of the most important means of generating economic development of the Klang Valley. Therefore, with the progressive development of the Klang Valley, the Federal Territory of Kuala Lumpur and the State of Selangor have adopted and drafted their structure plans in order to ensure that the physical, economic and social development of all of their administrative areas proceeds along the same lines as the Klang Valley.

We have seen in this chapter, however, that there are some differences in vision regarding development between Kuala Lumpur and Selangor: while Kuala Lumpur is striving towards hyper-development and focusing more on constructing buildings and infrastructure, Selangor's vision is more focused towards sustainable development, with the state taking on board the need to be sensitive to the environment. The Kuala Lumpur authority has planned to develop all land

that they consider suitable for development in the Federal Territory of Kuala Lumpur; however, in the Draft Selangor Structure Plan, a few alternative strategies has been designed to spread the development outside the Klang Valley in order to reduce pressure, particularly given that the supply of suitable land in the Klang Valley region is now exhausted. Thus, different strategies for development in Kuala Lumpur and Selangor will need some measures of harmonisation.

Even though the purpose of development is to support the needs of urban society in terms of housing, infrastructure and employment facilities, if the environment is not considered, the consequences of development simply invite problems for the future. The problems currently experienced illustrate the impact of development and had been predicted by many researchers in the late 1960s, including Ian Douglas in his studies of the Klang Valley. Ironically both a greater degree of housing security, particularly for the urban poor, and damaging environmental impacts, chiefly flash floods, are products of the rapid development of the Klang Valley. The urban poor tend to be shipped away from the city if they cannot afford to live in the housing constructed for them, which is generally expensive both because of high land prices and the design standards set by the government. City living should involve not only living in a modern environment but also living without fear and anxiety. Thus, the main challenge is to learn how to live in an urban environment and how to plan the process of urban development better and manage it more effectively, thus alleviating hazard, risk and disaster in the city while realising the positive potentials of urban growth. Therefore, Chapters 5, 6 and 7 will undertake further exploration of the impacts of conflict in the process of urbanisation that exist in the Klang Valley and the impacts of flash floods on society.

CHAPTER 4
THE RESEARCH STRATEGY

4.1 Introduction: the nature of the survey

As mentioned in Chapter 1, this dissertation is an enquiry into rapid urbanisation and flash flooding and the effects of floods on local communities. In order to shed light on these issues, various types of data were collected from both primary and secondary sources. This chapter discusses the process of data collection and some of the issues behind it.

Primary data were collected during fieldwork and are discussed in chapters five, six and seven. Two sets of data were obtained: first, data from the two study areas affected by flash floods; and second, data from the authorities and responsible bodies involved in planning and flood management in the Klang Valley.

The secondary sources consist of both qualitative and quantitative data; they are used to help understand the implications of rapid urbanisation in the Klang Valley, a process that has been discussed in Chapter 3. Fieldwork was carried out over six months, with two months allowed for the pilot survey and a further four months allotted to the actual fieldwork. Hence, suitable methods had to be identified that allowed the targeted fieldwork aims to be achieved in that time period.

At the outset of fieldwork in TTDI Jaya and Kampung Haji Abdullah Hukom, the physical settings, social characteristics and historical backgrounds of the settlement areas were studied. Information gained from government departments in related fields was also important for this research. Questionnaire surveys, interviews, document reviews and observation of the study areas were the methods chosen to gather the required information. These methods furnished both qualitative and quantitative data.

Most Malaysian government departments have important roles in planning urban development. A high degree of coordination and cooperation among various ministries and agencies is involved. The Klang Valley is covered by two authorities that are involved in developing and managing it, namely the Federal Territory of Kuala Lumpur and the State of Selangor. It is important, therefore, to understand the role of government ministries and agencies in the urban development process in the Klang Valley. In order to gain the information needed, formal and

informal interviews were conducted, and the understanding gained has been integrated by reviewing various documents (see Chapter 5).

4.2 Selection of the study area

This study examines the problem of flash floods with regard to planning management in the Klang Valley and it uses the conventional (but generally effective) strategy of selecting two contrasting case study areas. The two case study areas -- "bounded systems" -- chosen are Kampung Haji Abdullah Hukom and TTDI Jaya. According to Creswell (1998), a bounded system is bound by time and place, and the case being studied may for example, be an area, a programme, an event, an activity or an individual. A case study is a way of investigating problems or issues and the strength of the case study is its ability to deal with a full variety of evidence such as documents, archives, interviews and observation (Yin, 1994).

Selection of the study areas was based on two important criteria: the areas had to be located on the flood plain and they had to suffer from frequent flash floods. One planned and one unplanned settlement area were chosen in order to be able to compare the effects of flooding on two structurally and socially differing localities and communities.

TTDI Jaya in Shah Alam, Selangor, and Kampung Haji Abdullah Hukom, Federal Territory of Kuala Lumpur, both located in the Klang Valley, were chosen due to observations made over the past few years that confirmed that these areas fulfilled the criteria given above. Both areas were already known to the author through earlier research projects in the case of Kampung Haji Abdullah Hukom and through frequent social visits in the case of TTDI Jaya. TTDI Jaya is about three kilometres away from the residential area where the author lives; during heavy rain of two or three hours duration, the author has often wondered whether TTDI Jaya has flooded or not. A friend of the author's, who lived in TTDI Jaya, was contacted after each period of rain to confirm whether the area had actually been hit by flash floods. There have also been some cases where rain has fallen in Kuala Lumpur, but newspaper reports have stated that flash floods have also occurred in TTDI Jaya, some 25 kilometres downstream from the centre of the Malaysian capital. Furthermore, personal discussion with a neighbour who had recently moved from TTDI Jaya suggested that she had moved out because her family could no longer tolerate life in an area that suffered from such frequent flooding. On the basis of these contacts, it was concluded that this area was a suitable example of a developed residential area and could be examined for further research.

Kampung Haji Abdullah Hukom is a squatter settlement, which has been the subject of previous research by the author. In 1995, this area was listed by the Department of Irrigation and Drainage as a flood-free area after a few structural management interventions were made: the level of the road was raised so that it should form a barrier between Kampung Haji Abdullah Hukom and the Klang River and a floodgate was constructed. The area remained free from flash floods for only two years; in 1997 the flash floods struck again. The author continued to keep track of flash flood events in Kampung Haji Abdullah Hukom via newspaper reports and online information on flash floods in the Department of Irrigation and Drainage's web pages. There have until recently been many squatter settlements located on the flood plain of the Klang River; however, although they were all affected by flash flooding, this area was selected for further research because of its location surrounded by new development projects, either commercial areas or road developments, which had impacted on the area. Having visited and conducted research in Kampung Haji Abdullah Hukom off and on between 1994 and 2005, it has been possible to note longer term patterns of change, and in particular the construction of new developments that have made Kampung Haji Abdullah Hukom a natural retention pond for flash floods in Kuala Lumpur.

It is only by understanding the interrelationships between the specific physical setting, the social make-up of localities, the way that communities have evolved over time and the ways in which they deal with flash flooding that it is possible to draw conclusions and recommend approaches to tackle the problem of flooding.

4.3 Pilot survey

A pilot survey of households and committee members was conducted from December 2004 to January 2005 in order to feed into research strategy design, the design of questionnaires, and interview questions and to identify suitable parties to be included in the research. Furthermore the pilot survey allowed a plan to be made for the conducting and scheduling of the fieldwork timetable. A set of questionnaire samples and interview questions were tested during the pilot survey. These covered the extent of flash floods, flash flood impacts, adjustments made as a result of flooding including choice of living environments.

The pilot survey began with visits to the two study areas; the plan was to conduct six questionnaires in Kampung Haji Abdullah Hukom and ten in TTDI Jaya. Visiting Kampung Haji Abdullah Hukom was not a problem as the author was familiar with the area. However, in earlier research, the author had been less involved with the community as the work in 1994 and

2001 had been focused more on the physical aspects of the study area rather than social impacts. Kampung Haji Abdullah Hukom is a squatter settlement, and this means that the houses are not constructed in any regular order. This situation presented challenges to the researcher, as sometimes the author found herself stuck in a dead-end alley, and on other occasions during early visits she found herself inadvertently walking among the houses and finding herself back where she started. The pilot survey allowed sampling methods to be tested, and techniques to encourage cooperation by residents were evaluated. Meetings with some of the residents during the questionnaire survey demonstrated that the community was friendly and willing to cooperate.

Generally, people in the TTDI Jaya area were kind and did not see the author as a stranger. This may have been due to the author's being a resident of a nearby area, or the way in which the author was presented as being not much different from the people who lived there. During free-flowing discussions with residents (six female and four male) as part of the pilot survey, the flash flood issue was raised and the purpose of the research explained. Feedback from the people was copious because flash floods are the major issue in that area has and have caused a significant drop in the standard of living.

During the pilot survey in TTDI Jaya, calculations were made as to the total number of houses and the number that were to be included as part of the main fieldwork. There were found to be 1045 houses, 60 of which were empty. A further 25 were not considered for the research as they were inhabited by students and factory workers who rented on a temporary basis houses that were not fully furnished (but some rented accommodation was included). It was felt that they did not have a sufficient commitment to the neighbourhood to be able to respond to the questions. Therefore, 85 houses were excluded from the questionnaire survey leaving 960 houses.

The author's prior knowledge of the way people live in TTDI Jaya and Kampung Haji Abdullah Hukom helped her build informal relationships within these two societies; frequent informal visits to these areas allowed the communities to acknowledge and trust the author as a researcher, facilitating the smooth execution of the research. In general terms, the pilot survey enhanced the author's knowledge of the study areas and helped to establish whether and how to revise the questionnaire survey and interview questions.

4.4 Obtaining initial access and ethical considerations

Obtaining initial access to households was important in ensuring that the fieldwork would proceed smoothly and according to plan. Initial access was granted via the leader of the residents committee, committee members or someone who knew many people in the community. Introductions were also required for interviews with government officers so that the information needed could be obtained.

Any residential area in Malaysia, whether it is an urban housing area, a village settlement or a squatter settlement, normally has a residents', or neighbourhood, committee. In TTDI Jaya, residents formed a committee soon after the housing estate was severely damaged by a flash flood in 1996; in Kampung Haji Abdullah Hukom a committee has been in existence for more than 40 years. During the pilot survey carried out in both settlement areas, meetings with the committee leaders were not possible, but other committee members provided the required information. Rohaya, who works with her family in a stall near Kampung Haji Abdullah Hukom, gave useful tips concerning people who could provide information on local history; one of these was Haji Abdullah Hukom's granddaughter, who still lived in the area. Rohaya also volunteered to be a key informant and was willing to arrange meetings with other survey respondents for the main study. Rohaya introduced the author to Haji Kamarul, the community leader of Kampung Haji Abdullah Hukom, who then went on to introduce other members of the community. Haji Kamarul also explained to the community the nature of the research and, granted the author permission to conduct her survey there.

Meetings with government officers often resulted in disappointment with requests for meetings rejected and meetings cancelled or postponed. Therefore, questions of access were also important here. Organisational cultures and protocols had to be respected. For example, it was an officer of the Selangor State Drainage and Irrigation Department who gave the author an introduction to a colleague from the Selangor Waters Management Authority (SWMA). And it was the same officer who introduced the author to an officer of the Department of Irrigation and Drainage of Petaling District. My informant from the Ministry of Federal Territory provided assistance by suggesting the names of relevant officers at Kuala Lumpur City Hall. With an initial link created from another department it was found that the next appointment for an interview was obtained more easily because in general people will feel respectful when someone from another department has appreciated the scope of their knowledge, and they also feel secure being interviewed when they know that colleagues have already assisted the researcher.

Ethical considerations need always to be considered when conducting research, and this is particularly true for the sort of investigations undertaken here, not least because of the author's relations of trust with friends and with contacts established over a long period of time. It was important not to compromise informants in any way, whether they be local residents or government officials, while at the same time maintaining appropriate levels of academic rigour. In light both of these ethical considerations and of official protocol, as outline above, all given names of people interviewed for this research are fictitious, in the case of TTDI Jaya and Kampung Haji Abdullah Hukom residents, or are replaced by codes, in the case of government officials (see Appendix 5 for a table a list and explanation of the codes).

4.5 Methods of data collection: questionnaire survey, sampling design, interview, document review and observation

4.5.1 First stage: questionnaire survey and selection of households

A structured questionnaire was designed according to the variables discussed by White (1974), Ward (1978), Smith and Tobin (1979) and Smith and Ward (1998) in their work on flood impacts and responses to flood hazards. The questions were modified in order to suit the situation of the selected study areas. Questionnaires were distributed to 200 households in TTDI Jaya and 100 households in Kampung Haji Abdullah Hukom, which represented 20.8 per cent of TTDI Jaya's total of 960 households, and 20 per cent of Kampung Haji Abdullah Hukom's total of about 500 households. The questionnaire was divided into five sections (see Appendix 1 for the full version) in order to collect information on flash floods and their impact, the structure of individual houses, opinions regarding local facilities provided, and the demographic and socio-economic characteristics of the households. These are listed below:

Section A: This section was designed to determine the extent of the impact of flash floods on the area. Respondents were asked when they first experienced flash floods, how frequently they had experienced flash floods and their perceptions of flash floods. Enquiries were also made about loss of property during flash floods.

Section B: This section focused on understanding whether the affected communities were aware of steps that they could take to minimise the impact of flash floods. A further objective of this section was to examine whether any adjustments had been made to a house's fixtures and fittings in order to minimise flood damage.

Section C: The objective of this section was to investigate the characteristics of houses and their impact on flood events in an affected area. Questions about a household's consumption of goods were asked. The questions were concerned with house ownership, type of house, material from which the house was built, height of the house from the ground, and drainage system. There were also questions on satisfaction with the facilities provided in the settlement areas and/or the nearest facilities provided for Kampung Haji Abdullah Hukom.

Section D: This section focused on the socio-economic and demographic backgrounds of all household members: age, sex, occupation, origin, and factors influencing their choice of living area.

Several revisions were made before the actual fieldwork took place, but some minor problems still existed when the questionnaire was completed by the respondents, for example, with the questions about household damage and house adjustment. Suggested answers had been written into the questionnaire. These were based on information obtained from personal communication and questionnaire tests during the pilot survey. In some situations, answers given were combinations of several suggested answers and all the answers were ticked, so a code was given for all combination answers to ensure that this information was counted in the analysis.

4.5.2 Sampling design

In the pilot survey it was found that the easiest sampling method was to choose a person who was present outside their home during the visit (in random or open sampling). Ten respondents had given their cooperation in TTDI Jaya and six respondents in Kampung Haji Abdullah Hukom in just two visits to the study areas. As mentioned by Strauss and Corbin (1998: 208), open sampling is based on convenience, and the researcher must accept the data collected to evaluate possible biases. Therefore, in the case of this research, all households had the possibility of being selected, as the whole area of the study included land that had experienced

flash floods. One respondent, husband, wife or an elder who lived in the house was chosen to represent the household. According to Fowler (2002:26), any adult who is knowledgeable and at home can answer the questions and respond on behalf of all family members. Where the head of household was absent, the author asked the respondent to supply all the socio-demographic information for the household head. However, the disadvantage of this random technique is that diversity within households in terms of occupation, gender and age is ignored. Due to time limitations and the lack of recorded data about socio-demographic characteristics, stratified sampling by socio-demographic group could not be applied. However, while this method worked for the pilot survey, it proved unworkable when it came to conducting the full survey in TTDI Jaya.

4.5.2.1 TTDI Jaya: successful use of the snowballing technique

For TTDI Jaya, the neat order in which one house is located next to its neighbour made it easy for some form of systematic random sampling to be applied when it came to conducting the full survey. The problem here was uncertainty over whether the residents of the houses selected would prove cooperative. During the pilot survey, residents did not always cooperate; for example, when the author saw there was a car in the car porch, it was assumed that the resident was at home. To attract the attention of the selected household, the author would ring the bell but sometimes there was no answer; when there was an answer, sometimes the residents would wave their hands to indicate that they were sorry or were not interested in talking to unknown persons at the front door. It was clear that there would be problems applying this method in TTDI Jaya.

As a result of these difficulties, it was decided for the full survey to split TTDI Jaya into smaller districts divided by main roads to ensure a balance between the number of respondents in each part of the settlement. In this research, therefore, only stratification by location was applied (see Map 15). Fifty respondents took part in each section. The author stopped each section of the survey when the number of participants reached 50.

The simple random method failed, however, to achieve the aim of hand-delivering the surveys and obtaining the answers in person. During the first few weeks of the full study, conducted in the four months from May to August 2005, the numbers of respondents who participated in the questionnaire survey was below the anticipated figure of at least five respondents a day. It was difficult to meet many respondents who were away from home during the author's afternoon visits. Furthermore, frequent late afternoon rains kept most residents inside their houses after

their return from work. Even when the rain stopped during the author's visits, the wet condition of house compounds did not encourage outdoor activities. Hence, the sampling method reverted back to the first plan, which was to drop the questionnaires into residents' letterboxes.

Initially, 50 questionnaires were distributed to check the response from the residents. Once a satisfactory rate of response had been ascertained, another 50 questionnaires were sent out. The questionnaires included a stamped, addressed envelope and pencils, in order to encourage respondents to give feedback and not delay in returning the questionnaire. Visits to the areas to meet with the respondents continued, but after a month only 25 questionnaires had been received. Thus, due to time restrictions, the snowballing technique was applied. This method had not been used earlier because during the pilot survey it had been found that the interactions within the neighbourhood were less in the TTDI Jaya community than in Kampung Haji Abdullah Hukom, and key informants had not been introduced to the author. However, to the author's surprise, initial perceptions of this community proved wrong; neighbours knew each other and were able to offer mutual help when needed. By asking previous respondents to make introductions to other potential respondents, the number of questionnaires completed in each visit increased as trust was built within the community.

However, there was a disadvantage associated with these techniques: with non-probability sampling there was no means of estimating the probability of units included in the sample being representative, which meant that there was no guarantee that every element had the same chance of study (Burgess, 1990).

4.5.2.2 Kampung Haji Abdullah Hukom: random sampling and the snowballing technique

For Kampung Haji Abdullah Hukom the area was divided into two sections; one suffered most from flooding and the other least (this division was effected according to information given by the community leader and information from other local people). Working in small areas was more convenient, because data collection could be focused on one particular area at a time (see Map 16). In section A, 20 questionnaires were conducted, as this area suffered fewer flash flood problems than in section B. In section B, more respondents were needed, as this area suffered from the most flash flood problems, and 80 people participated in this survey. The survey stopped when the number reached 20 and 80 in each section.

During fieldwork in Kampung Haji Abdullah Hukom, the simple random method of sampling was applied with snowballing techniques used whenever necessary. The snowballing technique

was used with the help of the key informants and the leader of Kampung Haji Abdullah Hukom (see Bernard, 1988:98). The first visits were held in the morning; most men were out at work, but to gain the information required, the researcher had only to greet people who were already out and about. This approach was easy, because people outside were ready to communicate, unlike those who were busy indoors. Moreover, during a morning chat, housewives and other residents such as retired people or those who worked in the evening were willing to discuss any topic, as they were free at that time. In general, therefore, information about flash floods in Kampung Haji Abdullah Hukom was easily obtained, with each respondent adding to the information needed.

4.5.3 Interviews: formal interviews, informal interviews and personal communication

Semi-structured interviews were conducted with government officers and community leaders: more specifically, with one committee leader, two committee members and 11 officers from various departments engaged with development planning and management of the Klang Valley (see Appendix 5). A set series of questions was used, but during the interview, the interviewee would often give some information that would lead to further questions in response to what were seen as significant replies (see Appendix 4). This is where the flexibility of the semi-structured interview approach was a help. During the interview the conversation was tape-recorded and notes were made of the important issues. Normally, after the author returned from fieldwork, she worked on the notes of her dairy-cum report. As suggested by Flick (2002:169), subjective views during the survey may be included in the data and become accessible for analysis.

Informal interviews were conducted with the residents of TTDI Jaya, Kampung Haji Abdullah Hukom and other government officers encountered when visiting their offices for pre-rearranged formal interviews. In order to obtain in-depth information about flash flood events in the study areas, informal interviews proved the most suitable method. If formal interviews had been held in these communities, people might have felt that they were being forced to answer the questions. This situation would have made people reluctant to answer any further questions, and the community would not have welcomed the researcher into their settlement.

Informal interviews were also held with other government officers and staff in order to obtain a range of information. The informal interviews helped establish friendly relationships with those staff. These relationships were important in enabling the author to publicise her research and gain further access to the relevant department if more information was needed later. Moreover,

informal interviews often ended with a discussion that allowed better understanding of the operation of the department. The advantage of the informal interview was that the interviews were not fully structured and questions were asked according to the feedback given to previous questions. This approach also allowed sensitive issues to be tackled which would not have been answered during a formal discussion where it was restricted by government policy.

Efforts to meet with and interview government officers sometimes met with bureaucratic frustration. Nevertheless, 11 officers were interviewed and knowledge and information from the relevant departments was obtained. Difficulties arose when meetings had to be rearranged because officers were not in their office even though they had promised to meet the author. Additionally, telephone calls made to arrange interviews were sometimes met with an unhelpful response. Therefore, as a solution, the researcher visited the government office and showed them a letter from the University of Leeds; this approach allowed me to offer a direct explanation of the research and request introductions to suitable officers. In some situations, other officers assisted with the information required.

Personal communication also enriched the information gained, particularly in a situation where interviews could not be arranged. For example, a meeting with a friend who lived in TTDI Jaya but had just returned from holiday allowed the researcher to ask about the latest situation in the area, the condition of her house and how she had felt when she first saw her house after the tremendous flash flood of 26th February 2006. This communication offered new information even though the fieldwork had finished.

4.5.4 In-depth interviews and selection of respondents

In order to gain a better understanding of the flash flood phenomenon in the study areas, the questionnaire survey was followed by in-depth interviews that enriched the information and understanding obtained. The interviews allowed many aspects of the research aims to be broached in the study areas. In all, 20 of the 200 household samples in TTDI Jaya and 15 of 100 households in Kampung Haji Abdullah Hukom were selected for in-depth interview. This selection was carried out after the questionnaire survey had been conducted; respondents who were not in a hurry were asked to take part in an interview. Many respondents wanted to talk more about their experience of flash floods and share their stories. Conducting an in-depth interview with a group of people was interesting as they shared their memories of events. As such, understanding of how the community as a whole was affected was gained; as well as how it reacted. For example during a visit to Kampung Haji Abdullah Hukom, preparations for a

wedding ceremony were occurring in the community hall, and once finished with their work, the opportunity was taken to ask for an interview during the time when people were having some refreshments; most of the respondents agreed to be interviewed (see Appendix 3).

4.5.5 Observation

Physical observations were conducted in the areas affected by flash floods. These were important as they allowed a first-hand impression of these areas in terms of the in-situ factors that led to flash floods and how flash floods affected the residents. Observation of the distance of the river from the settlements, the topography of these areas and housing conditions allowed this knowledge to be combined with information from questionnaires and interviews. During these observations, photographic evidence of the effects of flash floods was gathered as an important source of data (Flick, 2002:148). Besides, visual evidence of the flood proofing undertaken by residents and flood control by the government helps to show why attempts to control flash flooding in the study areas have been unsuccessful. Observations were used to make sketches of the study sites from several sides, from front, back and cross-section. Although some photos had been taken of the study areas, those pictures only covered one dimension; the three dimensional sketch views of the study areas gave basic information about the areas' situation, development and surroundings (see Chapter 6, figures 6.6a and 6.6b and Chapter 7, figures 7.10a and 7.10b). In order to sketch the areas every angle was reached (Wilkinson, 1995:216).

4.5.6 Document review

A document review of primary and secondary resources was used with the interview and questionnaire survey results in order to understand and demonstrate how planning processes were carried out in the two study areas and in the Klang Valley. Quantitative data were gathered from archival sources, for example, department reports, journals and structure plans. The structure plans of Kuala Lumpur and the State of Selangor, flood reports from the Department of Irrigation and Drainage of the Federal Territory of Kuala Lumpur and Selangor, the Development Proposal Document of the Malaysian Planners Association and documents from the Selangor Water Management Authorities were among the major documents analysed.

4.6 Difficulties arising during the fieldwork

As the fieldwork was conducted without an assistant, the schedule had to be followed rigorously. However, not all went according to plan in the actual fieldwork. While things went smoothly most of the time, there were a few occasions when it was hard to gain cooperation and information, particularly from the officers involved in development planning.

Two officers in particular refused to be interviewed; but officers from different departments provided the required information. Another problem with the interviews was that the officers refused permission for the interviews to be recorded, and they asked that their names be withheld. Apparently, Malaysian government officers are required to swear an oath to the government according to which they are not to pass on government information to the public except through official channels. Nevertheless, this did not detract from the quality of the information gained from the interviews. Interestingly, none of the officers involved in the interviews objected to the author noting down all the information given. Furthermore, some of them gave the author time to finish writing down their comments. Behind this apparent discrepancy is the understanding that recorded information is directly traceable to its source. By writing down the information given and not including their names, there was no proof of who had given the information out. On returning home, the author was able immediately to transcribe the entire interviews with guidance from the written notes.

An interview that did not take place was with the project manager for TTDI Jaya. It had been hoped through this interview to understand the development strategy and objectives for TTDI Jaya, the concept behind the development, and guidelines to be followed during construction. Arranging an interview proved impossible as the official immediately refused to take part in any discussion or interview despite being told that it was for academic purposes only. Therefore, the information was gained from members of the TTDI Jaya residents committee, Internet websites and informal information from a friend of the researcher who worked with the developer.

4.7 Conclusion

Several methods of data collection were used in this dissertation to gather information. Interviews with government officers provided some important information that is discussed in Chapter 5. Questionnaire results are combined with the analysis of qualitative data and are discussed in Chapters 6 and 7. All the data from the questionnaire survey have been keyed into the computer and have been examined using SPSS. Although this study only explored two

affected areas, it offers rich evidence concerning the lives of vulnerable people who live in either planned or unplanned settlements that are prone to flooding.

CHAPTER 5

PLANNING DEVELOPMENT ISSUES AND THE PROBLEM OF FLASH FLOODS IN THE KLANG VALLEY

5.1 Introduction: development and environmental crisis

Rapid urban development in Southeast Asia has contributed to the existence of many environmental problems that subsequently affect the quality of life for urban dwellers. As discussed in Chapter 3, for the past few decades, the Klang Valley has faced the problem of flash flooding, which remains unresolved. Urban communities, particularly those who live in hazardous areas of the flood plain, continue to suffer from flash floods despite government efforts at control. However, the problem of flash floods has not been solved, and the question this dissertation examines here is why. Are the flash floods suffered by the urban community due to failures in flood management planning or to the rapid development of the Klang Valley, which leads people to settle in hazardous areas of the flood plain and thus puts them at risk? This chapter goes on to suggest that there has been a failure to implement a coherent flood management regime or to abide by the planning restrictions that already exist and examines the consequences of this failure.

As mentioned in Chapter 3, the latest structure plans adopted by Kuala Lumpur and Selangor have different visions. The development plan for the Federal Territory of Kuala Lumpur envisages a maximisation of land use development within existing land resources, with a number of developments planned, such as business centres, housing projects and also infrastructure. Given the very limited land supply in the Federal Territory and the need to fulfil human needs and political visions, the environment of the Klang Valley has become fragile and natural processes have lost their equilibrium, leading to long-term environmental adjustment. The Selangor Structure Plan 2020, on the other hand, emphasises sustainable development and includes plans to extend development planning away from the development corridor of the Klang Valley (see figure 5.1). It aims to decrease the concentration of land use development in the region when other parts of the State of Selangor have ample land resources that are seen as suitable for development. However, the increasing economic development of the Klang Valley continues to attract rising numbers of people to live in the region. Therefore, the lower reaches of the Klang Valley, particularly Shah Alam, which is Selangor's state capital, have recently undergone significant development, with most of the area being turned over to housing estates. The supply of land that is suitable for development in the upper and middle areas of the Klang

Valley has been exhausted, and some of the upstream developments already involve sensitive and hazardous hill-slope areas. As discussed in the literature review, sensitive land use planning and regulation are vital for the protection of the urban population from flooding and involve long-term flood control management as part of the process of urban development. Indeed, the development and planning of the Klang Valley and the problem of flash floods are closely related: the development of the Klang Valley, as specified in the Kuala Lumpur Structure Plan 2020, demands huge amounts of land resources, including flood plain areas.

This chapter discusses these contradictions in more detail. It consists of two parts. The first part (5.2 to 5.5) identifies how the differing planning development strategies of the State of Selangor and the Federal Territory of Kuala Lumpur have resulted in confusion over overlapping jurisdictions in the Klang Valley, while the second part (5.6 onwards) focuses on flash flood problems and the flood management programme in the Klang Valley, and discusses river management as an important parallel tool to land use development. The chapter argues that flash flood problems in the Klang Valley, which have reduced the quality of life of local residents, are due to the development planning strategies of the Federal Territory of Kuala Lumpur in particular but also that of the State of Selangor and to ineffective methods in flood management.

The discussion in the first part of the chapter is brought together under the following headings: planning procedures and guidelines, the planning issues of the Klang Valley and the issue of land resources for development in the Klang Valley. Through this discussion a potentially damaging conflict between the State of Selangor and the Federal Territory of Kuala Lumpur is identified, with the former concerned to ensure that development is appropriately scaled and located and the latter concerned principally by Kuala Lumpur's status as a world city. The current policy of eliminating squatter settlements from the Federal Territory might help Kuala Lumpur achieve its aim, but it seems likely to increase urban sprawl in the flood plain

In the second part, the discussion focuses on government approaches to eradicating the flash flood problems in the Klang Valley. This part includes a discussion of the flash flood problems in the Klang Valley: the causes and effects, managing the problem, flood mitigation programmes under the DID of Federal Territory of Kuala Lumpur and planning in the context of the drainage basin for the State of Selangor, including the establishment of the Selangor Waters Management Authority (SWMA).

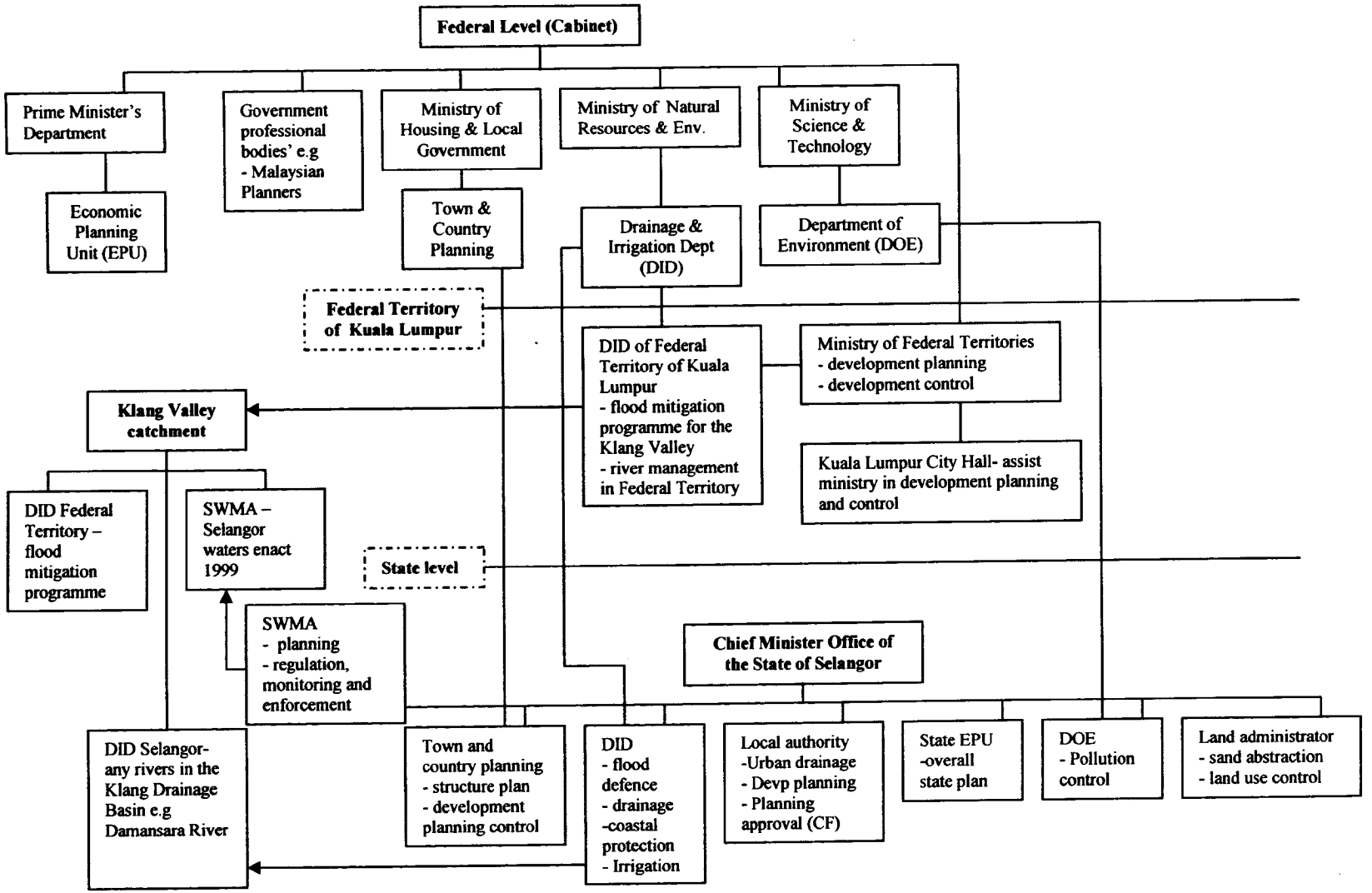

Figure 5.1. Government ministries and agencies in the urban development process and flood management in the State of Selangor and the Federal Territory, illustrating the link between bodies involved in development of the Klang Valley.

It is important to understand the role of government ministries and agencies in the urban development process in the State of Selangor and Federal Territory of Kuala Lumpur. The author interviewed a number of government officials (see Appendix 5) in order to gain an insight into the local planning process, into what has actually been achieved regarding development planning in the Klang Valley and how to deal with the problem of flash floods. The officials interviewed came from various departments and authorities -- the Ministry of Federal Territories, the Town and Country Planning Department, local government authorities, the Department of Irrigation and Drainage and the Selangor Waters Management Authority. All these departments and authorities play important roles in land use planning development and water management in the Klang Valley. The interviewees all stressed that a high degree of coordination and cooperation among various ministries and agencies is needed in planning development of the Klang Valley.

5.2 Planning procedures in Malaysia

This section examines planning approval issues in the State of Selangor. It starts with a summary of planning procedures in Malaysia as a necessary precursor to an examination of cases where these procedures are not strictly observed for whatever reason.

In 1970, the Federal Department of Town and Country Planning was established under the Ministry of Housing and Local Government, with departments later established at the state level too. In 1976 a Town and Country Planning Act 1976 (Act 172) was introduced (and amended in 1995 and 1998). The main objective of the act is to ensure that the land use development process in Peninsular Malaysia is manageable and to control the overall physical planning, which focuses on land allocation and layout plans as well as population density (Dasimah, 2000).

The principal function of the Federal Department of Town and Country Planning is "to encourage a comprehensive, effective and efficient planning system through planning laws, planning methodology, research, procedures and standards" (Town and Country Planning, 2005). At the state level Town and Country Planning Departments act as advisors to the state government on development issues such as land use development. The Department of Town and Country Planning delegates powers to local authorities to coordinate and control land use development and building construction within local authority boundaries (Town and Country Planning, 2005).

A number of laws regulate development and construction activities, among them the Environmental Quality Act 1974, the Drainage Work Ordinance 1974 and the National Forestry Act 1984 (Forestry Rule 1986) (Ministry of Housing and Local Government, 2001).

There are three types of land that can be developed at any time, freehold land, lease land and Malay reserve lands located in urban areas. To develop a piece of land, a developer first needs to win approval from the State Land Office, whose function is to give permission for changes in land use status. The Land Office writes a report on the land request and submits it along with the developer's application to the State Authority of any state in the country where the development project will proceed for approval. For any large-project the developer must submit their planning proposal to the State Economic Planning Unit[1] for approval before submitting the proposal to the Land Office, but most large projects are normally government-sponsored anyway. Therefore, the procedure applied involves the government and the Economic Planning Unit generally leads to fewer problem compared to developments undertaken by private companies.

For small-scale developments using this procedure, the proposal must be submitted for approval to the local town planning office, which is under local authority control. However, the local authority can only approve the planning development if the development area is less than 100 hectares in size or deals with a population of less than 10,000. The local authority has its own guidelines for planning development; the guidelines prepared by a local authority are more focused on physical urban aspects, such as a suitable design for building construction and the size and arrangement of buildings.

For the development of new urban districts, the preparation of the plan involves several agencies. The same procedure is followed, where the proposal must be submitted to the local authority, and the local authority then forwards the application to the State Town and Country Planning Department for an assessment. At this stage, the State Town and Country Planning Department convenes a meeting for further study and also acts as a secretariat.

Within the planning approval process, a Development Proposal Document has to be submitted along with the development project proposals (Ministry of Housing and Local Government, 2001). This document reports on the environmental impact of the project and the nature of any

[1] The State Economic Planning Unit serves as a secreatriat for the preparation of the development plans and formulates policies and strategies for socio-economic development in the state. It prepares development project budgets, and monitors and evaluates the achievement of the development programme and also advises the state government on economic issues.

local geological features (Ministry of Housing and Local Government, 2001; Kamalruddin, 2003). Furthermore, for any development exceeding an area of fifty hectares, an environmental impact assessment is also required.

During the meeting to determine the fate of a development plan, advice is sought from state agencies such as the Department of Irrigation and Drainage, the Department of Environment and the Land Office. They give comments and recommendations in order to improve the development project. After following all the planning procedures, the proposal is then returned to the local authority with either unconditional approval, approval with conditions, or a refusal.

5.3 Examples of problems in planning procedures

Although the procedure looks simple enough, there are still complications that can arise during this process. In this section, we look at some of these problems. More specifically, the question asked in this section is why development in certain sensitive and reserve areas has been allowed to proceed.

One of the central problems concerns the powers of state governments to change land use categories. All state governments in Malaysia have been given authority to change land use categories and ownership. Section 5 of the National Land Code 1965 provides discretionary power to the state authorities to alienate State Land, that is, land that has been designated as "State Land" (Salleh, 2005). In view of the discretionary power enjoyed by the state authorities to alienate State Land, Salleh (2005) writes that "State Authority" means "the Ruler or Governor of the State"; in practical terms it refers to the State Executive Council (EXCO). He adds, in simple language, "land alienation is solely within the discretion of the Menteri Besar (chief minister) and his EXCO (state executive council) members -- people who collectively wield political power in the State". Therefore, this circumstance obviously creates problems in land use conflicts where applications for land use development at the local planning level may already have been approved by the state government (Kamalruddin, 2003). In the words of Kamalruddin (2003:8): "Without changes in legislation, confusion at the planning approval stage will persist when two separate authorities give differing conditions".

In addition to these problems caused by state powers of alienation, a second layer of problems results from the politicisation of the planning process at the level of the local authority. In this context, the comments of Interviewee E, an officer in the Selangor Town and Country Planning department, are particularly revealing:

> Local authorities always create problems with regards to the rules and guidelines provided by the [State] Town and Country Planning Office. Sometimes a planning unit under a local authority ignores advice given by the Town and Country Planning Office. This situation normally can be seen in connection with development proposals that have approval status but with conditions attached, like when developers need to follow appropriate guidelines if the development is to proceed. But sometimes approval is given regardless [of compliance with the guidelines by the local authority].

This suggests that local authorities in the State of Selangor tend to dominate the planning approval process. As we have seen, various agencies are involved in giving advice regarding development planning approval. However, political interests influence local-authority approval, even though the local authority only has power over small-scale projects. According to investigations by Selangor State agencies such as the Department of Irrigation and Drainage and the Town and Country Planning Department, approval has been given even for developments that should not proceed for various reasons, such as contravention of environmental restrictions or failure to follow the standards of development required (author's interpretation of comments made by Interviewees E and I).

In the National Land Code, State Land that can be alienated does not include forest reserves. However, if a developer wants to develop a piece of land that is part of a forest reserve, a request can be made to the Land Office. The Land Office then writes a report on the request, which is forwarded to the State Authority along with the developer's application (New Sunday Times, 14/8/2005). According to the Selangor Director of Forestry, if the application is approved, it means that the State Authority has, in principle, agreed to change the status of that patch of forest reserve, but generally this process takes time as a number of procedures need to be followed. For example, the State's legal advisor has to ensure that the declaration of changing land status is prominently displayed on the land and in public places in the area where the land is situated, including court houses, the mosque and the market (New Sunday Times, 14/8/2005). Unfortunately, according to the Selangor Forestry Director, it is common practice in the State of Selangor, where demand for housing and commercial space is high and has to be met quickly, to sidestep these procedures; hence, the Bukit Cahaya Seri Alam forest reserve development projects, as discussed below, took place on land technically still reserved as permanent forest (Selangor Forestry director, New Sunday Times, 14/8/2005). Therefore, it is likely that in reality, political disruption has allowed such development to proceed, as the location is just a few kilometres away from the state government administrative centre in the city of Shah Alam.

In the text that follows, a number of specific cases are introduced that exemplify some of the ways in which the state-level authorities have played a role in allowing encroachment on reserve lands.

Case 1: Routing the Light Rail Transit along the Klang River. Recently, many development projects in the Klang Valley particularly in the Federal Territory of Kuala Lumpur have used flood plain areas as development sites. Under planning guidelines, river reserves need to be protected together with river flow and these areas must be treated as green strips in order to prevent soil erosion. However, such vulnerable areas have been gradually encroached upon by development projects, and a number of projects have been approved. For example, the light railway transit mostly uses the river reserve of the Klang River and its tributaries; this has caused a decrease in the size of the flood plain.

This appears, however, to contradict the proper procedures, as outlined by Interviewee A,[2] who stated that:

> Before any development can be approved, all the related agencies for the project hold a meeting, which can also be attended by a representative from the Department of Irrigation and Drainage. For any project, the drainage system for the area is one of the major components that has to be included in the planning proposal. Thus, the Department of Irrigation and Drainage gives their approval only after ascertaining that the drainage system provided is suitable for the development.

This means that planners also agree to planning proposals when assurances have been given by the appropriate department that the area is suitable for development after any structural work, even if it has been concluded that the area must be protected.

Case 2: Sungai Buloh forest reserve. Recently, it was reported that the Sungai Buloh forest reserve in the State of Selangor, also located in the Klang Valley, had lost 2,928 hectares since 1990 from its original area of 6,590 hectares (New Sunday Times, 14/8/2005:4). In 1994, 402.6 hectares were designated as State Land, reserved for public purposes: this is the Sungai Buloh Botanical Garden. However, in 2004, 58.8 hectares were removed for development. Today, the remaining 343.8 hectares of land are undergoing planning by private companies for mixed

[2] Appendix 6 contains a list of names and functions of organisations involved in development planning and flood management in the Klang Valley.

development projects (New Sunday Times, 14/8/2005:4). As already mentioned in Chapter 3.3.2, state authorities are not permitted to dispose of forest reserves. Therefore, the issue arises of how the state has been able to transfer ownership of land to individuals or organisations without complying with requirements under the law, and the whole transaction has been thrown open to question (New Sunday Times, 14/8/2005:3).

Case 3: Bukit Cahaya Seri Alam Agricultural Park. As mentioned above, another example is provided by the case of 1,200 hectares of land of Bukit Cahaya Seri Alam Agricultural Park in Shah Alam, Selangor, on which earthworks were carried out before planning permission was granted. In the case of the Bukit Cahaya Seri Alam Agricultural Park, the mayor of Shah Alam is also an executive committee member of the State of Selangor. Thus, it could be concluded that the local authority has over-ruled the power granted by the State government. The Bukit Cahaya Seri Alam Agricultural Park is situated only about two kilometres from the chief minister's office and the Shah Alam City Council office. The question here is as follows: the Environmental Quality Act (1974) stipulates that only development projects covering more than 50 hectares require Environmental Impact Assessment reports. However, the 1,200 hectares development project at the Bukit Cahaya Seri Alam Agricultural Park clearly shows signs of having caused environmental damage (Author's observation, 7/8/2005). Were the developers exempted from the law or was no Environmental Impact Assessment report filed? This situation has caused problems for other agencies, as all agencies concerned need to give explanations regarding developments and on some occasions, agencies will be identified as responsible for having failed to monitor projects that have caused environmental damage. Salleh (New Straits Times, 5/3/2005:10) emphasises that:

> These political leaders need to be reminded that this "discretionary power" of the State Authority is not absolute. Like all discretionary power, it is "fettered" or limited, and one of the fetters is the principle of *bona fide*.

Furthermore, Kamalruddin (2003:8) writes regarding the Environmental Impact Assessment (EIA) that is considered during the planning approval process: "It is common knowledge (especially to developers) that the local authority and the Department of Environment are not capable of monitoring the various conditions imposed in the EIA. The number of cases where adjoining residential areas are put at risk due to failure to comply with such mitigating measures is not insignificant".

Problems of lack of consistency occur also at the federal level. In order to control the planning process, the Federal Department of Town and Country Planning prepared guidelines on the protection of natural topography for river reserves and hill and coastal areas, guidelines for the provision of open space and recreation, guidelines for commercial areas and guidelines for public facilities (Federal Department of Town and Country Planning, 2005). Interviewee A from the office of the Town and Country Planning Department, Peninsular Malaysia, noted that:

> A few areas are unsuitable for development, such as mountain areas, hill slopes, watershed areas, and reserved forest. Areas with historic value must be excluded from any development. One important aim in planning development is that any development project must be able to protect the natural topography during construction.

It is interesting to note, however, that in the report on development planning proposals (Ministry of Housing and Local Government, 2001), nothing was mentioned about the importance of flood plain areas for accommodating overflow water from the river. According to Interviewee A, flood plain areas were not really given any consideration in the planning processes. Nor had flood plain areas been mentioned in the Land Conservation Act 1960 (Act 385), which only mentioned designation of hill slopes and restrictions on the clearing and cultivation of hills (Malaysia, 2003). This means that according to the law only hillsides have been marked out as elements of the landscape that have a valuable and important environmental function and need to be protected.

We can reasonably surmise from the evidence given above that, despite all the planning procedures and requirements necessitating approval, the fate of most development projects, especially in the Klang Valley, is based on economic factors. Projects are only likely to be stopped or refused approval if high office holders such as the prime minister notice that a development is located in a sensitive and vulnerable area and decide to take action. For example, in December 2004, Prime Minister Abdullah Ahmad Badawi ordered a housing development project that was being carried out in the Selangor reserved forest to be stopped immediately. However, this project had been approved by the state government of Selangor.

5.4 Planning issues in the Klang Valley: between Selangor State and the Federal Territory of Kuala Lumpur

The fact that Klang Valley exists in two administrative areas -- Selangor State and the Federal Territory of Kuala Lumpur -- has led to contradictions and ultimately to conflicting pressures of development and environmental protection. Managing the Klang Valley without having good linkages between these two administrative areas was bound to create problems, especially over the planning and development process, and these problems inevitably lead to instability in the environmental system. The development corridor connecting Kuala Lumpur, Petaling Jaya, Shah Alam, Klang, and Port Klang is the most populous area in Malaysia (see Map 2). There are eight local authorities operating within the Klang Valley -- seven local authorities under the State of Selangor, and only the one in the Federal Territory of Kuala Lumpur. Furthermore, the seven local authorities of the State of Selangor lie in four districts. In order to manage and sustain the development of the Klang Valley, planning needs to be integrated among all the local authorities.

The potential for conflict between the authorities of the State of Selangor and those of the Federal Territory of Kuala Lumpur exists in a number of areas, most significantly for this dissertation in the domain of river management; this will be examined in more detail in section 5.7. Equally, however, conflicts over land use for development in the Klang Valley are a common feature -- for example, in situations involving loss of reserved areas for rivers, loss of open space, and sprawl development. Instances of these include the development of residential areas of TTDI Jaya and Taman Sri Muda in the State of Selangor and the development of the Mid Valley 'mega-mall' and commercial area in the Federal Territory of Kuala Lumpur, which exploited flood plain areas located close to the city centre.

Interviewee E, a planning officer in the Selangor Town and Country Planning Department, noted that:

> The flood plain areas that are located near the city centre especially in the State of Selangor have become a chosen site for some developers as the value of the land in the flood plain is considered cheaper compared to other land which is not located in a sensitive location. Moreover, the flood plain needs to be reclaimed before development can begin as the land is generally half swamp and generally below the mean sea level. That is one of the factors why land in the flood plain is cheap.

Kamalruddin (2003:6) writes that, "Despite ...having planning documents as a guide to good planning of development, the reality is that for a greater portion of the valley much haphazard development has already occurred in the late 80s and 90s" .

In the early 1980s, the Klang Valley Planning Secretariat was established during the administration of Prime Minister Mahathir Mohammad, who was politically committed to developing the Klang Valley and who directly monitored the development process in the region. The Klang Valley Planning Secretariat was formed in order to coordinate planning and development, especially economic development plans, including large infrastructure projects, for instance highway construction and infrastructure (Kamalruddin, 2003).

However, this planning secretariat no longer exists. When Abdullah Ahmad Badawi became the prime minister of Malaysia in 2003, it was replaced with a new ministry, known as the Ministry of Federal Territories. The new ministry is responsible for all planning and development processes in the Federal Territory of Kuala Lumpur as well as in the Federal Territory of Labuan in Sabah and in the new Federal Territory of Putrajaya. For the Federal Territory of Kuala Lumpur, part of its role is to ensure that development planning in Kuala Lumpur is consistent with development in the State of Selangor. This situation also means that jurisdiction over a large number of development projects overlaps between federal ministries and departments such as the Department of Drainage and Irrigation, which manages all rivers and river corridors, and the Town and Country Planning Department, which prepares guidelines and planning management for the country.

Before the Ministry of Federal Territories was established, all matters regarding development and planning processes in the Federal Territory of Kuala Lumpur were controlled by Kuala Lumpur City Hall and the mayor of Kuala Lumpur as its administrative leader rather than, as one might have expected, by the Klang Valley Planning Secretariat. The main function of the Kuala Lumpur City Hall was to manage and sustain the clean appearance of the city and towns, including managing rubbish collection, managing urban drainage systems, building and managing public housing, operating traffic flow within the city, controlling pollution, providing infrastructure for urban society and giving planning approval for land use development. Kuala Lumpur City Hall also played an important role in managing the planning and development process for Kuala Lumpur, and the mayor had the scope to approve any development projects, such as housing and road development. In fact, Kuala Lumpur City Hall had control over most of the planning process and development in the Federal Territory of Kuala Lumpur. In the last two decades the City Hall adopted two structure plans, Kuala Lumpur 84 and Kuala Lumpur

Structure Plan 2020 (see Chapter 3.3.1). Therefore, although it was stated before the establishment of the Ministry of Federal Territories that the Klang Valley Planning Secretariat was responsible for managing the development of the Klang Valley for the Federal Territory of Kuala Lumpur, all power was actually in the hands of the Kuala Lumpur city authorities.

As a result, Kuala Lumpur City Hall was (and indeed still is) usually blamed by local people when the Klang Valley is swept by flash floods. For example, after a flash flood event on 5th May 2000, the affected residents reported that the flood was the result of improper development projects near the Klang River (Mariney, 2001). Most people were confused about which body was responsible for the tackling of flash flood problems in the city -- Kuala Lumpur City Hall or the Department of Irrigation and Drainage. Kuala Lumpur City Hall argued that the problem was actually due to the river being unable to accommodate the huge amount of water that gathers in a point upstream of some shallows. Therefore, the Department of Irrigation and Drainage was blamed (Utusan Malaysia, 30/3/1996). As mentioned by former Federal Territories Minister Mohamed Isa Abdul Samad:

> Sometimes, projects in the Federal Territory of Kuala Lumpur cause problems like congestion in Selangor and vice versa ... as with the problem of overlapping administration of land and drainage matters and the jurisdiction of the local authorities at the Selangor-Kuala Lumpur border.
>
> (Utusan Malaysia Online, 6/5/2004)

According to Interviewee B, head of technical and research department of the Ministry of Federal Territories:

> The establishment of the Ministry of Federal Territories is designed to ensure that the Kuala Lumpur City Hall only conducts city maintenance.

It is hoped by Prime Minister Abdullah Ahmad Badawi that the establishment of the Ministry of Federal Territories will eradicate the overlap concerning planning development in the Federal Territory of Kuala Lumpur and that the Ministry will be able to oversee development in an appropriate way, linked to development policies in Selangor State. As Interviewee B noted:

> The ministry cooperates with other ministries, other departments and also with the State Government of Selangor to make sure that all the planning and development projects

> are linked and well coordinated. It should hold monthly meetings with the State Government of Selangor to investigate and discuss planning projects and projects that are supposed to have been completed, whether any problems have arisen and whether things are going as planned. Regarding other ministries and related departments and agencies, meetings are arranged according to planning needs.

Unfortunately, in reality, he acknowledged that:

> It is impossible to set up meetings between the Minister of Federal Territory and the Chief Minister of the State of Selangor every month. Arranging suitable dates for meetings between these busy people is extremely difficult, and the last meeting was actually held in June 2004 [just over a year prior to the date of the interview].

Interviewee B noted that:

> At the current time, the planning unit within the Ministry of Federal Territories as well as its counterpart in the Town and Country Planning Office are not undertaking any planning with regard to the flood issue. All the flood mitigation projects are being conducted by the Department of Irrigation and Drainage.

Referring to an important project being undertaken by the Ministry of Federal Territories, Interviewee B added that:

> The department is currently in the process of constructing a terrain map for the Federal Territory of Kuala Lumpur. This map will be particularly important for future projects and for developers to refer to before any development planning starts. It will also help developers to find suitable areas and locations for project development. In addition, they were also currently undertaking some planning for suitable locations for telecommunication control towers around the Federal Territory.

However, according to information from Interviewee D, the planning officer from Kuala Lumpur City Hall:

> Planners create a planning development blueprint according to the needs of the economic situation and hand it over to those who will be implementing the projects according to approved guidelines. During the preparation of the Kuala Lumpur

> Structure Plan, the Kuala Lumpur City Hall submitted the planning development proposal to the Ministry of Federal Territories for approval. Besides, the Ministry of Federal Territories also refers their planning research to the Kuala Lumpur City Hall.

Looking at the planning process for the Klang Valley in the context of the drainage basin, Interviewee B, head of technical and research department of the Ministry of Federal Territories, noted that:

> At this time there is no planning process for the [whole of the] Klang Valley, but we look further for examples of countries that have successfully used drainage basin plans in their planning system. There is still no such work in Malaysia with regard to planning in the context of a drainage basin, especially in terms of solving the flash flood problems.

This situation shows that the passing on of knowledge and expertise from Kuala Lumpur City Hall is still important, as the Ministry of Federal Territories lacks adequate staff. According to Interviewee C:

> The Ministry and the Technical Planning Unit still has a few vacancies to fill, but is waiting for other planning departments to release their staff to work here. This new ministry can only be well managed when all the posts are filled; it still needs time to fully establish itself.

In contrast to the Federal Territory, for the State of Selangor planning in the context of the drainage basin is one of the aims raised by the State Government in order to achieve the state's development vision. Interviewee G, a senior engineer from the Selangor Waters Management Authority (SWMA) told the author that the Government of Selangor formed the SWMA as a new institution for the integrated management of rivers and water resources for the State of Selangor (see section 5.6). However, problems arise for the planning of the Klang drainage basin, where planning management and development goes up to the border with the Federal Territory of Kuala Lumpur and continues again when the river re-enters the boundaries of the State of Selangor. That part of the Klang drainage basin that falls within the Federal Territory of Kuala Lumpur is not under SWMA control.

In the context of development in the State of Selangor, 62 per cent of land use developments have occurred in the Klang Valley (Selangor Town and Country Planning 2002). In 1991,

densely inhabited areas covered 41,511 hectares, while in 2002 they had grown to 141,745 hectares, an increase of 100,234 hectares (Selangor Town and Country Planning 2002). Hence, in order to achieve sustainable development in the State of Selangor, as mentioned in the Selangor Draft Structure Plan, the government of Selangor plans to disperse new development projects out of the Klang Valley (Selangor Town and Country Planning 2002; Selangor Town and Country Planning, 2005). Moreover, the strategy is also designed to decrease the traffic and flash flood problems in the Klang Valley (Selangor Town and Country Planning 2002; Selangor Town and Country Planning, 2005) (see Chapter 3.3.2).

The differences in planning development between the State of Selangor and the Federal Territory of Kuala Lumpur are compounded by the federal government's aim of achieving the status of world-class city for Kuala Lumpur. In order to do this, it plans to abolish all squatter housing. There is also a plan to eliminate low-cost housing in the city. The only housing for the urban poor who still need to live there will be semi-low cost housing. Semi-low cost housing consists of houses with three bedrooms, as compared to two bedrooms in the low-cost housing, and the price is higher, at RM 46,000, compared to the low cost houses, which are RM 25,000. Therefore, this means that the quality of these houses is better and they are suitable for a family of five to six members, which means less crowded living conditions than those frequently found in low-cost housing (Ministry of Housing and Local Government, 2005). According to Interviewee B:

> Those people who are not able to afford the houses provided by the government will need to move out to low cost housing that has been constructed by the government in the urban fringes, which is a considerable distance for those who are working in the city -- or otherwise they must be able to afford to continue living in the city [see Chapter 3.4.2].

The inhabitants of the squatter settlement of Kampung Haji Abdullah Hukom (see Chapter 7) are also being forced to move. Semi-low cost housing is being constructed in order to reallocate these squatter dwellers, who have no choice but to abide by government decisions. By some point in 2007, the new houses will be ready to live in, and the last squatter settlement in Kuala Lumpur will have been demolished.

Interviewee B linked this policy of re-housing squatter settlement dwellers to improvements in the transport system:

> In order to facilitate people commuting from the urban fringe to the city centre the Ministry of Federal Territories, together with the Selangor State Government and the Town and Country Planning Department, intend to improve public transport in the Klang Valley, and the Klang Valley Urban Transport policy is in the process of being implemented. Public transport systems will be upgraded; for example, trains, the light railway transit system and the bus service will become more efficient. Thus, in the Ninth Malaysia Plan in 2006, the Ministry of Federal Territories hopes that the budget will be released for this planning project. The budget will come from the government after being approved by the Economic Planning Unit. [However] it will inevitably take a few years to complete these projects.

It is clear, then, that there are deep-rooted contradictions in the positions taken by the Ministry of Federal Territories and the Kuala Lumpur City Government on one hand and the State Government of Selangor on the other. These contradictions work against an orderly plan for the sustainable development of the Klang Valley.

5.5 The issue of land resources for development in the Klang Valley

Trends in land use development in the Klang Valley are dependent on the economic situation of the country. For example, in the 1990s, after recovery from the economic recession of the mid-1980s, government incentives led to a rising trend in land use development in Kuala Lumpur. During the period from 1990 to 1994, the Kuala Lumpur City Hall stimulated land use development in Kuala Lumpur in the lead-up to Visit Malaysia Year in 1994, using flexible policies including tax exemptions (Omar and Yusof, 2002).

These policies are reflected in comments from property researcher Ho Chin Soon, who asserted that, "the Klang Valley has an ample land bank that would last a very long time" (The Star, 7/5/2004). However, according to Omar and Yusof (2002), during the period from 1995 to 1998, approvals for land use development in Kuala Lumpur declined. The reason for the downward trend in the number of approvals was linked to an insufficient land supply to meet the increasing demand for development in the Federal Territory of Kuala Lumpur (Omar and Yusof, 2002).

The result of this situation was commented on by Interviewee D, the planning officer in Kuala Lumpur City Hall, who noted that, "Most of the cleared squatter areas, located on the river reserved areas, will be replaced with new development projects. Lack of land in the Federal Territory of Kuala Lumpur has resulted in river reserved areas being used in development projects". These comments contrast with Ho's assertion.

Interviewee E, a planning officer from the Selangor Department of Town and Country Planning, noted that, "In August 2005, the State Government of Selangor had designated the Selangor Heritage Park under the Selangor State Park Corporation Act of 2005 to protect nature and to control environmental problems, for example floods, river pollution, haze and air pollution". She noted, in addition, that, "One of the most important factors that led to the designation of the Selangor Heritage Park was the Government of Selangor's discovery that housing developments in the upper catchments of the Klang Valley were gradually encroaching onto the Klang Gates Quartz Ridge that protects the Klang Gates Dam -- and what's more this is the longest quartz ridge in the world, at a length of 14km".

The Selangor Heritage Park provides 98 per cent of Selangor's water supply; it is the source of three major rivers in Selangor, namely Selangor River, Klang River and Langat River. Furthermore, five dams are located within this park with 23 major water intake points (Sunday Star, 28/8/2005). The Klang Gates Dam, which is also located in the park, is vital for the water needs of the Klang Valley population. Hence, the Selangor Department of Town and Country Planning built into their development planning strategies consideration of the natural area as an important aspect that needs to be preserved.

Developers, however, have been quick to focus on the advantages of locating new projects in flood plain areas. For example, in a new housing development called Mayang Sutera, the developer TTDI Jaya Sdn. Bhd. claimed that the housing location is strategic, has easy access to major highways, is close to Shah Alam city centre and within walking distance of the primary school (TTDI Jaya Sdn. Bhd, 2005; see Chapter 6). It also mentioned that the residential area is a landscaped environment (TTDI Jaya Sdn Bhd, 2005) but failed to mention that it is actually situated in the river reserve area, which is part of the flood plain of the Damansara River.

Interviewee D, the planning officer from Kuala Lumpur City Hall, commented that, "Kuala Lumpur nowadays has very limited land that can be developed, so the Federal Territory of Kuala Lumpur will maximise its land use development including flood plain areas".

Interviewee E, an officer from the Urban Drainage Unit of Selangor Department of Irrigation and Drainage, noted that, "There is no bye-law that forces any development to follow the guidelines that have been made by this department, and this department only assists development projects by issuing guidelines during the submission of a proposal".

According to the Assessment Report (Selangor Town and Country Planning, 2002), there is a very limited supply of land suitable for development in Petaling District, which is in the central area of the Klang Valley (see Map 2). Therefore, rapid development in the Klang Valley makes it highly likely that some sensitive areas such as flood plains will be used for development purposes, jeopardising the chances of the State of Selangor achieving a sustainable form of development (Selangor Town and Country Planning 2002; Selangor Town and Country Planning, 2005).

Interviewee F, an engineer from the River Engineering Unit, Selangor Department of Irrigation and Drainage, stressed the great importance of protecting the river reserve as, during heavy rain, this area is responsible for accommodating flood waters. According to the DID of Selangor (2004), a few guidelines must be considered for development of river frontage:

i. Development projects must not increase the river flow. A development area which is 10 hectares or more must include a retention pond in order to accommodate the flow from the river.
ii. Permanent structures and infrastructure are not recommended to be built in the river and river reserve areas. If development still needs to be carried out in these areas, there are regulations that need to be followed.
iii. The base must be at a sufficient level to avoid and/or minimise flood damage. In order to avoid flooding for urban areas, the suggested level is one in one hundred years (1:100).
iv. Building and other infrastructure development must follow the concept of development for river frontage, that is, buildings must face the river.
v. Buildings and infrastructure must not block the view of the river so as not to damage the landscape.

(DID Selangor, 2004:4)

Thus, failure to follow the Department's guidelines will have a negative impact on the environment.

The availability of land and its suitability for development are two different things. However, in the context of the Klang Valley, as mentioned in KL Structure Plan 2020, the land available for development is an area of 5,227.40 hectares (Table 5.1). That the land is available for development does not mean that it is all suitable for development, considering the location of squatter settlements along river banks and the extent of the flood plain areas in the Klang Valley. Therefore, more thought needs to be given to development planning in sensitive areas. A Development Proposal Document and Urban Stormwater Management Manual, which will be discussed further below (section 5.6.2), need to be included in any development project, while an Environmental Impact Assessment is required, as we have seen, if the development area is more than 50 hectares in size. However, this concentrates only on the impacts on the environment at the development site, which means that if development in any particular area fulfils all the requirements and reaches the necessary standard for maintaining the environment, this indicates that the development area is safe and development can proceed, even, for example, on flood plains and hillside areas.

The use of modern technologies and engineering works, such as the construction of flood embankments, land reclamation and slope retaining walls, means that many sensitive areas could be developed in accordance with the conditions laid down by the local council. In contrast, as mentioned by a planner working for the Selangor Town and Country Planning Department, some of the conditions required are not taken seriously. Besides, it could be argued that even where the development area is free from common environmental problems related to land use such as flooding and land slides, the development of land that is located in the drainage basin system will have detrimental effects elsewhere in the basin. The development of the flood plain generally will affect the capacity for water storage and this will extend to any area that can be reached by overflow from the river. Besides, as reported in the KL Structure Plan 2020 (Kuala Lumpur City Hall, 2003), in 1984 squatter settlements covered 2,400.31 hectares, while by 2000 this area had decreased to 570.63 hectares. This means that 1,833.68 hectares had been cleared and now represent new land for development. Hence, the KL Structure Plan, which focuses more on the potential for economic success if the area is developed, has led to an imbalance in the environment, and flash flooding was one of the consequences.

Table 5.1. Net available land in Federal Territory of Kuala Lumpur.

Category of land use	Area (in hectares)
Unstable land	**2 854.90**
Squatters	245.11
Long houses	169.24
Undeveloped land	2 440.55
Potential development land	**1 081.82**
Government buildings & land	407.21
Government quarters	13.55
Dilapidated areas	185.27
Malay reservation areas	249.50
Traditional kampung	101.20
New villages	125.10
Committed land available for development	
Housing	877.99
Commercial	412.69
Total	**5 227.40**

Source: Kuala Lumpur City Hall (2003) page 6-8.

While development continues on sensitive land without consideration given to integrated environmental systems, some areas that have experienced flooding before will continue to suffer, and there could well be an increase in the frequency and magnitude of flooding; it is possible that low-lying areas in the urban environment that have never experienced floods before will suffer. From the studies made by the author in 1999 and 2000 (Mariney, 2001), it was discovered that some areas in each of the upper, middle and lower catchments of the Klang River have experienced repeated flash floods since early 1990. Flooding had not occurred in those areas until the Klang Valley had become the scene of intense development, but it has become a major environmental problem for local residents. Furthermore, each section of the Klang drainage basin has been involved in developments that have a central focus around the idea of Kuala Lumpur as a world class city. The KL Structure Plan 2020 (2003:3-1) stated that, "As a world class city, Kuala Lumpur must also ensure that the infrastructure, environment, city management and cultural, social and community facilities meet the highest expectations of the majority of its residents, visitors and investors".

Currently with the new KL vision and goals as laid out in the Structure Plan, most of the areas of the Klang Valley that are adjacent to the Federal Territory have been sucked into the massive sea of development in order to ensure that the Klang Valley continues to serve as the centre of development in Peninsular Malaysia.

In summary, then, differences over land use development between the State of Selangor and the Federal Territory have resulted in conflicts over the management of the Klang River, as this river flows through Selangor and Kuala Lumpur and then Selangor again. According to Kamalruddin (2003:7):

> A weak regard for regional policies and their spatial proposals, and overlapping land administration practices, all contribute to the current regional sprawl mayhem.... More importantly, will local plans and proposals be ambivalent towards such issues by propagating and playing to the tunes of the market-driven economy?

Thus, the rapid and complex urban development of the Klang Valley needs to be re-evaluated with reference to previous land use planning, regulations and controls to avoid a continuing crisis in the urban environment.

5.6 Flash flood problems in the Klang Valley: nature, causes and impacts

Over the last two decades, the type of flood event experienced in the Klang Valley has become more likely to be a flash flood rather than ordinary flooding. Flash floods occur after only two or three hours of heavy rain and the situation reverts to normal within a day; they are normally a local problem, as they only occur in certain areas during an event. Yet a typical flash flood situation in the Klang Valley, especially in the Federal Territory of Kuala Lumpur, commonly affects more than ten areas during one event (see Map 12), and this has caused havoc among urban communities in the Klang Valley. Some major roads have also been flooded, and the situation is now considered by the Government of Selangor and the Federal Territory Authority to be a national problem (The Star Online, 28/2/2006).

Flash flood problems in the Klang Valley generally get a great deal of attention from the media, and such events have frequently become newspaper headlines. "Downpour wreaks havoc on KL roads" (NST, 24/4/2004), "Flash floods in Kuala Lumpur" (The Star, 29/10/2001) and "Chaos in KL after downpour" (NST, 11/6/2003) are a few headlines that suggest the extent to which flash floods have become a common topic discussed throughout the Klang Valley.

The occurrence of flash floods in the Klang Valley is due to the heavy rain that is commonly released on the valley. Heavy precipitation leads the hydrograph band to increase rapidly in a short period and this circumstance shows that the river has received an extraordinary amount of

water compared to normal flows. Therefore, peak flow will discharge the water volume into the flood plain when the river no longer can accommodate the water.

According to the Department of Irrigation and Drainage (DID) of the Federal Territory of Kuala Lumpur, flash flood events in the Klang Valley occurred 15 times in the year 2000, 5 times in 2001, 8 times in 2002, and 5 times in 2003, but the flash flood event that occurred on 6th June 2003 was the worst flooding disaster since 1971 (DID of Federal Territory of Kuala Lumpur, 2001, 2002, 2003 and 2004). In the year 2004, flash flood events occurred four times (DID of the Federal Territory of Kuala Lumpur, 2005a).

The phenomenon of heavy rainfall in the Klang Valley needs to be related to other factors which have contributed to this environmental problem. According to research by the Japanese International Cooperation Agency (JICA, 1989), there are five major factors that lead to the emergence of flash floods in the Klang Valley:

i. Rivers and main drains unable to accommodate the huge amount of water due to sedimentation that reduces the depth of braided channels. Therefore, the water capacity that can be held will decrease and water will overflow from the river system.
ii. Increases in development projects, including housing development, and river pollution. The destruction of forests for construction has created sediment in the neighbouring streams. Furthermore, for developments located close to rivers, unwanted wood and bricks will normally be dumped into the river.
iii. Water flow from mines. Generally, mines will store water for use in their activities. Therefore, when enormous amounts of water flow into the mine ponds and they do not have enough capacity to hold the water, the water then will flow out of these areas and flood nearby areas.
iv. Riverbank collapse. This will increase the sediment load in the river and reduce the depth of the channels. Thus, the river will have a decreased potential to accommodate high volumes of water.
v. Residential areas lower than the river and protected by high banks. When a residential area is lower than the river, high banks protect the area from overflow of the river nearby but also prevent the rainwater inside the area from flowing out. Thus, the people who live in that area are still liable to suffer from flooding.

The DID of the Federal Territory of Kuala Lumpur (2001, 2002, 2003, 2004, and 2005a) sees the main factors that cause flooding in the Klang Valley as follows:

i. Loss of flood storage as a result of development extending into and taking over flood plains and drainage corridors
ii. Increased runoff rates due to urbanisation
iii. Inadequate drainage systems or failure of localized drainage improvement works, extended insufficiently downstream
iv. Construction of bridges and culverts that are either undersized or partially blocked by debris build-up
v. Silting in waterway channels from indiscriminate land clearing operations
vi. Localized continuous heavy rainfall
vii. Tidal backwater effect
viii. Inadequate river capacity.

However, in addition to the causes of flash floods mentioned by JICA and DID, a few other factors relating to the physical environment and the natural processes of the drainage basin also need to be considered.

The impact of urbanisation on rivers in tropical areas is well documented (Aiken, *et al.*, 1982; Gupta, 1984 and 2004; Douglas, 1983 and 2004). According to Rahmat (2000) and Douglas (2004), the increase in flash flood events is due to inadequately controlled urbanisation and land development activities. In the late 1960s, Douglas (1968) relates that in six hours or less following intense short-duration rainstorms, the Gombak River in the Klang drainage basin could rise to its flood peak. Douglas (1968) and Jamaluddin and Sham (1990) argued that flash floods in the Klang Valley are controlled by four factors: development, settlements, squatters and mining activities. Additionally, in the case of the Klang Valley, flash floods are closely connected to changes in environmental elements such as vegetation clearance, which is important in the process of infiltration, interception and restoration of ground water. Vegetation removal is a major process to allow for the construction of development projects. Hence, in the Klang drainage basin, as construction activities continue, the denuded areas, through soil erosion processes, produce a huge amount of sediment, which is brought down the slopes and causes large volumes of sedimentation in the rivers (Douglas, 1999).

As reported by the DID of the Federal Territory of Kuala Lumpur (2003), the flash flood events in the year 2003 in the Klang Valley caused a great loss of property. One person died and

massive traffic congestion occurred due to flooded roads. These are classic tangible impacts, which include such factors as environmental pollution due to sediment and rubbish left by the flood. Intangible impacts are less often cited but are just as significant. Anxiety, stress, mounting pressure and increasing tension are among the intangible impacts caused by these periodic flash floods in the Klang Valley. Both tangible and intangible impacts are examined in more detail in the following chapters.

In the modern world, technology has allowed mankind to have the ability to radically modify natural catchments in pursuit of industrial and urban development. Development of a drainage basin like the Klang Valley can produce a variety of impacts that exist through complex interactions between society and its environment. The squatter settlements, which are mostly located on the flood plains, place the urban poor at risk of being hit by flash floods. Recently, as we shall see in Chapter 6, some commercial housing estates have been located in the river reserves, as suitable land areas are so limited and the land value is very high. Therefore, the urban middle class are also at risk of various flood impacts.

5.7 Managing flood problems in the Klang Valley

Flood problems in the Klang Valley have been given special attention by the Government since the catastrophic floods of 1971. During the 1971 floods, a third of the Klang Valley was inundated. The whole of Kuala Lumpur was covered with water, and all the offices, schools and shops in the affected areas were closed. Under the Second Malaysia Plan (1971-1975), the government spent a sum of RM 14 million on flood mitigation projects (Chia, 2004). The amount spent on flood mitigation has increased each time a new Malaysia Plan has been presented. The Sixth Malaysia Plan (1991-1995), with RM 431 million, was followed by the Seventh Malaysia Plan (1996-2000), RM 845 million, and the Eighth Malaysia Plan (2001-2005), RM 2.7 billion (Malaysia, 1991; Malaysia, 1996; and Malaysia, 2001). According to Chia (2004), the estimated future cost of flood mitigation work and river improvement in the next 15 years will amount to some RM 17 billion.

The Department of Irrigation and Drainage, under the Ministry of Natural Resources and Environment, which operates both at federal and state level, has been given the responsibility for managing flood problems in Malaysia. According to its own official website, the main objective of the Federal Territory of Kuala Lumpur's DID (2007) is:

> To improve the quality of life for the people in the Federal Territory/Klang River basin by reducing negative impacts of flooding through a flood mitigation programme and to improve drainage systems and rivers without interfering with the natural environment and beauty of the area.

The department lists its functions as being "to plan, design and implement a flood mitigation programme in Kuala Lumpur and the Klang River basin". It claims responsibility for maintaining the flood mitigation structure and flood warning system of the Klang River basin and increasing the potential for the river environment to become a recreation centre (DID, Federal Territory of Kuala Lumpur, 2007) It is clear therefore that the DID of the Federal Territory sees its responsibilities as stretching beyond the Federal Territory and covering the rest of the basin.

According to the DID Officer of the Federal Territory (Interviewee K), in order to standardise the flood management programme in the Klang Valley, a flood mitigation programme has been designed to tackle both ordinary river flooding and flash floods. However, for the Klang River Basin Floods Mitigation Project, the mitigation planning programme does not appear to include the whole Klang River Basin -- despite the Federal Territory of Kuala Lumpur DID claiming responsibility for managing the whole of the Klang River basin (Interviewee K). The rivers included in the programme are the Klang River and its tributaries that flow through the Federal Territory of Kuala Lumpur and the downstream stretch of the Klang River that flows through Selangor but, crucially, not upstream reaches and other Klang River tributaries in Selangor. Besides, even though the DID of the Federal Territory of Kuala Lumpur is liable for managing the rivers in the Klang River basin, during the author's visit to the DID of Selangor, Interviewee F mentioned that the state office also manages the Klang River and the rivers in the Klang drainage basin that flow through Selangor under the Selangor flood mitigation programme. As reported by Dr Nik & Associates Sdn. Bhd. (2004), there are two major on-going projects for flood mitigation in the Klang Valley. They are, firstly, the Klang River Basin Flood Mitigation Project and environmental improvement starting from December 1996 undertaken by the Department of Irrigation and Drainage of the Federal Territory of Kuala Lumpur, and secondly, the Selangor Flood Mitigation Project (2001), undertaken by the Department of Irrigation and Drainage, Selangor (Dr Nik Associates Sdn. Bhd. 2004). This clearly shows the extent of duplication and the capacity for misunderstanding in the administration of river management of the Klang Valley. Furthermore, the function of all DIDs concerning urban drainage appears to overlap with similar functions of the local authority. Local authorities are responsible for giving guidelines and approval for building proposals,

including for the design of drainage systems (Rahmat, 2000; Ramadas, 2000). Thus, regarding the management of the Klang drainage basin river, different authorities give different information.

The DID Officer of the Federal Territory (Interviewee K) added that under the Flood Mitigation programme of the Klang Valley, two types of measures, structural and non-structural, are applied in order to provide effective and adequate flood protection for the Klang River Basin. The main question here is how efficient the techniques chosen in the Klang Valley are. In the context of flash floods, not every technique applied in other countries is suitable for the Klang Valley, as different places have different inputs of rain, different geomorphological aspects and different man-made adjustments to the environment. The details of the flood mitigation programme will be discussed further below.

5.7.1 Structural measures: the preferred methods

As mentioned in Chapter 2, structural measures are the "hard" flood control procedures, using engineering techniques that can be easily recognised in some parts of the Klang River such as river concretising, levees, embankments, flood storage and construction of dams and ponds, particularly in the upper catchments of the Klang river basin.

The major structural flood mitigation projects in the Klang Valley, at a cost of more than RM 100 million, are:

i. Construction of Batu Dam
ii. Raising of the Klang Gates Dam
iii. Construction of the Gombak Diversion and the Batu Retention Pond
iv. Construction of the Kg Baru Pump House
v. River improvement works for 11 rivers with a total length of 185km
vi. Removal of Puchong Drop, and
vii. Utilisation of ex-mining ponds as flood retention storage.

(DID Federal Territory of Kuala Lumpur, 2005b)

From the studies conducted by the author on flood problems in the Klang Valley, "hard" engineering techniques represent the most popular solution chosen by the government over the past few decades (Mariney, 2001). For example, since 1930, after the Klang Valley experienced

a great flood in 1926, as part of the flood mitigation programme of the Klang River the section of river that passed through the city centre was concretised with a double trapezoidal cross-section (see figure 5.2 and 5.3). However, according to Douglas (2004:353), the channel design changed in appearance two or more years after construction, when the concrete river was covered with silt and accumulation from flood flows, as well as aquatic vegetation growing on this silt. The river concretising project was continued in 1997, when the River Anak Ayer Batu and the Pantai River were turned into "concrete rivers" (see figures 5.4a and 5.4b). This was done in order to control riverbank erosion and to speed up the river's flow into the Klang. Before this project took place, "soft" control techniques had been applied to the river, controlling bank erosion by using logs. The concretisation of the banks clearly shows the DID's confidence in engineering techniques as a solution to flooding. However, this project has not prevented or minimised the occurrence of flash floods in the Klang Valley: from 1990 to 2000, the incidence of flash flood events recorded by the DID of the Federal Territory of Kuala Lumpur was higher than had been recorded in the decade before.

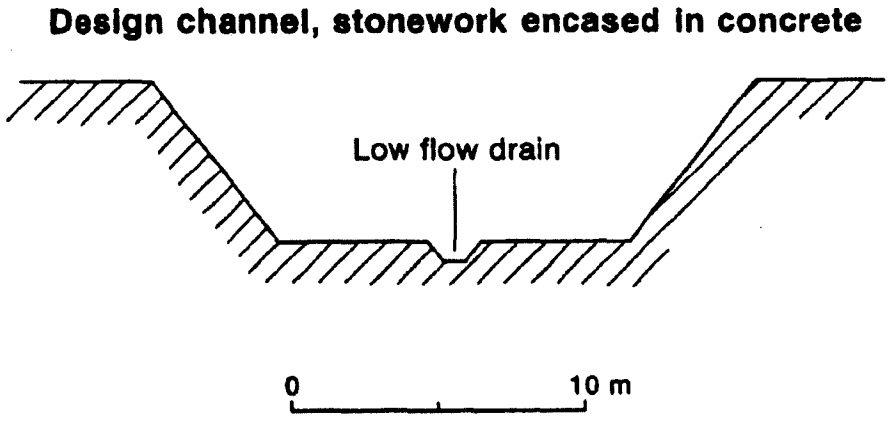

Figure 5.2. The section of river that passes through the city of Kuala Lumpur has been concretised with a double trapezoidal cross-section.

Source: Douglas (2004:353).

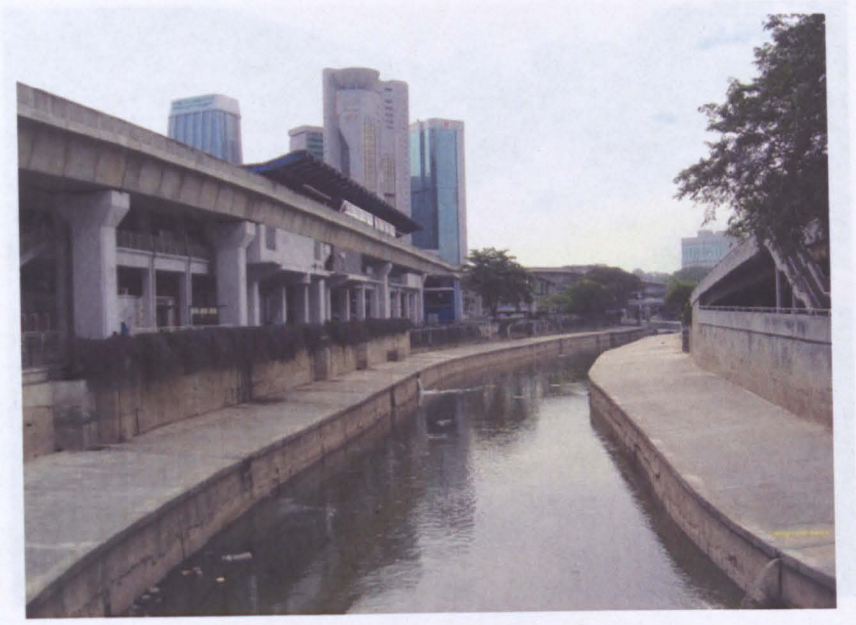

Figure 5.3. The concrete Klang River in the city centre.

Source: Author's photograph.

Figure 5.4a. A part of the Pantai River on which natural protection in the form of a barrier of branches was installed to control river bank erosion before 1998 (see arrow).

Source: Author's photograph.

Figure 5.4b. Part of the Pantai River from which natural protection was removed and concrete slabs installed in 1998.

Source: Author's photograph.

A further example that illustrates the tendency to use structural measures is the decision taken in 2004 by the federal government to use new "hard" solution techniques, such as constructing a flood diversion tunnel called the Stormwater Management and Road Tunnel, or SMART, at a cost of RM 1.9 billion. Keizrul, the Department of Irrigation and Drainage director-general, claimed that as a result of this construction, "The city centre will be free of major floods by 2006 when the Storm Water Management and Road Tunnel (SMART) project is completed, and the city centre will no longer see floods like that which occurred on 10th June 2003, or even Kuala Lumpur's worst flooding disaster in 1971" (New Straits Times, 20/6/2003).

This project is being implemented in Kuala Lumpur in order to divert large volumes of floodwater through an underground tunnel, preventing it from entering the city centre (DID Federal Territory of Kuala Lumpur, 2005b). The channel has two purposes: it is a motorway on normal days, but a storm water channel if flooding occurs (see Figure 5.5). Previous programmes, according to the DID's director-general, did not achieve satisfactory results in eradicating flash flooding in the Klang Valley. However, the aim of this tunnel is to eliminate flood problems in the restricted area of the Federal Territory of Kuala Lumpur. In this situation, where flash floods occur in most parts of the Klang Valley, other parts of the valley will continue to suffer. Hard control techniques need huge budgets if they are to be implemented in

the entire drainage basin; hence, given the financial restrictions, most of the large structural projects such as river channelisation and the SMART tunnel focus only on the city centre to enhance Kuala Lumpur's image as national capital.

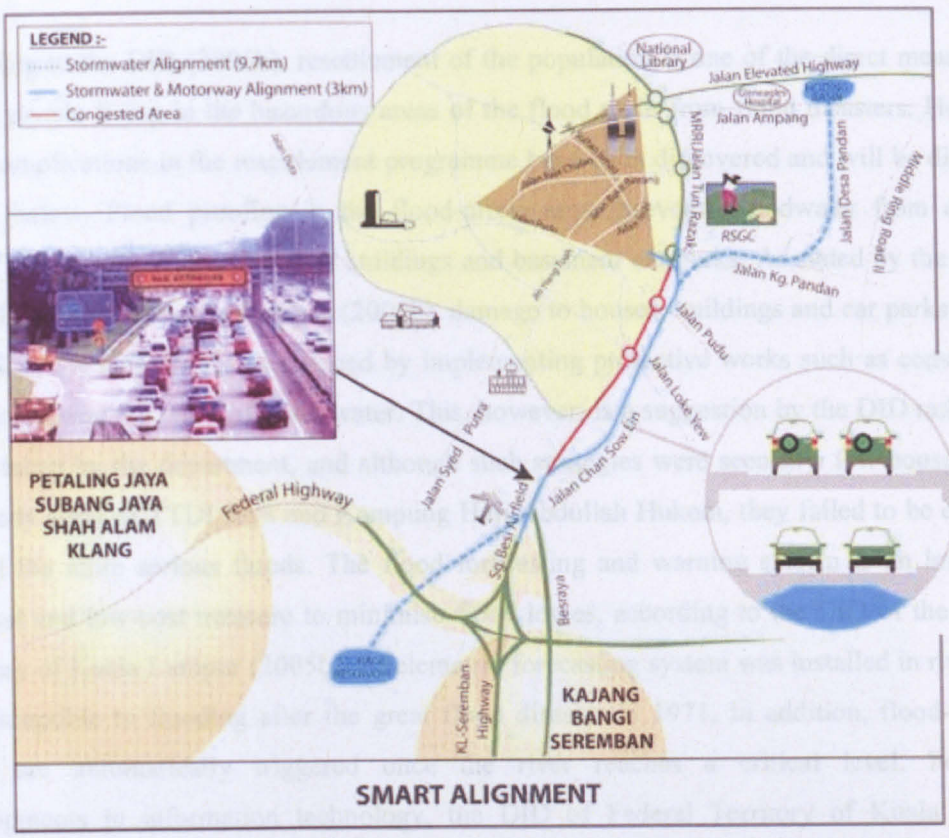

Figure 5.5. The Storm Water Management and Road Tunnel (SMART).
Source: DID, Federal Territory of Kuala Lumpur (2005b).

5.7.2 Non-structural solutions: a supporting role

While engineering solutions have tended to be the predominantly used approach in the Klang Valley, recently the government has started to add non-structural measures to the mix. Non-structural measures, or non-engineering solutions, according to the DID of the Federal Territory of Kuala Lumpur (2005b), are not only methods for preventing floods but also for reducing flood damage in the Klang Valley. The non-structural measures implemented in the Klang Valley comprise resettlement of the population, flood proofing, flood forecasting and warning systems, as well as the setting up of a nationwide network of hydrological flood data collection stations, river clean-up programmes, the preparation of guidelines and design standards, integrated river basin management (IRBM) schemes and river basin studies and the preparation of drainage master plans for major towns (DID Federal Territory of Kuala Lumpur, 2005b).

The Federal Department of Irrigation and Drainage (2005b) has also focused its research on bringing the flood maps up-to-date and proposing optional flood control planning and design criteria, with consideration of socio-economic development.

According to the DID (2005b), resettlement of the population is one of the direct measures to protect people living in the hazardous areas of the flood plain from flood disasters. However, some complications in the resettlement programme have been discovered and will be discussed further below. Flood proofing in the flood-prone areas prevents floodwater from entering houses and specific objects such as buildings and basement car parks. As stated by the DID of Federal Territory of Kuala Lumpur (2005b), damage to houses, buildings and car parks located in flood-prone areas could be reduced by implementing protective works such as constructing walls to prevent the entry of flood water. This, however, is a suggestion by the DID rather than action taken by the department, and although such strategies were seen in a few houses in the two study areas of TTDI Jaya and Kampung Haji Abdullah Hukom, they failed to be effective against the more serious floods. The flood forecasting and warning system is an important, practical and low-cost measure to minimise flood losses, according to the DID of the Federal Territory of Kuala Lumpur (2005b). A telemetric forecasting system was installed in rivers that are susceptible to flooding after the great flood disaster in 1971. In addition, flood-warning sirens are automatically triggered once the river reaches a critical level. Following developments in information technology, the DID of Federal Territory of Kuala Lumpur recently developed a web-based information system of flood warnings and flood information. The web-based information is useful for those who have Internet access at home, but for the urban poor, this web information is not really effective, as generally computers are not a basic need for them. Also, the author has visited this web site whenever she has been aware of heavy rainfall in the Klang Valley in order to check the current situation. Unfortunately, however, it has not always been possible to obtain information during the web visits due to various online system failings. However, for flash floods, little lead-time is available for effective warnings (DID, Federal Territory of Kuala Lumpur, 2005b).

In 1992, the DID of the Federal Territory of Kuala Lumpur introduced a Ten-Year River Clean-up Programme under its Klang Valley flood mitigation programme. The objective of this programme was to clean rubbish and silt from the Klang River and its tributaries in order to increase the water quality and improve the scenery of the river corridor by developing it as a recreation area (DID, Federal Territory of Kuala Lumpur, 1996a). However, from observations made by author, it is not clear how the scenery of the Klang River corridor has been improved, as the section of the Klang River passing through the city centre is fully concretised, and as for

the rest of the stretch that flows through the Federal Territory of Kuala Lumpur, most urban development is located close to the river, and in some places there is no border between the river banks and development areas. This definitely does not follow the guidelines prepared by the DID for river frontage development as mentioned above (see figure 5.6). Furthermore, a river cleaning programme cannot be truly effective as part of a ten-year programme: it needs to be implemented continuously. According to the DID of the Federal Territory of Kuala Lumpur, the cleaning programme started in the upper catchments, but they tended to be silted again by the time the work reached the middle section of the drainage basin. After ten years, when the cleaning programme was approaching the lower catchments, the upper and middle reaches of the Klang River were already back to the same situation in which they had been before the programme started. However, according to the DID of the Federal Territory of Kuala Lumpur (2005b), the Klang River desiltation programme will be carried out once every three years, except for the stretch of the Klang River that passes through Kuala Lumpur city centre, which will be excavated every year (see figure 5.6).

Figure 5.6. Excavation work on the Klang River and a new commercial development abutting the river bank (see arrow).

Source: Author's photograph.

As regards the preparation of guidelines and design standards, in the year 2000, the Federal DID published a new Urban Stormwater Management Manual (USMM). The USMM replaced the DID's 30-year-old Urban Drainage Design Manual, which was based on pure engineering

solutions (Yong and Md Nasir, 2004). The USMM emphasises both structural and non-structural measures. It provides control-at-source measures, and also contains recommendations on flood fighting. Private development companies and various government agencies that are involved in land clearing activities for development projects are encouraged to work together to ensure that excess runoff and silt do not affect neighbouring areas (Yong and Md Nasir, 2004). The utilisation of detention/retention ponds and infiltration and water purification processes is urged in order to create a more harmonious urban environment (Chia, 2004). As Interviewee H, from the Urban Drainage Section, DID Selangor, stressed, "The purpose of the USMM is to control the quality and quantity of water flowing into the river". Chia (2004) has noted that, "The Department of Drainage and Irrigation has published more than 20 Hydrological Procedures as well as the Urban Drainage Planning and Design Procedure No. 1 for use as reference materials and guidelines by all planners, consultants and other government agencies throughout the country". According to Interviewee F, an engineer from the River and Coastal Engineering Unit of the DID Selangor, "If these guidelines and design standards are followed strictly by the private and public sectors it will help to minimise the flood problem and also the flash flood problems in the Klang Valley. However, there is no bye-law or measure that forces people to exactly follow the guidelines prepared".

Integrated river basin management (IRBM) is one of the latest non-structural measures implemented in the Klang Valley, and was initiated as part of the Eighth Malaysia Plan. Research by Dr Nik and Associates Sdn. Bhd. (2004) shows how, under the concept of IRBM, the river basin can be planned in an integrated manner with all factors taken into consideration. The aim of IRBM in Malaysia is to strengthen environmental management of issues such as floods, water shortages and water pollution and link it with land use (DID, Federal Territory of Kuala Lumpur, 2005a). When a certain development plan is proposed, factors like the natural flood plain, zoning for river corridors, riparian areas, conservation of wetlands and storage ponds should be taken into consideration in order to incorporate them into flood management plans (Dr Nik and Associates Sdn. Bhd., 2004; Chia, 2004). However, Ramadas, *et al.*, (2000) argue that the implementation of IRBM in Malaysia so far has been generally based on the application of engineering solutions and has not incorporated environmental and ecological considerations. Although IRBM appears to be accepted among Malaysian planners and decision makers, they say this strategy does not seem to have been successfully applied on the ground, as the overlapping jurisdiction of different government agencies and departments is still complicating matters (Ramadas, et al., 2000). In the specific context of the Klang Valley, there are two agencies involved in managing the IRBM strategies: in the Federal Territory, the

strategies are implemented by the DID, and for the State of Selangor, by the SWMA. This situation again causes conflict to arise over flood management in the Klang Valley.

Investigations undertaken by the author have revealed that the structural and non-structural measures currently undertaken by the DID fail to offer an integrated solution that uses "soft" control measures or environmentally friendly methods. Furthermore, structural measures have not been divided into flood control strategies on the one hand and flood abatement strategies on the other; this division would clarify which measures are structural and which are environmentally friendly or "soft" solutions, as discussed in the literature review (see Chapter 2.4.4). As we have seen, while the use of "soft" controls has been encouraged in the Klang Valley, little has actually happened, and in practice, "hard" engineering techniques are the only approach that have been used in the Klang Valley flood mitigation programme. "Soft" controls would also involve using the cultural value of water and rivers, redeveloping urban waterfronts, providing a "greener" environment, and introducing river restoration programmes (Waley and Purvis, 2002:5). In the case of Japan, lower catchments were concretised for flood control management in the period of rapid growth after World War II. Continued flooding, however, led to moves to re-introduce flood meadows and comprehensive basin-wide planning to replace the use of concrete beds and banks (Waley, 2005). In addition, it was found that emphasis on combining measures with the recovery of riverside land as a public amenity could minimise flood damage.

From investigations undertaken by the author into the Federal DID's non-structural measures, it has become clear that some substantial aspects such as land use planning, flood plain zoning or flood insurance have been ignored and are not being implemented, even though their importance has been stated in the integrated river basin management strategies, and these problems in flood management have been recognised at least since the publication of the work of Leigh and Low (1978) more than two decades ago and, in a local context, of the research undertaken by the author from 1994 to 2001.

Land use planning and flood plain zoning are important in order to ensure that the community is protected from flood hazards and are therefore legally regulated. The National Land Code (1965), for example, contains indirect provisions for dealing with flood control. Besides, various other regulations affecting flood management come indirectly via laws on river use and water. One of these is the national Waters Enactment 1920, which is the basic law on river use. It covers building activities on or adjacent to river banks, and gives the state powers to stop construction (Chan, 1997:212). For obvious reasons, it does not differentiate between federal

and state governments, and this, as Chan points out, has led to frequent clashes between federal and state governments.

When land use regulation is not applied in flood management, there have been cases where non-structural measures applied in the Klang Valley have faced failure, with overlap occurring between agencies responsible for flood management and agencies that deal with land use development. For example, the resettlement from the flood plain of the Klang River of more than 60,000 squatters who had repeatedly suffered from flash floods was arguably one of the positive moves undertaken by the federal authorities. This move was achieved in stages, the first of which involved the 2,651 squatter houses that needed to be moved immediately because of the DID's ten-year river cleaning programme, as they were located adjacent to the river banks. The resettlement programme involved a large budget, as every unit of new housing supplied needed RM 20,000 in construction costs. In addition, this resettlement project also involved land alienation from the State of Selangor. Therefore, the federal government was given a subsidised grant for this resettlement project (DID of Federal Territory of Kuala Lumpur, 1996b). However, this was only a temporary solution, as some of the flood plains have been redeveloped, either for commercial purposes or for housing. Therefore, in the new residential developments, inhabitants will continue to suffer the same problems that were experienced by the urban poor, as in general the developments do not include any flood proofing as this would have increased the cost of construction.

Furthermore, when questions were raised about how development will proceed in one of the planned areas following the clearance of squatter houses, Interviewee D, the Planning Officer at Kuala Lumpur City Hall, stated that the city council would leave it to the developer to decide how to develop the area. This situation clearly illustrates that in the Klang Valley, there is little communication between agencies involved in managing floods and those responsible for development.

When problems occurred, Ong Ka Ting, the Housing and Local Government Minister, gave feedback concerning the construction of proper housing settlements on the flood plain:

> The ministry sent out notices to all local authorities to check certain guidelines which ought to be imposed on future housing developments.... New housing schemes were not allowed to be built on natural flood plains or on low-lying areas in order to minimise the flood impact.
>
> (The Star, 3/5/2000)

The minister was referring to a long-term plan prepared by the Housing and Local Government Ministry to reduce the impact of flooding on local communities. According to Interviewee L, a planner from Shah Alam City Council, there are no local-authority planning guidelines for development projects located on the flood plain. She also said that all the guidelines regarding river reserves or flood plain developments are the responsibility of the DID. However, Interviewee F from the Selangor River Engineering Unit of DID Selangor stated that planning guidelines provided by the DID Office have failed to elicit a positive response from developers, and the local authority has no means of enforcing any guidelines. Local authorities regard problems with development of the flood plain area as being the DID's responsibility.

Finally, one of the major reasons why engineering solutions tend to be the priority method for flood management in Malaysia in general and the Klang Valley in particular is that all the directors and assistant directors and most of the officers of the DID are engineers. It is not surprising, therefore, that 'hard' control techniques are preferred to 'soft' or environmentally friendly solutions.

5.8 Selangor State planning in the context of the drainage basin: the establishment of the Selangor Waters Management Authority (SWMA)

In order to respond to water management issues in Malaysia, during a cabinet meeting in July 1997 the Selangor State Government was requested to consider a proposal to establish an agency to manage the river and water resources in an integrated manner by applying the Selangor River as a pioneer project. The agency was the first in Malaysia to manage catchment development in a project that was regarded as a pilot scheme for other developments in the State of Selangor and also for other States in Malaysia (SWMA, 2004).

On 18th September 1999, the Selangor Waters Management Authority (SWMA) was launched as a one-stop agency for the management of water resources, river basins and coastal waters in the State of Selangor. However, it only came into operation on 1st August 2000 (Selangor Waters Management Authority, 2004). According to Interviewee G, a senior engineer at SWMA:

> This new agency has been formulated in order to eliminate any duplication of functions and responsibilities among the agencies and between the State Government and the Federal Government. It is a pioneering agency in the management of water resources

> and river basins and has been accorded the status of legislative and enforcement authority.

The SWMA has authority over river basins and other designated water bodies such as lakes, ponds and wetlands, aquifers and coastal waters (Rahmat, 2000). The objectives of SWMA are:

i. Protection of rivers and water resources including the environment.
ii. Promotion of integrated river and water resources management.
iii. Promotion of private sector participation in rivers and water resources whilst protecting public interests.
iv. Promotion of public participation and awareness of the importance of rivers and water resources.
v. Coordination of research and development in the water sector.

(SWMA, 2004)

In order to monitor development in Selangor State, four drainage basins in Selangor each have their own regional office. The aims of regional offices are to be, "Responsible in the implementation of various policies and programs of SWMA at the regional level, in accordance with directives made by the Head Office, and the organisational structure at the regional office are streamlined with that at the Head Office division" (Rahmat, 2000).

Interviewee G believes that, to ensure this authority functions well, the creation of the SWMA board of directors was very important as it also includes members of the State Executive Council. She argues that:

> Because we know most of the decisions made regarding the development process in this country are controlled by politicians, by including them in this committee we hope that all the planning and management decisions made by this authority will be followed -- because normally politicians have power in their words.

The board of directors is chaired by the Chief Minister of Selangor. The deputy chair is the Selangor State Secretary, and other members are the Selangor State Legal Advisor, State Financial Officer, two members of the State Executive Council appointed by the Chief Minister of Selangor, the Director General from the Department of Irrigation and Drainage, five other

members who are appointed based on their field of specialization in water resources management. The Director of SWMA acts as the secretary to the board (SWMA, 2004a).

During the inception stage of the SWMA, planning and zoning were the most important agendas dealt with by the authority. However, the SWMA is a state agency and some problems have occurred in coordinating with federal agencies such as the Federal Town Planning and Country Department and Department of Irrigation and Drainage.

The SWMA's mission is to preserve and improve the quality of water resources and the river basin, and contribute to its sustainable development through an integrated and holistic management (SWMA, 2004b). To preserve water resources, river basins, coastal areas and the natural environment in the State of Selangor in a sustainable and manageable condition, the SWMA has implemented research, planning, zoning, environmental management, development, operation and maintenance, legal and enforcement and corporate services (Rahmat, 2000).

For the future, the SWMA aims to proceed with a "protection zone area", with the SWMA as the coordinator. Therefore, research has been carried out for the Damansara catchment within the Klang River basin as a pioneer project and the SWMA hopes to finish by 2006 in order to realise the objective of the Draft Selangor Structure Plan, which incorporates sustainable development in policies to promote Selangor as a developed state by 2005 (SWMA, 2004b). Interviewee G notes that:

> The protection zone area means that any development project in that area must be referred to the SWMA. The SWMA will have prepared guidelines for physical development and engineering that determine standards, procedures and regulations for catchment development. The SWMA delegates its authority and functions to other agencies, for example the local authority and Department of Irrigation and Drainage, in order to ensure that the development process follows what has been laid out.

Interviewee G goes on to note that:

> Until today, the SWMA was actually only at a preparatory stage of its work, which emphasises research programmes. This means that in five and a half years there is not much the authority can do, because, as a new body involved with legislation and

enforcement, it has had to create understanding from other agencies, and this is very difficult as well as being very important.

By managing and controlling urban development in Selangor State, the state government also expects to minimise flash flood events. Flash floods in Selangor became a national issue when the Federal Expressway II and the New Klang Valley Expressway in Shah Alam frequently flooded to a depth of more than one metre, causing traffic to Port Klang to be halted. This is not to mention the many nearby settlements that suffered from flash floods, including TTDI Jaya, Kampung Baru Subang, Kampung Kebun Bunga and Kampung Chempaka (DID Petaling, 2000).

Until 2005, only Selangor State considered that water planning management needed to be undertaken alongside other land use development. However, in the context of development in the Klang Valley, the coordination of planning between Selangor and Kuala Lumpur is essential. The battle for sustainable development in Selangor will be an illusion if Kuala Lumpur has a different view in managing its land use development.

5.9 Conclusion

The discussion in this chapter has focused on the issues of development and the environmental crisis faced by the Klang Valley with regard to the problem of flash floods. In order to better understand the consequences of the conflict over land use development that occurs in the Klang Valley, a few aspects of the general development planning process in Malaysia were introduced. The study then examined some issues regarding land use development in the state of Selangor and Kuala Lumpur. This provided an insight into what really happens behind the statements that development planning needs to follow specific land use regulations before planning approval is given in order to ensure that the development is not going to harm the environment. The discussion then continued with the problems that have arisen in the development of the Klang Valley due to the fact that two different authorities were engaged in development planning for the region. The problems became more critical when the issue of flash floods persisted, and indeed still remain unresolved. Development planning based on a drainage basin needs suitable guidelines in order to ensure that construction will not inflict environmental problems on other areas. In fact, the new Ministry of Federal Territories was established in part in order to guide development planning in Kuala Lumpur. The Klang Valley, as the centre of economic development in Malaysia, has also seen the development of land use resources. Recently, the Klang Valley has experienced a land use crisis, as suitable land is now

becoming ever more scarce. Hence, some sensitive areas have been used in development projects. Consequently, with the loss of sensitive land, flood problems which a few decades ago were not a critical issue have now become a serious and undeniable problem in the Klang Valley.

From the discussion above, it is clear that the flash flood events that have had such a huge impact on some members of the urban community are firstly related to the development planning strategies of authorities in the Klang Valley, which have failed to consider the importance of planning in the context of drainage basins and the significance of the natural system as a key element of development planning in sensitive areas of the flood plain. There are already plans to develop further the flood plain in the future, as stated in the structure plans of Kuala Lumpur and Selangor. Without an awareness of the impacts to the environment of development planning strategies drawn up by the authorities, communities who live in flood plain areas will become ever more vulnerable.

One reason why the authorities tend to neglect the impacts of development in hazardous areas is related to the fact that different authorities and agencies have overlapping responsibilities for dealing with the flooding. A second reason lies in the fact that flood mitigation projects adopted by the DID clearly show that the focus is on "hard" engineering techniques for solving flood problems. The DID flood mitigation programme suggests that attempts are being made to make flood control projects suitable for the Klang Valley. However, in solving flood problems in the Klang Valley, environmental conservation needs to be the new agenda on which the DID focuses. Finally, the discussion above clearly shows that development planning and the flood management programme tend to be seen as two separate matters; even though the DID provides planning guidelines for flood plain development, there are no bye-laws that must be followed, and the DID of the Federal Territory of Kuala Lumpur which claims to be responsible for managing floods in the whole Klang River basin actually has overlapping responsibilities in flood management with the DID of Selangor.

In order to bring the urban environment of the Klang Valley up to a suitable standard as a good living environment, integration between development planning and flood management is important. The creation of such links will be a way to introduce land use regulation to protect the urban community from the hazard, risk and disaster of flooding; the SWMA is an agency with the potential to lead this mission.

CHAPTER 6

EXPECTATIONS AND QUALITY OF LIFE: FLASH FLOOD PROBLEMS IN TTDI JAYA

6.1 Introduction

Following on from the examination in Chapter 5 of the limited supply of suitable land in the Klang Valley due to rapid development, this chapter will focus on commercial settlement developments that have been constructed in flood plain areas. Such developments increase the risk of exposing the resident community to flood hazards, as discussed in Chapter 2. However, some planned settlements in the Klang Valley suffer from flash floods, and these have a tremendous impact on the affected residents. In order to understand the impact of flash floods for people living in commercial housing developments, the residential estate of TTDI Jaya in Shah Alam, Selangor, located on the flood plain of the Damansara River in the Klang Valley, was chosen for investigation, as this area frequently suffers from frequent flooding (see Map 13).

Early housing developments in Shah Alam were based on the Shah Alam master plan (1983) compiled by the Selangor State Economic Development Corporation; this plan allocated 4,048 hectares, or 30.43 per cent of the total of 13,439 hectares, to development of new housing (Dasimah, 2002:163). In 1997, the local authority boundary of Shah Alam was re-drawn and Shah Alam's area expanded to 290.3 sq km. This led to a population increase from 130,000 in 1990 to 298,191 in 1997 (Selangor Town and Country Planning, 2002). Shah Alam's population is predicted to reach 876,296 by 2010 (Selangor Town and Country Planning, 2002). Thus, considering the potential for residential development in Shah Alam, investment in housing by the developer of TTDI Jaya seemed to be soundly based.

TTDI Jaya has undergone two phases of housing development: the first phase was begun in 1992 and fully ready for occupation in 1994 (Zukri Jamal, TTDI Jaya committee member), while the second phase started in 2002 and was still under development in 2005 when the field work was undertaken. The research here concerns only the first phase of TTDI Jaya, as this area is fully established and started to experience flash floods in 1996. The second phase of TTDI Jaya's development can be easily recognised: it is distinguished by the fact that the houses are built on higher bases than those in the first phase.

The Damansara River, which flows through TTDI Jaya, is 21 km long and together with its tributaries forms the Damansara catchment, covering 148 sq km. It is one of the catchments with the most rapid rates of development in the Klang Valley (SWMA, 2004). In 2004, the population of the Damansara catchment was estimated at 369,000, and several new housing developments had been completed (SWMA, 2004). These are mainly concentrated in Damansara town and in Petaling Jaya. There are four local authorities involved in managing the Damansara catchment, namely Shah Alam City Council, with 50 per cent of the area, Petaling Jaya Municipal Council with 40 per cent, Subang Jaya Municipal Council with 5 per cent and Kuala Lumpur City Hall with a further 5 per cent (SWMA, 2004). TTDI Jaya falls within the Shah Alam City Council boundaries. The rapid development of the Damansara catchment has led to some flood plain areas being involved in urban development.

This chapter explores the ways in which residents of the first phase of development of TTDI Jaya have experienced, perceived and responded to flash flood problems and examines how the impact of flash floods have changed people's behaviour towards their living environments. However, people still live in TTDI Jaya, even though the problem of flash floods remains unresolved.

In its enquiry into the problem of flash floods in TTDI Jaya, this chapter consists of two parts. The first part provides background information on the history and development of TTDI Jaya, its socio-demographic composition, its natural and built environment and reasons why it has become vulnerable. The second part discusses the community's experience of flash floods, how flash floods have affected the people of TTDI Jaya, preparations and adjustments for flash floods and the future of TTDI Jaya. Questionnaire surveys, interviews and observations were conducted throughout the area in order to obtain a fuller picture. The questionnaire survey addressed four areas: opinions about flash floods, adjustments to flooding, housing history and opinions about the settlement area and socio-demographic data (see Chapter 4.8.1). Interviews were conducted to supplement the results of the questionnaire survey by focusing on a few important topics such as interviewees' experiences of flash floods, the impact of flash floods and why people choose to continue living in TTDI Jaya. The combination of information from questionnaire surveys and interviews gave a clear description of what people feel about flash floods and helped the author gain a better understanding of the overall situation of the study area.

Even though some difficulties arose when obtaining information for the questionnaire survey, the use of snowballing techniques and assistance from residents of TTDI Jaya provided the

author with an opportunity to collect suitable knowledge about the flash floods in the area (see Chapter 4.5.2.1). All the quotations that appear in this chapter were collected during the author's fieldwork in 2005, except for the interview with Zukri Jamal, the TTDI Jaya committee member, which was conducted during a brief visit home that the author undertook in December 2004).

6.2 TTDI Jaya and TTDI Development Sdn. Bhd.

The aim of this section is to explore the general situation of the settlement area of TTDI Jaya and offer an overview of TTDI Development Sdn. Bhd., the developer who was responsible for constructing this residential area.

In 1992, TTDI Development began work on construction of the residential estate of TTDI Jaya in the state capital of Selangor, Shah Alam. TTDI Jaya, or the Taman Tun Dr Ismail Jaya, was named after the late Tun Dr Ismail, who served as deputy prime minister from 1969 to 1973. The development project of TTDI Jaya consists of a total of 107 hectares of land (see Map 14). A total of 2,632 dwellings were built by the TTDI Development Sdn. Bhd. in TTDI Jaya, at a cost of RM 350 million (Property Times, NSTP, 7/12/2005).

TTDI Development Sdn. Bhd was established in 1973 and has since become one of Malaysia's leading developers of residential property. The successful housing development project of Taman Tun Dr Ismail Township in Kuala Lumpur in the 1970s motivated the developer to continue to produce high quality property developments. However, in 1998, with Malaysia facing an economic crisis, many property developments found themselves in a critical state, and TTDI Development Sdn Bhd. was one of those affected. Therefore, in order to maintain the company's property portfolio, in November 2000 Pengurusan Danaharta National Berhad (Danaharta), the federal-government-owned national asset management company, purchased TTDI Development (Fazli, 2006). As a result of this move, TTDI Development is now owned half government-owned and half in private hands.

Under new management, the TTDI Development Sdn Bhd continued to build houses on land the land the company had bought in Section 13 of Shah Alam. Thus, a further 1000 houses have been completed and all of these houses had been sold by the summer of 2005 (author's observation 2005).

In 1994, most of the houses in the first phase of TTDI Jaya were fully occupied. The majority of the residents of TTDI Jaya are middle class. The good reputation of the developer from its previous developments and the layout of TTDI Jaya encouraged people to expect a similar quality of environment as in the same developer's Taman Tun Dr Ismail in Kuala Lumpur. Rozie Ahmad, a housewife who has lived in a single storey terrace house on Jalan Prosa U2/28 for 12 years, noted:

> When my husband and I first bought this house, we were so pleased and really liked this area. It's close to my husband's office and close to Shah Alam city centre, and once all the shops had been opened, we were able to find most of our basic needs here. And my children can go to school by themselves because the school is just about 100 metres from the house.

Muzaffar Jailani, a professional of Jalan Bidalan U2/12, who has also lived in his two-storey terraced house for 12 years, expressed a similar sentiment:

> Before I lived in TTDI Jaya, my family and I lived in Selayang, which was a very crowded area. I work in Petaling Jaya. From Selayang to Petaling Jaya the traffic was so bad and everyday I faced traffic jams. When I heard about this new area of TTDI Jaya, I realised that it was a good area to live in, less built-up and would mean no more traffic jams when travelling to work. What's more, it was being developed by the well-known developer TTDI Developer, and we were keen to move in.

The statements above show the excitement of some residents about the prospect of starting life in TTDI Jaya when they first purchased their houses. Everyone expected a high quality of life, especially those who were buying their own homes for the first time.

The TTDI Jaya houses have been sold freehold rather than leasehold. The first phase was built on 50.9 hectares of land and contained 1046 dwellings. The types of houses in the first phase of TTDI Jaya were 80 single-storey terraced houses and 966 two-storey terraced houses (see figures 6.1a and 6.1b). Three types of two-storey house were built: the first on plots 7.5 metres wide by 22.5 metres deep; the second, 6.6 metres by 21 metres; and the third, 6.6 metres by 19.5metres. All these houses have four bedrooms and three bathrooms. The single-storey houses measure 6.6 metres in width by 21 metres in depth and have three bedrooms and two

bathrooms. The price for the new two-storey houses about 12 years ago was RM 180,000[1], RM 160,000 and RM20,000 respectively. For the single-storey houses, the price was RM 80,000 in 1994. By early 2000, some of the house prices had increased -- to RM 300,000 for the larger two-storey houses and RM 260,000 for the medium-sized ones, while the single-storey houses were about RM 150,000. However, these increments were not as rapid as those found in other housing estates, where prices increased as soon as houses were put back on the market. For example, houses in Section 13, Shah Alam, located about 2 km from TTDI Jaya, which were sold leasehold and were built on plots 7.5 metres wide by 22.5 metres deep, cost RM 260,000 new, but this increased to RM 290,000 when sold to the second owner in the same year. In the same development, houses on plots 6.6 metres wide by 19.5 metres deep were sold new for RM 180,000 but sold on at RM 230,000 in the same year (author's observation, 1999). In addition, freehold houses should cost more than leasehold houses.

The price of TTDI Jaya houses rose much more slowly right from the start due to the repeated flash floods, which made buyers think twice about buying these properties. Moreover, as a result of the latest flash flood on 26th February 2006, according to real estate agent reports enquiries about property in TTDI Jaya have been extremely slow (Bernama.com, 28/2/2006). For the single storey houses, the price is now RM 150,000. In other words it has remained unchanged; while two-storey houses cost about RM 200,000, which means that prices for the two-storey houses have plunged by RM 60,000 from the price in early 2000.

According to Zukri Jamal (TTDI Jaya Committee member, 2004), in its early years, TTDI Jaya was a gated community; anyone entering and exiting had to pass through a guard post for a security check. The security guards were employed by the TTDI Jaya residents. However, after a few years, the guard post was eliminated from the area when the residents found that the service provided was not good; there were a few cases of burglaries at a time when the primary and secondary schools were being constructed. The construction workers, who were generally foreigners, were free to enter and leave TTDI Jaya at any time, and suspicion inevitably fell on them. The TTDI Jaya Committee took their own initiative to organise patrols at night, with volunteers from the community (Zukri Jamal). Besides which, every house has its own gate and people can park their cars inside and lock the gates. Some of the residents have replaced their ordinary gates with electric gates.

[1] For conversion to pound sterling please refer to the note at the front of this work.

TTDI Jaya normally remains quiet during weekdays when most people are out at work, and after 5 p.m. many children go out to the park and play. Residents who have just returned from work generally prefer to stay inside and rest. Only during the weekends are adults commonly seen outside, cleaning their houses, gardening or playing with their children.

Local residents formed the TTDI Jaya Committee after the first flash flood in the area in 1996. The primary objective of the TTDI Jaya Committee was to raise the problem of flash floods with the responsible bodies, but other issues and problems also came under the committee's consideration. People who live in TTDI Jaya are automatically entitled to join the committee (the role of the TTDI Jaya Committee is discussed further in section 6.7.2).

In order to make the area convenient, TTDI Development had also constructed a centre for small businesses for TTDI Jaya residents. The idea was that this should benefit all residents. At the entrance to TTDI Jaya, as to similar planned settlements, there are a few blocks of mixed economic activities such as mini markets, grocery stores, restaurants, banks, clinics, office lots, petrol stations, laundries, workshops and similar facilities. Primary and secondary schools and also a kindergarten and a nursery are provided for the children who live there. A Community Hall was built by Shah Alam City Council for the use of TTDI Jaya residents (see figures 6.2a and 6.2b). Therefore, people who live there have easy access to most of their daily requirements without needing to leave their residential area. There are also a few parks that were laid out for each section within TTDI Jaya, and trees were planted by the developer along the streets. Rubbish collection in this area is organized by Shah Alam City Council, and residents pay.

TTDI Jaya is surrounded by a network of highways including the Federal Highway Route II, the Shah Alam Expressway, the North Klang Valley Expressway and the North-South Central Link. This location is particularly convenient for those originating from the north and south of the country. When they go back to their hometowns, they can avoid the traffic because they not do not have to cross the city centre (see Map 13).

Figure 6.1a. Two storey houses.
Source: Author's photograph

Figure 6.1b. Single storey houses.
Source: Author's photograph

Figure 6.2a. The secondary school in TTDI Jaya.

Source: Author's photograph

Figure 6.2b. The community hall of TTDI Jaya.

Source: Author's photograph

6.3 Socio-demographic composition of the TTDI Jaya population

Moving on from the wider picture of TTDI Jaya, this section introduces the socio-demographic details of the people who live there, using data from Section C, question 2 and Section D, questions 1, 2 and 4 of the questionnaire survey. Data from Section C concern house ownership, while Section D of the questionnaire gives information about the place of origin of the respondents, employment by occupation, age, size of family, how many people from each household are working and car ownership. Although these data are general, the information identified is important in forming an understanding of how and why people live in the flood-prone area of TTDI Jaya. Some of the socio-demographic information given by the respondents will also contribute to the discussion in the next section, as characteristics such as types of employment, size of the family and car ownership, are reflected in the perception of flash floods.

The residents of TTDI Jaya have come from various parts of the country to work in the Klang Valley, as this region offers a great many professional opportunities (see figure 6.3). Most people in TTDI Jaya own their houses: 82 per cent of respondents to the survey were homeowners. The remaining 18 per cent were renting, and the cost of renting was between RM 600 and RM 800 per month. Respondents in TTDI Jaya come from all 11 states in Peninsular Malaysia. People from the State of Selangor dominate with 24 per cent, as TTDI Jaya itself is located in Selangor. Perak shows the second highest rate of migration to TTDI Jaya, with 17 per cent of respondents originating from this area. From the informal interviews during the questionnaire survey I found that one of the factors that attracts people from Perak to live and work in the Klang Valley, apart from the job opportunities, is proximity -- Perak is a neighbouring state to Selangor. Therefore, people can easily travel to their hometowns at weekends without facing with long journeys. For example, for those whose families live in Ipoh, the capital of Perak, the journey home from TTDI Jaya only takes about two and a half hours. For those who originate close to the border between Selangor and Perak, the maximum journey from TTDI Jaya is about one and a half hours. The third highest proportion of respondents, 14 per cent, come from the state of Kelantan, on the east cost of Peninsular Malaysia. The journey from Kelantan to Selangor (800 km) generally takes about eight hours. According to the Economic Planning Unit (EPU), Kelantan is a less developed state, and it has with fewer job opportunities.

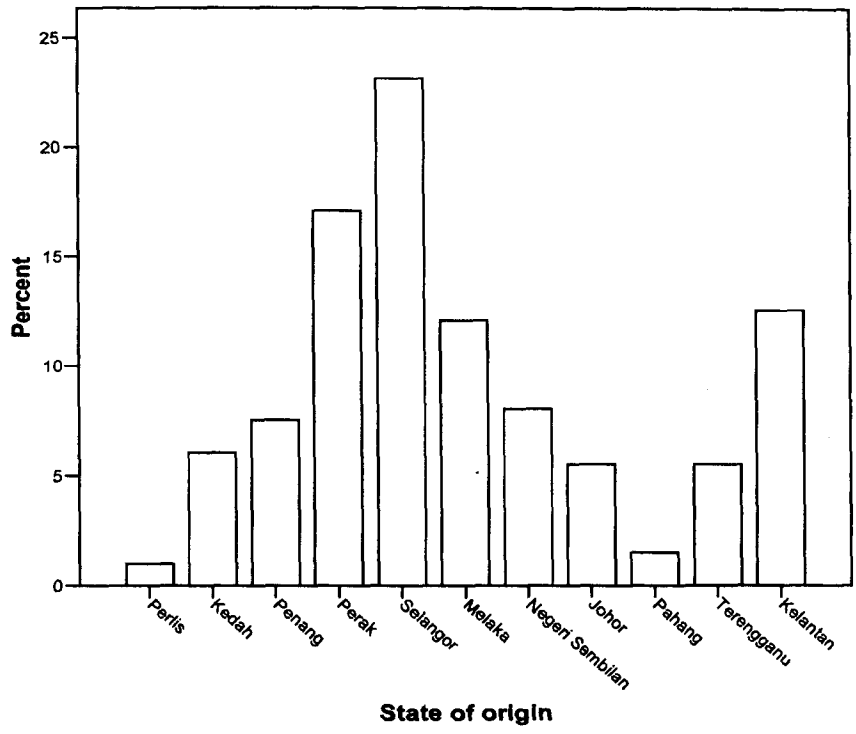

Figure 6.3. Provenance of the residents of TTDI Jaya.
Source: Author's survey (2005).

However, in contrast to the Perakians who live in TTDI Jaya, it is not distance that leads respondents from Kelantan to live in TTDI Jaya specifically and the Klang Valley generally, but rather employment opportunities in the State of Selangor. For example, Azimah, of Jalan Peribahasa U2/43, said: "We both, husband and wife, came from Kelantan and after we finished our studies [in Shah Alam] we were not planning to go back to our hometown because the opportunities to get a job there were so slim. Thus, after my husband and I got jobs here, we decided to settle down in Selangor and bought a house in TTDI Jaya".

Of those who live in TTDI Jaya, the survey indicates that 29 per cent are working with the government, 37 per cent in private industry, 25 per cent are self-employed and 9 per cent are retired (see table 6.1). Thirty per cent of the residents are professionals such as engineers, lawyers and senior managers such as directors, while another 30 per cent are teachers (Zukri Jamal, TTDI Jaya Committee Member, 2004). Of the 91 per cent of respondents who are working, 60 per cent said that both husband and wife are working, while with 31 per cent only the husband works.

As there is no public transport[2] provided in TTDI Jaya, it is important for those who live in the area to have their own transportation in order to fulfil their daily routines within and outside the residential area, particularly for going to work. For households where both the husband and wife are working, especially in different areas, it is preferable to have two cars. One of the reasons for this is to minimise the length and time of the journeys, and to avoid having to set out for work too early in the morning, because those with families generally need to take their children to school before going to work. In TTDI Jaya, all respondents own a car and 60 per cent of them have two or more cars.

Table 6.1. Employment of survey respondents in TTDI.

Employment	Numbers	Per cent
Government	56	28.0
Private	72	36.0
Own business	51	35.5
Retired	18	9.0
No information	3	1.5
Total	**200**	**100**

Source: Author's survey (2005).

According to the questionnaire survey, the average family in TTDI Jaya has either five or six people, with 60 per cent of households being of this size. Only two per cent of respondents have big families with nine to ten persons. The average age range in TTDI Jaya is from 31 to 50; 85 per cent of the respondents are in this age group. The houses are suitable for families and are quite aspirational in Malaysian terms, helping those moving into the area to consider that they have improved their material circumstances.

6.4 TTDI Jaya: from planning settlement to vulnerable area

TTDI Jaya residents' hopes for a better quality of life were short-lived. This section looks at how the planning of TTDI Jaya has exacerbated the problem of flash floods, with severe consequences for the reputation of the settlement and its developer. Observations and interviews conducted by the author throughout the area were matched with information provided by the Drainage and Irrigation Department of Petaling District and the Selangor Water Management Authority.

[2] Public transport is only provided down a nearby street which is about 200 metres away from the settlement area, but the service is infrequent with the bus passing by approximately every 30 minutes and generally full of passengers (author's observation, 2005).

The Damansara River flows through TTDI Jaya while a tributary, the Ayer Kuning, flows along its western perimeter (see Map 13). Before the construction of TTDI Jaya, the land was poorly drained and semi-swamp, covered with long coarse grass, which acted as storage for the abundant floodwater. However, the development of TTDI Jaya modified the natural floodplain area, which was supposed to accommodate overflow from the river during its peak discharge in a natural way but now continues the same process even though its physical appearance has changed. Therefore, the housing development of TTDI Jaya has created a vulnerable area and the community that lives there has to live with the floods.

Two years after the first residents moved into TTDI Jaya, in March 1996, they were shocked when the first flash flood hit the area after an hour of heavy rain. Between 1996 and 2005, twelve flash floods have occurred here. According to survey responses, of these twelve flash floods, six have infiltrated people's homes. The flash floods that happened in 1996 and 2000 were the worst: 90 per cent of the area was covered with water. However, on 26th Febraury 2006, TTDI Jaya residents were rudely awoken at dawn on Sunday morning by flash floods which submerged the entire settlement, with none of the houses excluded from the flood water as had happened with previous flash floods (Agenda Selangor, 27/2/2006 and Utusan Malaysia online, 27/2/2006) (see figures 6.4a and 6.4b). It was an unusual event because, despite a lack of heavy rain, the water level rose to 1.6 metres, the highest recorded since 1996 (personal communication, Zainal Mohd , TTDI Jaya Committee member).

During the construction work, the developer had designed a raised foundation of compounded soil for TTDI Jaya 7.5 metres above sea level. Before the establishment of the TTDI Jaya residential area, the highest flood level was 7.3 metres above sea level. However, according to the Department of Irrigation and Drainage, Petaling District, in 1997 the new flood level of Damansara River was 8.6 metres above sea level, which means that TTDI Jaya is 1.1 metres below flood level at any time.

From personal observation, the current physical appearance of TTDI Jaya is about 80 per cent built-up land (houses, school buildings, community hall, roads and pavements), while the other 20 per cent is made up of playgrounds and football fields. From the questionnaire surveys, 35 per cent of the respondents' compounds were totally covered with impermeable surfaces -- either cement or tiles -- 5 per cent were grass and 60 per cent were a combination of grass and impermeable surface. Impermeable surfaces retard the infiltration process and encourage higher surface runoff. As Douglas (1984) mentions, areas used for terraced houses have a higher proportion of impervious surfaces as compared to other types of houses (see table 6.2).

Table 6.2. Percentage of impervious surface as a function of land use.

Land use	House density (houses/ha)	Impervious surface (%)
Terraced house	5.4 5.9	80 85
Semi-detached house	2.3 3.2	52 62
Bungalow	1.2	41

Source: Douglas (1984), cited in Sham (2004:385)

It is particularly surprising to note that the drainage system constructed in TTDI Jaya was not designed to cope with the huge volume of water, and although a monsoon drain is supposed to be built in any housing development in tropical countries, which generally receive high intensity rain throughout the year, there was no such drain in the area. Moreover, for TTDI Jaya, which is located on the flood plain, the construction of a large drain such as a monsoon drain is very important. The author measured the drain as soon as it had been finished and found that it had a maximum depth of approximately 75cm, with a width of 60cm. It is clear from the author's observation and by measuring the biggest drain constructed that the maximum depth of the drains in the area is 75cm, with a width of 60cm. According to Interviewee H, monsoon drains are generally designed with a depth of 3.5 metres and width of 3 metres (see figure 6.5a and figure 6.5b). All the 20 respondents for the in-depth interview can identify the water conditions that lead to flooding, as they have experienced flash floods many times. They told the author that the area is first covered by clear water, which comes from the rain. The drains initially hold the clear water, which also flows along the road. However, when the water turns brown, this means that the river has discharged water and has reached its tolerance level. When this situation occurs, it serves as a warning for inhabitants to get ready and prepare for the worst. As Rozita Amin of Jalan U2/16 reported:

> If I see water in the drain change colour from clear to brown, it is a sign that this area will be flooded very soon. So I need to get ready and put everything in a safe place.

The river flow in TTDI Jaya would be a great asset if it could be used to the residents' advantage. Flowing water indicates prosperity and is a symbol of a good life (Postel and Richter, 2003). The Damansara River could have been used as a leisure facility for the community if the river conditions had been upgraded and good river maintenance had been

employed. Zainal Mohd testifies that the river has played an important and positive part in his life since he moved to the area, despite the frequent floods:

> I like to go close to the river and watch it flow, especially during the weekends when I have nothing to do. Some of my friends sometimes accompany me and we have a chat here. This is how I relax. Thus, I built a small hut here with the help of my friends so that we can sit here together and enjoy ourselves by watching the scenery; even though the river is not crystal clear water, we love sitting here.

The river soon became contaminated. After the first flash flood struck in TTDI Jaya, a newspaper reporter found that sand bars had formed on one side of the river and that there were at least four abandoned concrete culverts in the river (The Malay Mail, 26/3/1996). According to Zukri Jamal (2004) the contaminated river conditions at that time were due to the irresponsibility of the contractors, who had dumped earth and unused construction materials such as bricks and had failed to control soil erosion into the river during construction. Interviewee G, from SWMA, commented that the Damansara River has been classified as a class III River, which means that the river is polluted and not suitable for domestic usage (drinking, washing, bathing and cooking). However, the interviewee L, planner from Shah Alam City Council considered the Damansara River to be a drain and not a river. Therefore, the guidelines for the development of the river frontage provided by the DID were not taken into consideration by the developer in this project (see Chapter 5.5) as the development has followed the development planning procedure. However, the DID advised that the entrance to any riverside development must be facing the river, and that the rear of the buildings should not be looking towards the river. TTDI Jaya houses are only 14 metres away from the river, whereas according to the regulations set out by the DID, Petaling, the distance between the Damansara River and development of TTDI Jaya must be 60 metres (Interviewee I, officer of DID, Petaling District, 2005). This means that, another 46 metres of land is missing for the river reserve area.

Even though the first phase of TTDI Jaya has suffered from tremendous flash flood problems, the exclusive second phase of TTDI Jaya is now being continued by TTDI Development Sdn. Bhd. The exclusive second phase houses have "smart" features such as a security alarm system and lighting system controlled by mobile phone (TTDI Development employee). The new phase incorporates control measures in order to protect the area from floods. The platform level of the first phase of TTDI Jaya was elevated to 8.6 metres, but the new development at Jalan U2/1 is raised another 2 metres from 8.6 metres and becomes 10.6 metres above sea level (Zukri Jamal, 2004). This means that the first phase of TTDI Jaya will become more vulnerable; it will

increasingly act as a retention pond during flooding because the new phase is higher than the old one (see figures 6.4a and 6.4b).

Figure 6.4a. The flooding in TTDI Jaya on 26th February 2006 in TTDI Jaya. This picture was taken five hours after the Damansara River overflowed its banks. The arrow shows some floating cars.

Source: The Star Online (27/2/2006)

Figure 6.4b. Another view of the flash flood situation on Sunday morning, 26th February 2006.

Source: The Star Online (27/2/2006)

Figure 6.5a. One of the drains in TTDI Jaya.

Source: Author's photograph

Figure 6.5b. A monsoon drain constructed in a residential area of Section 10, Shah Alam showing the correct size for monsoon drains.

Source: Author's photograph

Surrounding areas increase the risks faced by TTDI Jaya and the vulnerability of this area, as one third of TTDI Jaya is adjacent to new highways. Following the construction of these roads, which are also located on the Damansara River floodplain, the flash flood situation has been worsening because the highways have been built higher than the TTDI Jaya platform. There is also a new development, Bukit Jelutong, on nearby higher land, which abuts on another part of TTDI Jaya. The development of Bukit Jelutong has had a huge impact on a small tributary of the Damansara River, the Ayer Kuning River, which is relatively small and is unable to cope with high intensity rainfall (author's observation, 2005) (see Map 13).

The rapid development around this area since the 1990s has also changed the natural environment surrounding the development of TTDI Jaya. Vegetation had been cleared to give way to development projects, where previously these areas were oil palm plantations. As well as the impacts from developments surrounding the settlement area, TTDI Jaya has been affected by developments in the upper catchments of the Damansara River in the Sungai Buloh forest reserve, with the site of more development, as discussed in Chapter 5.5. This development consists of housing and a commercial project called Subang 2, which is located close to the Damansara River (Map 13). The development has caused high sedimentation, which has had a major impact on the lower catchments. During preparations for major housing construction projects, as reported by Douglas (2004:349), cleared land and land-filling exposed the area and made it vulnerable to erosion during storms, and the flow of water transported particles of silt, clay and fine sand into the nearest drains and river channels (see figures 6.6a and 6.6b).

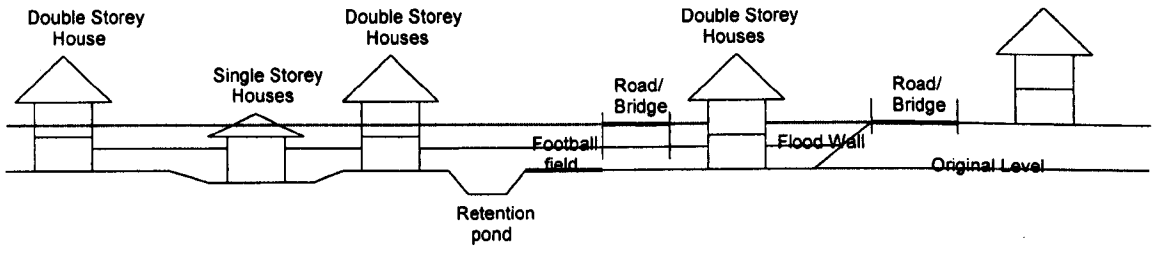

Figure 6.6a. A schematic cross section of TTDI Jaya from the rear (see line AA' in map 14). Source: Author's observation (2005).

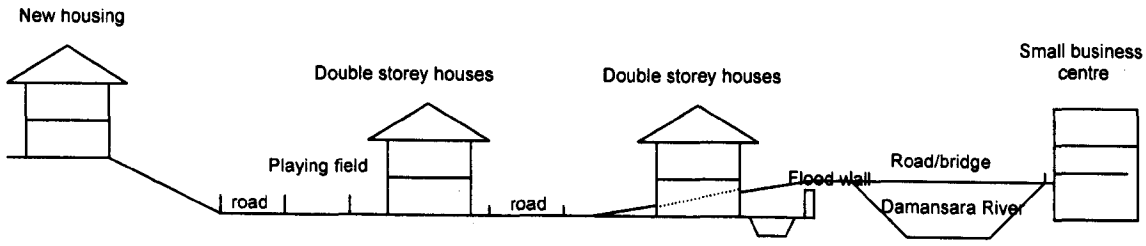

Figure 6.6b. A schematic cross section of TTDI Jaya from the side (see line BB' in map 14). Source: Author's observation (2005).

6.5 Threat of flash floods: the experience of TTDI Jaya residents

This section considers TTDI Jaya residents' experience of the repeated flash floods that penetrated their houses and their compounds. Section A (questions 2, 3, 4, 5 and 10) of the questionnaire survey provides results regarding residents' knowledge about the area before they moved here, preparation during their first experience of flash floods, level of flooding in the house, the effects of flash floods and people's priorities during flash floods.

The first flash flood, which occurred in 1996, was an absolute nightmare for the TTDI Jaya residents, as it was a sudden event and nobody had expected that the area would be vulnerable to the flash floods that affected other areas in the Klang Valley such as Taman Sri Muda in Shah Alam or Kampung Datuk Keramat, Kuala Lumpur. According to Zukri Jamal, many residents felt that they had been manipulated by the developer, who had sold them the property freehold in order to attract buyers without telling them about the vulnerability of the area. Moreover, the Department of Irrigation and Drainage (DID) of Petaling District had already made the developer aware that the highest level of the river before the area was developed was 7.3 metres and that it frequently flooded the area in its natural condition (DID, Petaling District, 2000).

According to the results of the questionnaire survey, from the first flash flood in TTDI Jaya in 1996 until 2005, 96 per cent of respondents had experienced flash flooding either in their houses or their compounds; 16.5 per cent had experienced it from four and seven times, 60.5 per cent two or three times. Of the 4 per cent of respondents who had not yet experienced flash flooding, all had moved in since the last flash flood (see table 6.2). The maximum height of water in the houses of those affected by flooding was 1.2 metres and the minimum level was 15cm. Out of 200 respondents, 92 per cent reported that they had never been told by anybody that they lived

in a sensitive area of the flood plain when they bought their houses while 8 per cent said that they were already aware of the situation of the area either through newspapers, from friends or had been told by other home owners. Significantly, however, of this eight per cent, three-quarters were people who rented their houses. However, of the few (eight) respondents who had never experienced flash floods, three had not been told and did not even know that TTDI Jaya had frequently suffered from flash floods. These people had generally just been posted from another state to Selangor, and of those who were from Selangor, all had previously lived a long way away from TTDI Jaya.

Table 6.3. The number of flash floods experienced since by respondents in TTDI Jaya.

Number of flash floods experienced	Frequency	Per cent
Never experienced	8	4.0
1	38	19.0
2- 3	121	60.5
4- 5	20	10.0
6- 7	13	6.5
Total	**200**	**100**

Source: Author's survey (2005).

During the first flash flood in this area, all of the houses had been infiltrated by water. As this was the first time a flash flood had occurred in TTDI Jaya, people were not prepared and had no idea what to do. They were thrown into a state of panic and shock by the suddenness of the event. The 12 per cent of respondents who were prepared during their first flash flood had come to live in TTDI Jaya after 1998 and were already aware of the area's condition either through newspapers reports or had been informed by their neighbours when they moved into their new houses. The eight survey respondents who said they had never experienced a flood in TTDI Jaya had their first experience of flooding on 26th February 2006, a few months after the author finished conducting the survey. These residents, who moved in about two years ago previously, had been assured that safety measures installed by the developer would protect the area from flooding.

6.6 Perceptions of flash flooding

The frequent flash floods in TTDI Jaya raise the question of how people perceive these disasters. This section presents the four main categories of perception given by the respondents with regard to flash floods, as examined in Section A, questions 6 and 12 of the questionnaire. In order to understand the situation and gain a real insight into what was actually happening in TTDI Jaya, interviews were employed to supplement the questionnaire survey responses and uncover how flash floods have really affected the lives of residents in TTDI Jaya.

According to the questionnaire survey, 14.5 per cent of respondents categorise flash floods in the area as extremely severe, while 57.5 per cent said that they were severe. This gives a total of 72 per cent of respondents regarding the flash flood events in the area as severe or extremely severe. A further 20 per cent considered the situation to be moderate and tolerable, while 4 per cent said it was mild or a common situation. In addition, 4 per cent of the respondents did not have any idea about how to give their opinions regarding the event (see table 6.4). The different perceptions given by the members of the local community can be explained partly by the length of residence in the area, partly by the nature of the housing occupied and partly by the depth of the flood water.

Residents who had experienced the first and the second flash floods -- that is, the first generation to live in TTDI Jaya -- were more sensitive to the flash flood problems. These people had not expected that they would face flash floods and the issue was far from their minds when they had moved to the area.

Additionally, cross-tabulation has been used to test perceptions in relation to the type of house occupied (single- and two-storey houses). From the results, it appears that respondents who live in single-storey houses and thus cannot move their families and belongings upstairs to protect themselves felt that flash flooding in the area was extremely severe (see figure 6.7). Single-storey houses in TTDI Jaya are located at a slightly lower elevation than other sites in the settlement (see TTDI Jaya cross-section above, figure 6.6a). Therefore, during floods, the water level in these houses is higher than in the two-storey houses. Another disadvantage for people living in single-storey houses is that they need to move out of their dwelling temporarily in order to survive the flood episode.

Table 6.4. Perception of flash floods among respondents in TTDI Jaya

Perception of flash floods	Frequency	Per cent
Extremely severe	29	14.5
Severe	115	57.5
Moderate	40	20.0
Mild	8	4.0
No idea	8	4.0
Total	**200**	**100**

Source: Author's survey (2005).

"Severe" and "extremely severe" ratings were given by respondents who had experienced the first and second flash floods, due to the magnitude of these floods, which had reached up to waist height in many homes. The flash floods entered houses extraordinarily rapidly not leaving people the time to move all their belongings to safe places; within half an hour, most of the houses were flooded. The loss of property was very high; many cars were damaged because people did not have time to move them to safe places, as the water rushed in from all directions. The loss was more than half a million ringgit (Zainal Mohd, TTDI Jaya committee member).

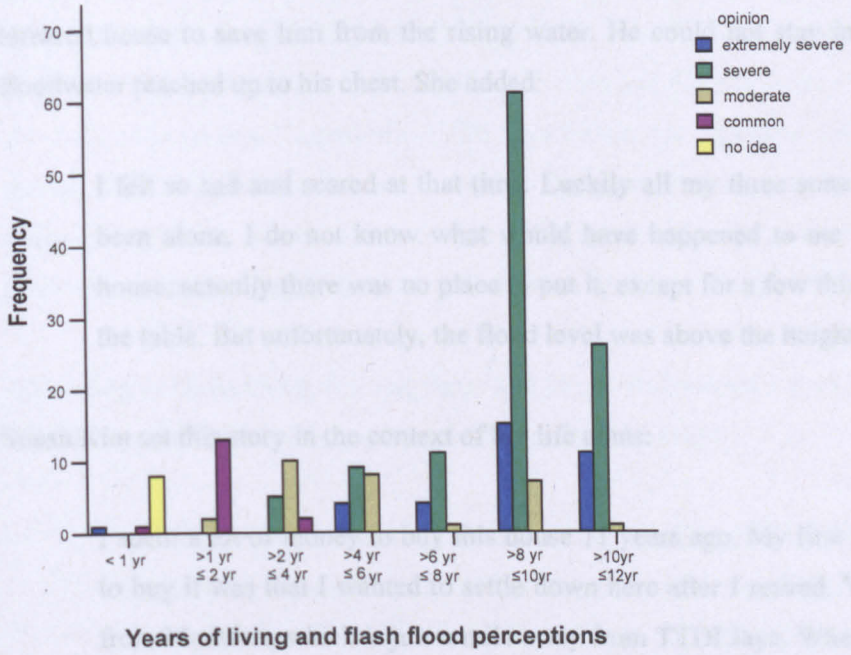

Figure 6.7. Length of residence and perception of flash floods.

Source: Author's survey (2005).

A "moderate" rating came mostly from people who had moved to TTDI Jaya after 1999 and were already aware of flash floods in the area either from newspapers or from being told by the previous owners, landlords or their neighbours. Therefore, they had been able to prepare their houses, and were also more mentally prepared for the probability that flash floods would strike again. This group was not so worried because they had never experienced the high magnitude of flash floods, and did not possess a strong sense of having been cheated. These views commonly came from people who had lived in TTDI Jaya for fewer than three years, and from people who had never experienced floods entering their houses, only inundating their carport. Two of the respondents did not know at all that the new area in which they lived had experienced flash floods several times and were extremely shocked to hear. One of the respondents asked me whether I really had clear information about the frequent flooding because she had only bought her house one month before the survey and knew nothing about the history of TTDI Jaya. Those respondents who had been living there for less than a year but perceived the flooding to be extremely severe had heard from their neighbours and had noticed cracks in the paving in their front gardens.

A number of residents described to the author the effect that the floods had on their life. The following stories are representative of local experiences. Susan Kim, a pensioner who lives in a single-storey terraced house at Jalan Sajak U2/29, recalled the first flash flood that had swept into her house. She said that her eldest son had taken her youngest son to her friend's two-storey terraced house to save him from the rising water. He could not stay in the house because the floodwater reached up to his chest. She added:

> I felt so sad and scared at that time. Luckily all my three sons were at home. If I had been alone, I do not know what would have happened to me. As for the stuff in the house, actually there was no place to put it, except for a few things that could be put on the table. But unfortunately, the flood level was above the height of the table.

Susan Kim set this story in the context of her life plans:

> I spent a lot of money to buy this house 11 years ago. My first thought when I planned to buy it was that I wanted to settle down here after I retired. You see, I am originally from Montfort, which is just a mile away from TTDI Jaya. When I moved here in 1994, I found that the neighbourhood was very good and I thought that I had made the right decision. But flash floods here are so terrible and ruin the quality of life and I have suffered great loss. I am thinking of moving away from this area but unfortunately I

> cannot afford to buy another house because I am not working any more. And if I were to rent another house, I would not feel happy, as I already have my own house and I do not think that it is a good idea for a retired person to rent. I wanted to settle down in my own property.

The following is the experience of Rohana Hakim, a housewife of Jalan Syair U2/26 in a two-storey house:

> During the first flash flood my husband was not at home; he had gone to Japan for a business trip. If I am not mistaken, the rain started in late afternoon and continued to fall heavily till eight o'clock. After having dinner with my children, suddenly I saw water seeping into the house through the front door. With five children to look after, all of whom were below ten years old at that time, I was thrown into an awful panic. I sent my children upstairs and brought up anything I could grab hold of. The water reached three steps up the staircase in the house. Suddenly, there was a blackout. My children were so frightened and we just kept silent; we did not know what to do and what was actually happening outside because at the same time the telephone was not working. Besides, I was not able to save my husband's car, which was in the carport: it was terribly damaged.

Like Susan Kim, Rohana Hakim said that flash floods in TTDI Jaya were extremely severe. She had never had any experience of flash floods before and did not know what she was supposed to do. According to Zukri Jamal, the TTDI Jaya committee members were told that during flash floods, if the water reached a certain level -- for example if it got into people's homes and was approaching power points, which are generally about 30 cm from the floor -- they should shut down the electricity supply to the area in order to avoid the danger of electric shocks.

According to Mohammed, his neighbour and family had moved out of TTDI Jaya as they could not tolerate the flash floods any longer. He recalled the events:

> I saw my neighbour standing in front of his window shouting that he could not get out. I suggested he open the door but he was in such a panic that it was only after a few minutes that he managed to carry his children out. The next week he moved away from TTDI Jaya.

The frequent flash floods have led the community to rethink the quality of life that had been highlighted by the developer. The problem is not only one of dealing with a flooded house. In 1998, for example, a resident went into labour during a flash flood and could not get out of her house because of the flood waters. With the ambulance unable to reach her house, eventually a TTDI Jaya committee member managed to ferry the expectant mother to hospital in a boat (Zukri Jamal). During the flash floods of 26th February 2006 boats were used to rescue children and elderly occupants of single-storey homes as the flood waters reached up to adult chest height. In two-storey houses, residents went up to the first floor but were stranded there until the waters subsided some eight hours later (see figure 6.8).

Figure 6.8. Boats were used to rescue stranded elderly people and children during flash floods on 26th February 2006.

Source: New Straits Times online (28/2/2006).

Three neighbours from Jalan Sajak U2/29 shared their experiences with the author. Melissa Adam, a housewife, said that every time flash floods got into her house, she wanted to cry, as the flood level frequently reached her knees. Zarina Hasan, another housewife, added that flash floods struck her with terror, while Rekha Vesanthi, a pensioner, said that she thought of moving away from the area every time the flash floods occurred.

The 26th February 2006 flood occurred when the author was back in Leeds. However, speaking on the telephone, Zainal Mohd (TTDI Jaya Committee member) told her that the water had got into every house in TTDI Jaya. He added that this flood had created a new perception as it was the most severe ever experienced in the settlement, worse than the first, which had previously been considered the worst. In the February 2006 flood, TTDI Jaya was 1.6 metres under water (The Star online, 27/2/2006). For some residents who had not experienced flash floods before, especially those who had lived there for less than a year, this flash flood caused chaos, sadness and confusion. As reported in the newspaper, one resident said that she had moved to TTDI Jaya just six months ago and was heart-broken, as she had spent time and money on her new home only to see it hit by flood waters that left it a mess (New Straits Times online, 2/3/2006).

To sum up the perception towards flash floods, 98 per cent of the respondents highlighted them as problematic to the community of TTDI Jaya, while only 2 per cent thought that flash floods were not a problem. This 2 per cent of respondents came from those had never experienced flash floods in that area and those who were renting houses and could move away from TTDI Jaya at any time. In addition, 91.5 per cent of respondents who had experienced flash floods in their houses said that family safety was their first priority during flash floods, while the remaining 8.5 per cent felt that saving household goods was the first action they took; these respondents came from families with grown-up children and without elderly people.

Overall, perceptions of flash floods vary according to a number of factors, such as flash flood experience, the nature and location of the dwelling, how long people have lived in the affected area and whether they are thinking of living there permanently or not.

6.7 Flash flood impacts

Flash floods have a variety of impacts in TTDI Jaya. They bring about negative impacts to humans and the environment (Ward, 1978). There have been cases of people being killed or swept away by the current. In additions, as White (1974) pointed out, floods will not cause problems if people do not live in the flood plain. Interference and adjustment to the flood plain will increase the potential for damage to the environment and lead to changes to the flood regime itself. Thus, the impacts of flash floods on local people will also increase (White, 1974). As mentioned in Chapter 2, the second level of flood impacts can be divided into tangible and intangible forms, and this typology will be applied to the flooding on TTDI Jaya and will be discussed further in the next sub-sections

The impact of the first flash flood on TTDI Jaya residents has left enormous marks on their lives and cannot be forgotten. Going through this experience for the first time without any preparation or knowledge about the phenomenon greatly increased the nature and size of the impact. This contrasts with the likely outcome if a community knows in advance that they are living in a hazardous area of a flood plain that annually receives a seasonal monsoon, as in the case of the people who live along the east coast of Peninsular Malaysia. This society generally avoids great losses, as people are always prepared for the worst, and most importantly, they have it set in their minds that the months between October and February are the time of floods. Nik Maizan is a TTDI Jaya resident who is originally from Kota Bharu, Kelantan:

> It is not unusual for floods to occur two or three times a year because that is what happens during the monsoon season, so we just get ready. If floods do not occur, it is considered fortunate.

These perceptions are common among the inhabitants of Kelantan, Terengganu and Pahang along the east coast of Peninsular Malaysia, where floods can be predicted. If the community is aware of the possibility of flooding, this generally minimises the pressure and impact of the problems, but in the case of flash floods, the nature of their emergence does not allow people enough time to prepare once the flood waters have started rising. In any event, however, houses will tend to have basic household goods such as sofas, cabinets, dining table, television, refrigerator and washing machine on the ground floor.

Flash flood impacts in TTDI Jaya have sharply reduced the quality of this settlement not only for the community itself but also in the eyes of wider society, as the flash flood problems of TTDI Jaya have been highlighted in local newspapers and on television news. Therefore, in order to understand and explore the impacts of flash floods in TTDI Jaya, the following sub-sections will present further discussion of economic, physical, environmental and psychological impacts.

6.7.1 Economic, physical and environmental impacts

The economic, physical and environmental impacts, which can be categorised as tangible impacts, will be discussed in this section. Here, the analysis will focus on data from Section A, questions 7 and 8, and also on Section B, question 4. Material from the interviews and newspaper reports that accompanied the questionnaire are also included to provide a better description of what has happened locally in TTDI Jaya.

When the flash flood problems of TTDI Jaya were highlighted in the local newspapers, it resulted in economic impacts with property values dropping immediately. Most householders had taken out loans to buy their house, and some were faced with negative equity. A real estate agent put it succinctly in the aftermath of the 26th February 2006 flood: "The price of houses in TTDI Jaya will obviously drop. If the owner is desperate to sell, he will have to quote a sharply reduced price" (Bernama.com, 28/2/2006). Another real estate agent said that he was about to drop TTDI Jaya properties from his list for the time being and added that if he could not get prices to match the expectations of house owners (as a result of the floods), it would be better not to deal with those who wanted to sell their houses (Bernama.com. 28/2/2006).

Zukri Jamal reported that 20 per cent of the residents had moved out of TTDI Jaya since first flash flood in 1996. Some people were moving out of the area and renting out their houses at a low price. However, it was still as difficult to find tenants, as it was to find buyers. In the summer of 2005, 60 houses were left empty without any plans for the future, and three families were about to move (see figure 6.9). According to one of the residents who was preparing to move in the summer of 2005:

> At this moment there is still no buyer for my house but I need to leave and move into my new house, where I hope there will be no more flash floods. About this house, I will just leave it like that: if someone wants to buy it, that would be good, but if nobody wants to buy it, what can I do?

As well as the problem of falling prices, major physical impacts existed on the houses themselves: 70 per cent of the houses were cracked, to a lesser or greater degree (Zukri Jamal). This situation had arisen because the area was frequently covered with floodwater, the soil was always wet, especially under the houses where the water infiltrated through cracking drains and grassy compounds while other surfaces were mostly impermeable. About 40 per cent of the main pipes to the houses had burst and needed to be replaced at the householder's expense. As noted below, most householders were unable to claim repairs on their insurance because the house insurance taken by the respondents only covered for fire. Most of those who were not covered by any household insurance did not know that household insurance can cover the damage to household goods due to floods.

Economic impacts from flash floods in TTDI Jaya come also in the form of damage to and loss of household goods. Every house has at least the basic electrical goods such as a refrigerator, washing machine, television and vacuum cleaner. These electrical goods cost at least RM 3000

each. Besides, every house has at least one car, while 60 per cent of the respondents have more than one. Of the 96 per cent of respondents to the questionnaire survey who had experienced flash floods, 48 said that their maximum losses due to flash floods were between RM 2000 and RM 3000; 75 respondents said that they highest had lost between RM 3001 and RM 8000; and 13 reported that they had suffered losses of above RM 8000. In terms of compensation for flash floods, only 4 per cent of households received compensation under their household insurance, while the remaining 96 per cent received no compensation, as their houses were not covered by household insurance.

Figure 6.9. One of the empty houses in TTDI Jaya.
Source: Author's photograph

Regarding his flash flood loss, Zainal Mohd noted the following:

> For me, RM 2000 to RM 3000 can be considered the minimum [amount that I have lost]. The first time a flash flood struck, I could not save my car because I was not prepared for it. At that time, what do you want to save first? Your belongings or your family: what are more important? Because the flood water was coming so rapidly, I needed to save my family first and then my property; however, by the time my family was safe, most of the household goods had gone under water.

According to the questionnaire survey, 86 per cent of respondents said they were only able to save a part of their belongings. For those who had experienced flash floods in their houses, 12 per cent said they were able to save all their household goods, while 2 per cent reported that they could not save anything.

In most households, both husband and wife are working (see section 6.3), meaning that the household income is relatively high. Thus, most people are able to have relatively expensive cars and furnish their houses with expensive furniture. Therefore, when these properties are damaged, the cost of the loss is higher than it is for poorer households. Many households are left in a quandary as to whether to buy replacement furniture in the style to which they are accustomed -- and risk losing it again. Some people minimised their appliances in order to avoid further great losses. Insurance of household contents was not considered an option by most.

According to newspaper reports, the residents of TTDI Jaya announced that the total losses from the 26th February 2006 flash floods were more than RM 100 million, of which RM 50 million were for the cost of household damage and another RM 50 million for the loss of productivity, as most of the professionals in the area needed to close their businesses for a few days following the flash floods (Utusan Malaysia online, 2/3/2006).

Flash floods in TTDI Jaya have also had impacts on the environment, bringing various forms of pollution to the area. According to residents, it takes five to six hours for the floodwaters to recede. In a number of single-storey terrace houses, it takes nearly 24 hours for the water to drain away. Meanwhile, the water is contaminated with sewage, mud and rubbish and leaves an unpleasant smell in the area. Most of the drains cannot function efficiently for some days after a flood because of the accumulation of mud and silt left inside them. Unfortunately, the unpleasant smell comes not only from outside the house but also inside, as household items like sofas, rugs and beds which could not be hauled to safety during the event need to be washed and dried. According to Melissa Adam if the next day is bright and sunny all those wet items can be placed outside the house to dry it. But if it is still raining, all the wet things will become smellier as sofas, rugs and beds were covered with mud and absorbed the contaminated water into them. Therefore, before a return to health, generally it will take a few months to recover.

An investigation into the impact of flash floods on TTDI Jaya would not be complete without examining the internal impacts to the society. The next section will portray the continuous impacts of flash floods on TTDI Jaya.

6.7.2 Psychological impacts

This section will discuss how flash floods have led to intangible, psychological impacts on the residents of TTDI Jaya. The information discussed here is drawn from interviews with TTDI Jaya residents and Section A, question 6 of the questionnaire survey.

According to Gardner and Stern (2002) psychological impacts are produced by the sort of events that elicit emotional reactions. Even though the psychological impacts on TTDI Jaya residents cannot be seen, most residents are affected before flash floods, for example when it is raining heavily, during the event and afterwards. The impact before the event only sets in after residents have experienced their first flash flood. During and after flash floods, these psychological impacts occur in two stages. The first stage is when people can still tolerate the situation, while stage two arises when residents can no longer tolerate the flooding. For example, in stage one, during flash floods, various feelings are experienced by residents, including panic, sadness, worry and fear; 78 per cent of respondents reported that they experienced all these feelings when the floodwaters start entering their houses. The second stage is when the level of water reaches its maximum height and many household goods are ruined, at which point residents' feelings towards the event turn to anger, and they direct their anger at the authorities. Additionally, after the floods, the feelings of sadness and anger continue.

However, the greatest stress for the community is when the flash floods have abated, because they leave muddy and smelly conditions that take at least two weeks to clear. Consequently, the impacts rise in the second stage when extra work, time and energy are needed in order to return homes to their normal condition. Normally, people need to take one or two days off work just to clean their houses (see figure 6.10). In addition, most affected residents feel exhausted, and 84 per cent of respondents end up with sickness and need to take medical leave for a few days.

According Chin a housewife who lives in Jalan U2/42:

> I felt sick after one week of cleaning because it was not ordinary cleaning; it was awful. The contaminated mud was about three to six inches deep in the house and there was mud on the car porch and stains on the wall.

This situation could be tolerated if it only happened once and was not a recurrent issue. However, flash floods are unpredictable. There was an occasion when flash floods occurred twice in a month. Nora Johan, a teacher from Jalan U2/20, reported that it was the month of

Ramadhan, at the end of which, most people in TTDI Jaya celebrate Eid. During that month, preparation is normally made for the celebration and most people upgrade their houses with fresh paint, new curtains and decorations. The flash floods that occurred during that month ruined the preparations for Eid and the mood of the community.

At the second stage, due to flood losses, the residents face the dilemma of whether to spend money to buy new households good in order to replace their damaged belongings. They have to weigh up the risk of further losses versus the inconvenience of living without certain household items.

After the first experience of flash flooding, these psychological impacts have left the people of TTDI Jaya living in trauma, phobia, and fear whenever there is heavy rain. Even though these impacts cannot be seen physically, most people in TTDI Jaya suffer from them. Eighty per cent of the respondents who had experienced the first and second flash floods in 1996 and 1998 respectively noted that they faced trauma every time there was heavy rain.

According to Kamarudin a businessman, of Jalan Rangkap U2/39, repeated flash floods induce in him a sense of trauma and phobia every time it rains. He frequently suffers from sleeping difficulties when it rains at night. He sometimes cannot even close his eyes and frequently wakes up to look out of the window to monitor the situation. This behaviour has occurred since he experienced the first flash flood in 1994. He is not alone; many other dwellers have suffered the same problems. According to Rohani Abdullah, a government servant from Jalan P U2/4:

> I just cannot sleep at night when it is raining. Sometimes I walk along the river with my husband and watch the river situation to see whether it will spill out ... or not. At the same time, other residents are also doing the same thing as me -- lines of umbrellas can be seen along the river. I am so worried as my house is located not far from the river. It is crucial for me to know if the river will flood so that I can prepare my things earlier, as if the flood gets into the houses, my house will be among the first to be affected"

Zukri Jamal (TTDI Jaya Committee member) reported that if there is heavy rainfall for more than an hour, the second stage is that people start to move their cars from the carports and park them on higher ground. Lines of cars can be seen on the side roads starting from the bridge and leading out from the area to high ground. Moreover, if the rain falls during working hours, most people go home early to prepare for a flash flood, even if no flooding actually occurs (see figure 6.11).

The trauma of flooding affects residents when they are away from home too. For example, Zarina Hasan said:

> I am always in a dilemma when I need to go back to my home town for two or three days. I keep all the important stuff in a safe place, and besides I need to inform my neighbour and leave a contact number in case flash floods hit the area, so that I can come back home early.

This action has become part of the community's behaviour. TTDI Jaya can be categorised, in the words of Burth (1987), as a washland region, as it is located in the lower catchment of the Damansara River. Development on a washland area is less critical than development on a flow-plain, according to Burch (1987), because the velocity of the floodwater will be decreased at that point and it will thus be less dangerous to people in terms of the possibility of being washed away by the water from upstream. Nonetheless, due to the surrounding developments, which are higher than TTDI Jaya, the floodwater recedes very slowly and the community needs to wait for longer before it returns to its normal conditions.

Therefore, it means that the longer duration of flooding will cause more damage to belongings, hence increasing tension and pressure on the community. Thus, the impact of flash floods in TTDI Jaya has damaged the image of this commercial development constructed by an established developer, the TTDI Development Sdn. Bhd.

Figure 6.10. A resident of TTDI Jaya looks lost, as his family starts cleaning up after the 26th February 2006 flood.

Source: The Malay Mail online (28/2/06).

Figure 6.11. Lines of cars on parked on a bridge as the nearest convenient high point, 26th February 2006.

Source: The Star Online (27/2/2006).

6.8 Preparation for and adjustment to the flash flood problems in TTDI Jaya

This section will focus on preparation and adjustment to the flash flood problems in TTDI Jaya. Three types of adjustment have been made that could contribute to minimising the impact of flooding: local strategies such as individual adjustments, the active use of neighbours and the active use of the TTDI Jaya Committee. The active role played by neighbours illustrates the importance of co-operation among members of the community, in that these three roles are actually related to one another in helping to minimise the flash flood impacts.

6.8.1 Individual adjustment

Analysis of Section B, questions 2(i), 3 and 4 and Section D question 3 reveals the adjustments to flash floods that have been made by individuals. Individual adjustment was the first step by which people in TTDI Jaya reacted to the flash flood problems, before anything could be done by the developer or DID, which normally took quite a long time to execute.

Individual adjustment involved simple measures such as minimising the amount of furniture in the house: 52 per cent of respondents said that they were minimising their furniture in order to avoid a great loss in the future. Thirty-eight per cent reported that structural adjustments were a suitable way to avoid flash floods getting into the house. Measures they have taken include raising the carport floor, building simple embankments and placing heavy electrical goods such as refrigerators and washing machines on special stilts. However, the raising of a carport floor is only effective if next-door houses take the same precautions.

Basariah Zaini, a teacher living on Jalan Buana U2/21, explained that before she raised the level of her carport floor, her neighbour had done so first, about a year earlier, but during a flash flood, water had nearly got into her house because the water had all flowed into her compound and her family was terrified that if the water rose any more, the inside of the house would be affected. Soon after that event, she decided that her carport also needed to be raised in order to avoid the same thing happening again (see figure 6.12).

In other cases, some residents who planned to raise their parking areas would not take action because their neighbours were not ready to do so. Alan, the pensioner of Jalan Bait U2/38, noted that:

> I planned to raise my carport, but thinking of my neighbour, who is not really interested in taking the same measure, I need to put aside my plans until we both agree to it. Because I thought if only my carport is raised, my neighbour will suffer more if flash floods struck.

As regards embankment construction, those who prefer this adaptation normally build raised thresholds outside the back doors of their houses. However, these raised thresholds cannot be built more then 30 cm high because otherwise they become to high to step over. In TTDI Jaya, only one household has constructed a simple flood protection at the front of their house (see figure 6.13). This adjustment nevertheless only works if the flood level is no higher than 60 cm.

The survey shows that carport floor heights in TTDI Jaya are built at three levels: less than 15 cm high, between 16 cm and 30 cm high and between 31cm and 50 cm high. However, 61 per cent of respondents had carports at a height of less than 15 cm, which means that they were not making any adjustment to the height of the carport floor, which remained at its original level. Thirty-five per cent of the respondents had raised their carport floor between 16 cm and 30 cm, and only 5 per cent had raised the carport floor to a height of between 31 cm and 50 cm.

As a few respondents mentioned during interviews, before the flood water can actually be seen flowing into the area, it first appears in wash rooms and kitchen sinks having penetrated the underground drain system. This gives some people early warning if they notice that their sinks are blocked and the washrooms start to fill with water. Therefore, one of the efforts made by householders has involved adjustments to their washrooms, such as putting in sandbags or blocks of concrete. Living in the flood plain area has forced residents to be creative and adapt.

As we have already seen, very few households have insured their houses and contents. Further, most of those who were not covered by household insurance did not know that household insurance can cover flood damage to household goods.

Figure 6.12. A raised carport floor (see arrow).
Source: Author's photograph

Figure 6.13. One of the more unusual techniques adopted by a resident: a simple flood protection at the front door (see arrow).

Source: Author's photograph

6.8.2 The role of neighbours and of the TTDI Jaya Committee

In a society living in a place like TTDI Jaya, neighbours are very important, and with the support of the TTDI Jaya committee, at least people living here are not facing the problems of flash flooding alone. This section indicates how neighbours and the TTDI Jaya Committee are significant in minimising the impact of flash floods. In the questionnaire, data from Section A question 8 informs the discussion about whether or not respondents are normally at home during flash floods. In emergency situations, the role of neighbours is very important: for example, contact numbers are left with neighbours so that if a flash flood occurs when there is nobody at home, at least the neighbours can inform the residents about the situation. In the early years of living in TTDI Jaya, most residents tended to mind their own business and not really care about other people -- as is the way generally in middle class areas. Eight per cent of respondents were not at home during the first flash flood that got into their houses. Because they were not at home, their losses were extremely high; one respondent reported that his neighbour had lost more than RM 20,000 because during the flash flood the family were on holiday for a week and did not leave a contact number. If the family had come back earlier, it is possible that some of the household goods, such as carpets, curtains and sofas, could have been saved. However, because the mud and other contaminants had been left for a few days, some of the stains could not be removed and the items could not be salvaged (Zarina Hasan and Melissa Adam).

In response to the first flash flood in TTDI Jaya in 1996, the residents formed Badan Bertindak Mengatasi Banjir TTDI Jaya (TTDI Jaya Flood Action Release Committee). This committee eventually became the TTDI Jaya Committee when it started to discuss not only flash flood problems but also other problems that arose in the area. The committee members became responsible for raising residents' concerns about flash floods to the responsible authorities, such as Shah Alam City Council, the Department of Irrigation and Drainage for the Petaling District and the Member of Parliament for the constituency. However, the committee chair told The Malay Mail (26/3/1996) that appeals to the Shah Alam City Council and the Department of Irrigation and Drainage (DID) to de-silt the river had fallen on deaf ears. "They said it was the developer's responsibility", he reported. The committee has remained very active, frequently meeting up with the TTDI Jaya developer to discuss issues related to the flash floods (Zukri Jamal). It is, indeed, much more active than neighbourhood committees in other settlement areas, where discussion normally focusses on general topics such as litter and safety.

Despite difficulties in dealing with bureaucracy, the committee eventually succeeded in arranging a meeting on 13th December 2000 that gathered together all the responsible bodies

who were involved with the development of TTDI Jaya and the surrounding area (Department of Irrigation and Drainage, Petaling District, 2000). This meeting was attended by representatives from DID Petaling, Shah Alam City Council, the Town and Country Planning Department of Selangor, TTDI Development Sdn. Bhd., Subang Jaya Municipal Council, the Ministry of Works and PLUS (highway developer), together with the Member of Parliament for the constituency, and the chair and eight members of TTDI Jaya Committee. During the meeting, every representative commented on the scope of their work regarding the flash flood problems in TTDI Jaya (DID, Petaling District, 2000). As a result of this meeting, some action was taken by TTDI Jaya Development and by DID Petaling, but no action was taken by Shah Alam City Council.

Learning from experience, the TTDI Jaya community and its representatives on the TTDI Jaya Committee now play an important role in neighbourhood watches, and people generally support each other as best they can.

6.9 The role of the developer and the authorities in fighting flash floods in TTDI Jaya

TTDI Jaya Development Sdn. Bhd., the company responsible for developing TTDI Jaya, acknowledge that they had judged the altitude of the area to be higher than it actually is (DID, Petaling District 2000). During the December 2000 committee meeting with the developer, residents claimed compensation for the losses resulting from the floods (Zukri Jamal). TTDI Development did not pay compensation to the affected individuals, but its representative noted that the company had built a flood protection wall built along the river (see figure 6.14) as well as a retention pond and seven new flood gates for drains (the original flood gates were allowing water to flow into the area when the river level rose above the devices). During the December 2000 meeting, TTDI Development claimed that they had already spent about one million ringgit on these measures, taken after the second flash flood in 1998 (Zukri Jamal). However, one of the residents said that he had no confidence in the embankment: "If one day there is a big flood", he said to the author, "the levee cannot prevent flood disasters. I still cannot live in peace. Look into my house: there is still no carpet and very limited furniture".

The retention pond proved insufficient at times of heavy rain, as it was under-managed and the design did not allow the floodwater to flow into it as it was higher than an adjacent playing field. The pond was sited on one side of the settlement, but according to residents, flash floods pour in from every side (see figure 6.15).

At one time, the construction of a flood wall seemed to be a good strategy for TTDI Jaya, which is located below the mean sea level. However, in November 2004, after a flash flood struck again, the TTDI Jaya committee found that there were 115 cracks in the flood wall. The cracks were created by the pressure and velocity of the floodwater. It is possible that the structure of the wall itself is weak (see figure 6.16).

In order to alert residents of TTDI Jaya, a flood-warning siren has been placed on the banks of the Damansara River. The siren is triggered if the river water approaches the alert level. Unfortunately, during the flash flood of 26th February 2006, the siren did not function and the community was left feeling even more frustrated and angry than they were before the siren was installed.

Figure 6.14. Flood wall built along the river.
Source: Author's photograph

Figure 6.15. Non-functioning retention pond designed to protect TTDI Jaya from flooding.
Source: Author's photograph

Figure 6.16. One of the cracks on the flood wall (see arrow).
Source: Author's photograph

The DID of Petaling District dredges and cleans the Damansara River once a year, working on the banks as well as the bed (Interviewee I). However, DID Petaling is having difficulty getting its dredger down the river because of blockages caused by the flood wall. Thus, the dredger has to start work a few kilometres upstream of TTDI Jaya. The work undertaken by TTDI Development and the DID of Petaling show that some effort was made to react to pressure from the TTDI Jaya committee. Nevertheless, this is still not enough to guarantee that the area will be free of floods. The severe flash flood that hit TTDI Jaya on 26th February 2006 demonstrates that the flood protection measures failed.

However, in response to the flash flood disaster in TTDI Jaya and parts of Shah Alam on 26th February 2006, the State Government of Selangor instantly approved a RM 3 million pump system, the installation of a flood gate and the widening of water channels along the New Klang Valley Express (NKVE), to be carried out by Shah Alam City Council (The Star online, 27/2/2006). It is hoped that this will minimise the fear and concerns of the affected community and encourage them to stay in TTDI Jaya by showing them that the State Government of Selangor itself is paying serious attention to the flash flood problems.

Realising the seriousness of the flash flood problems in some areas of the State of Selangor, especially in TTDI Jaya, Deputy Prime Minister of Malaysia Najib Tun Razak said that the Federal Government would act together with the Government of Selangor to prevent these events (The Star online, 28/2/2006). The Works Minister, S. Samy Vellu, was quoted as saying that the river had become shallow due to silt and garbage and proposed that it be deepened. He also proposed that bunds be constructed on both banks, as a huge quantity of water is being released into the river from the surrounding housing estates (The Star online, 28/2/2006). Bunds are considered more efficient than embankments as they cannot burst or crack.

Therefore, with assistance from the Federal Government and attention from the State Government of Selangor, the TTDI Jaya community has renewed hope that one day, flash floods will no longer be a problem for the area.

6.10 Why are people still living in TTDI Jaya

This section will explore why people are still living in TTDI Jaya even though most residents have suffered severely from the flash floods. Section E question 3, Section D question 7 and Section B question 2(ii) of the questionnaire survey are analysed in order to answer this question. With losses that have reached millions of ringgit from the first event in March 1996 to

the latest event in February 2006, the author found TTDI Jaya residents to be exasperated. At the time of the February 2006 flash flood event, newspapers reported that tempers had flared and some of the residents had confronted the chair of the State Infrastructure and Public Utilities Committee when he visited TTDI Jaya (New Straits Times online, 28/2/2006). People were infuriated that none of the projects -- neither those of TTDI Development nor of the Drainage and Irrigation Department nor the modifications undertaken by the local people themselves -- could prevent the latest and worst flash flood from occurring.

However, the strong impression conveyed to the author was that of a community insistent on fighting for what it perceived as its right to a safe living environment. Zainal Mohd, supported by Zukri Jamal (TTDI Jaya Community members), speaking on behalf of the TTDI Jaya community, told the author: "This is where we live and we will stay here and protect our rights, because it is not our fault that we bought houses in this hazardous area as we had not been told by any parties about the danger". They did confess, however, to fearing that new developments in the surrounding area such as the construction highways had made TTDI Jaya more vulnerable.

In answer to the question of why continue living in TTDI Jaya, survey results provided a number of reasons: bigger houses at reasonable prices, the facilities in the area, the proximity to people's workplaces, the good name of the neighbourhood, the strategic location and the freehold land had all been the main attractions of TTDI Jaya at the outset, as confirmed by 72 per cent of respondents who indicated that all these factors were relevant to their decision to remain. The other 28 per cent of survey respondents chose only one or a combination of two or three of the above factors. Ninety-five per cent of the respondents worked in Shah Alam and nearby areas such as Subang Jaya and Petaling Jaya, which meant that their journeys to work took less than 20 minutes. Due to heavy traffic congestion in the Klang Valley, it is common for people to have to spend several hours commuting by car every day if they live far from their office. As mentioned by Punpuing and Ross (2001), in the case of traffic jams in Bangkok, people will feel frustrated, stressed and bored if they are stuck in jams. Kamarudin, a businessman of Jalan Rangkap U2/39, noted that:

> TTDI Jaya is in a strategic location with good facilities. It offers easy access to any part of the Klang Valley, as the connecting highway is just a mile away. When people want to go to work, they do not need to think of traffic jams or leave for work early because they can sometimes reach their office in just 10 minutes. That is why even though this

area has suffered from flash floods, I still think that it is a suitable area, and we hope the government will do something to ease our life by eliminating flash floods.

As well as the strategic location, close to their workplaces, most of the residents who choose to stay in TTDI Jaya indicate that it is because of the local facilities in the area, including the school facilities: 72 per cent describe themselves as satisfied, 28 per cent as very satisfied and only 2 per cent as dissatisfied with the schools. Those who are not satisfied with the schools state that they expected a higher quality of teaching to be provided. Those people who report that they are satisfied or very satisfied have found that the teaching quality and the examination results are as they expected. The primary and secondary schools are located within the settlement and it is quite safe for the parents to let their children walk to school by themselves or with friends, as it is at most a ten-minute walk. Some respondents, including Zarina Hasan, Melissa Adam and Suzysamy, said that apart from the high quality of the schools, this area did not provide anything that would induce people to stay

The provision of retail facilities in TTDI Jaya was generally seen as good by residents. Additionally, 92 per cent of the residents were satisfied with the bank facilities in the area, while 8 per cent were very satisfied. The bank facilities in TTDI Jaya are very convenient, as they are easy to reach and not as busy as other banks located in business centres in urban areas. The provision of grocery stores and clinics also facilitates the life of TTDI Jaya residents. For working people, long journeys to buy food and the extra time involved are not desirable. The clinics that operate in the area are also very convenient for the residents. Even though they are private clinics, local residents told the author that they are happy with the service. Eighty per cent of respondents were satisfied with the rubbish collection in TTDI Jaya (managed by Shah Alam City Council). However, the remaining 20 per cent said that they were not satisfied with the service, as the collection sometimes failed to follow the schedule.

Overall, the strategic location of TTDI Jaya, close to other developments in the Klang Valley and to most people's workplaces, in and around Shah Alam city centre, as well as the fact that the local area provides most basic facilities, means that the area is a convenient place for people who choose to avoid long journeys to work, and it meets basic requirements for shopping and the like.

6.11 Conclusion: review and the future of TTDI Jaya

More than ten years ago, when TTDI Jaya was first occupied, this area became one of the most prominent and desirable housing developments in Shah Alam, with its modern houses constructed by one of the most established developers in the country. The good name of TTDI Jaya did not last, as flash floods degraded its image and left local residents living in frustration. However, the facilities provided, such as schools, community hall and centre for small businesses, have made people think twice before moving out of the area. On the other hand, TTDI Jaya residents feel that the developer has not been honest with them and, at the start, manipulated them by selling the properties freehold in order to attract people to buy without telling them the real situation: that the area was liable to floods and that the developer had been told to raise the ground level on which the housing estate was to be built.

People do not choose to live in a hazardous area. TTDI Jaya is an example of a Klang Valley housing estate that has suffered from flash flooding because of rapid land use development in the Klang Valley leading development to occur in sensitive areas of the flood plain and without prospective house buyers being warned of the risks. The consequences of the flash floods have become disastrous for TTDI Jaya residents, particularly the latest event in 2006. The flash flood situation in TTDI Jaya is now extremely serious, and calls for a rethink by the government and those who are involved with land use development, who need to understand the consequences of their impacts on the environment. For the residents, the floods have meant severe financial losses as well as individual psychological stress and fear. Indeed, it is fortunate that there have not as yet been serious injuries or fatalities reported as a result of flash flooding in TTDI Jaya.

Inevitably, the future of TTDI Jaya will depend on flash flood prevention measures, be they structural or non-structural. So far, priority has been given to structural measures such as the construction of the flood wall, floodgates and flood retention pond. The prevention proposed by the State Government of Selangor and the Federal Government in the wake of the latest flash floods was also focused on structural measures such as river deepening and channel construction.

In the case of TTDI Jaya, the structural measures are likely to be of only short-term effect. The responsible bodies who are involved with the flash flood mitigation programme should also consider non-structural measures. Structural measures on their own are likely to mean that in another 10 years, the area will suffer from a disaster of equal or worse magnitude than the 1996 and 2006 floods, as well as a series of lesser flash floods. In order to keep people from moving

out of TTDI Jaya and to secure the future of the settlement and the success of the community, the uptake of insurance policies should be encouraged, although clearly there would be difficulties here. In the end, this would help bolster the population, fill the 60 or so empty houses, and contribute to economic activity in the area.

TTDI Jaya is one of several Klang Valley communities that have suffered from flash floods because of rapid land use development in the valley and especially in sensitive areas of the flood plain. But nowhere have the consequences of flash flooding been as disastrous as they have in TTDI Jaya, particularly the latest event in 2006. The flash flood situation in TTDI Jaya is now extremely serious, and calls for a rethink by the government and those who are involved with land use development, who must understand the consequences of their actions for the environment and for vulnerable residents. Indeed the flooding in the Klang Valley can be considered a man-made disaster.

CHAPTER 7

KAMPUNG HAJI ABDULLAH HUKOM: BETWEEN THE NEED FOR A LIVING PLACE AND THE SPACE FOR FLOOD WATER

7.1 Introduction

The previous chapter discussed and examined the commercial development of TTDI Jaya, which has suffered tremendously from flash floods. In order to gain a fuller understanding and a better view of how rapid land use development of the Klang Valley has affected the people residing on the flood plain, the unplanned settlement of Kampung Haji Abdullah Hukom has been chosen for study. TTDI Jaya and Kampung Haji Abdullah Hukom are two totally different areas. However, both of them have frequently suffered from flash floods and both communities are exhausted with the unpleasant situation of flash flooding in their living areas.

Kampung Haji Abdullah Hukom is located in Bangsar, about 2.5 kilometers from the centre of Kuala Lumpur. Like TTDI Jaya, it is located in the Klang Drainage Basin but the difference is that this settlement is located on the flood plain of the Klang River itself. At the south end of Kampung Haji Abdullah Hukom, there is a tributary, the Anak Ayer Batu River, which has its source on Bangsar Hill and flows into the Klang River. Given the urban nature of the territory through which the Klang River flows -- Ulu Kelang, Ampang, Gombak and Kuala Lumpur itself -- and the fact that the Anak Ayer Batu River flows through the campus of the University of Malaya and several housing estates, it is hardly surprising that flooding is a problem (see Map 15).

Kampung Haji Abdullah Hukom is one of the early squatter settlements in the Klang Valley, and gained its first residents in the early 1900s (Hajjah Zainab).[1] However, according to Haji Kamarul, the Kampung Haji Abdullah Hukom committee leader, it was "officially" opened in 1946. Kampung Haji Abdullah Hukom is an unplanned settlement formed as a result of the imbalance in urban development in the early years of Kuala Lumpur, and more will be said about it in section 7.2. Historically, due to the growth in mining in the heart of Kuala Lumpur and rubber in the State of Selangor in the late 1890s, migration from rural to urban areas had continued to increase and had raised the demand for land to be developed for settlements (Gullick, 1994 and 1956). However, the limited number of settlements developed for the urban

[1] As with Chapters 5 and 6, all the quotations that appear in this chapter were collected during the author's fieldwork in the summer months of 2005.

poor has severely affected their choice of place to settle in the city. Consequently, due to the serious need for living space, any vacant land, especially in the flood plain areas, became attractive. The advantage of living in flood plain areas is that they are located by the river, which was seen to support people's domestic needs for water for drinking, washing and bathing. Therefore, by having a suitable place to settle down, like Kampung Haji Abdullah Hukom, the urban poor could continue their life in the city and could take advantage of the opportunities offered by the urban activities.

The word "kampung" in the name Kampung Haji Abdullah Hukom conveys the meaning of village, or enclosed settlement. This suggests that the people of Kampung Haji Abdullah Hukom still subscribe to what can be considered a village culture even though they live in the city. From previous experience of academic work in a village in Kedah in the north of Peninsular Malaysia, the author would argue that activities and culture in the two villages, one urban and the other rural, remain similar in some respects; for example, the spirit of *gotong royong* (helping hand or mutual help expressed in the form of a feast) is evident in both communities.

In the late 1960s, during the period of peak migration to Kampung Haji Abdullah Hukom, the Kampung started to experience flash floods (Douglas, 1983 and 1988; Hajjah Zainab, 2005). Douglas (1985) reported that from 1969 to 1970, the Anak Ayer Batu River had received a huge amount of sedimentation from land clearance activity following the development of Bangsar Heights and Damansara Heights. He wrote that in a year, 800 cu m/sq km of sedimentation was deposited. Due to those development projects, the lower reaches of the Anak Ayer Batu River had frequently flooded, and one of the areas located at the mouth of the Anak Ayer Batu River is Kampung Haji Abdullah Hukom. From then until today, Kampung Haji Abdullah Hukom has not stopped experiencing flash floods. However, in 1995, the DID of the Federal Office announced that the Kampung was a flood-free area as a result of flood improvement projects that have been constructed in the area, including flood gates and flood sirens (Mariney, 2001). Nevertheless, the area had been free from flooding for only a few years when in 1999 it started again to experience flash floods. According to DID reports (2001 and 2003), flash floods in 2000 and 2002 were among the worst that had occurred in the Kampung.

This chapter examines how people started to live in Kampung Haji Abdullah Hukom, why they chose to live in this area, and the difficulties and suffering that have been caused by frequent flash floods. Kampung Haji Abdullah Hukom is where many of its residents were born and grew up, and some who have got married continue to live there. Still, the flash floods that have

repeatedly occurred in their living space have impacted on the lives of the residents in various ways. Many have been caught in two minds as to whether to leave or to stay.

In order to understand the impact of flash floods on the community, questionnaire surveys, interviews and observations were undertaken by the author. The questionnaire survey contains four sections, the main headings being the same as those in the questionnaire provided for the TTDI Jaya residents (see Appendix 1). As with the discussion in Chapter 6 concerning TTDI Jaya, this chapter has three main parts: the first part discusses the development history of Kampung Haji Abdullah Hukom, its socio-demographic composition, the built environment and the vulnerable areas. The second part explores the community's experience of flash floods, the impact of flash flooding, perceptions of and attitudes towards flash floods, and preparation for flash floods. The third part looks at the attraction of Kampung Haji Abdullah Hukom, why people continue living there, and what has happened to the Kampung since the fieldwork was conducted.

In obtaining information from the residents of Kampung Haji Abdullah Hukom, the assistance given by the Kampung leader and key informants enabled the interviews and questionnaire surveys to be undertaken smoothly. The author was able to gain access therefore to some previously unrecorded and unpublished information on matters such as the history of this unplanned settlement.

7.2 Kampung Haji Abdullah Hukom: the nature of the residential area

On its way to achieving its target of making Kuala Lumpur a world-class city, one of the aims of the government is to eliminate all squatter settlements from the city centre (see Chapter 5.5). However, at the time of writing, this area still exists while most of the other squatter settlements have been demolished and their residents are in the process of being resettled. The objective of this section is to gain an understanding of the nature of the squatter settlement and the way it is constructed, both physically and socially. The information gathered in this section comes from Section A question 1 and Section C of the questionnaire. In order to achieve a better understanding, interviews were used to gather part of the information for this section. As this settlement was established gradually, recollections and memories about the early residential development of Kampung Haji Abdullah Hukom are important.

There are about 500 families living in the 9.6 hectares of Kampung Haji Abdullah Hukom (Haji Kamarul, Kampung committee leader). One of the characteristics of squatter settlements in general is that most people build their own homes, but some build houses and rent them out, even though they do not own the land. However, in Kampung Haji Abdullah Hukom, 99 of the 100 respondents said that they were living in the houses they had built and only 1 was renting. This ratio of owners to tenants suggests that most of the respondents have a high level of responsibility for the area in which they live; they do, after all, live in houses that they built themselves.

Questionnaire responses show that residents have lived in the area for between 2 and 50 years or more (see figure 7.1). Most respondents have lived there for more than 30 but fewer than 40 years (24 per cent), moving into the area therefore in the 1960s and 1970s. But 10 per cent of respondents have lived there for more than 50 years; these people are from the generation of Haji Abdullah Hukom (see section 7.3), the generation who came to live in Kampung Haji Abdullah Hukom as urban pioneers. According to Haji Kamarul, many of the early generation who lived in the area have passed away but their children continue to live in the same house. During the survey, I found that people who have lived in Kampung Haji Abdullah Hukom for 50 years and more intended from the start to live there permanently. In the words of Haji Yusof, a pensioner:

> I came to Kuala Lumpur in the 1950s to search for a job in the city. During that time, I was searching for a suitable area to live with my family. Then I came to Kampung Haji Abdullah Hukom and found that it was quite suitable for the family. Even though there were no facilities provided and we needed to build our own house, I decided to live here because it is close to the city centre. However, due to economic restrictions, I plan to live here permanently. Also the people who live here have created good relationships among the community, and so after a few years of living here, my family and I felt like this area had become our own village. Due to the high cost of living in the city, Kampung Haji Abdullah Hukom has become my permanent residence. I have only been back to my home village in Perak if there has been an occasion or just for a brief visit. My children all have their own families and during the weekend, everybody comes back here to visit. This is the home village for my children because they were born and grew up here and stayed here till they got married.

The attractions of Kampung Haji Abdullah Hukom are indicated by the relatively high number of second generation residents electing to remain there. One of the most interesting findings was that 23 per cent of the respondents who had lived there for 20 to 40 years were second generation residents. A number of couples who were born in the village chose to start their family life there. According to Sarina Nordin, a housewife:

> It is easy to live here. It lets me stay close to my family. Also, the most important thing is that my husband works in Kuala Lumpur, so this is the only suitable place for us. If we wanted to live elsewhere, the cost of living would be very high and we could not afford it. So the best thing is to stay here in order to save money, as most of the facilities and everything can be reached from here.

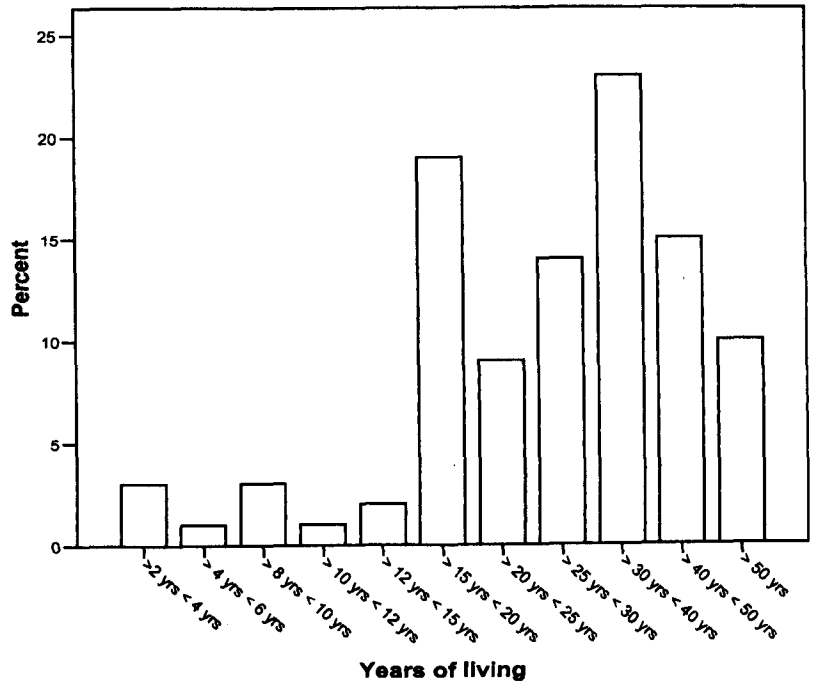

Figure 7.1. Length of residence in Kampung Haji Abdullah Hukom.
Source: Author's survey (2005).

During earlier research the author visited Kampung Haji Abdullah Hukom often between 1994 and 1998. When she returned to the area in 2005, she discovered that Kampung Haji Abdullah Hukom showed dramatic changes; it was much cleaner and there was an increase in car ownership with some empty spaces that had been turned into car parks. As the author walked into Kampung Haji Abdullah Hukom to initiate her research, she was welcomed by local

residents. A number of people asked her if they could help. The hospitality shown by the residents made her feel very comfortable as a researcher in Kampung Haji Abdullah Hukom and also helped her build a relationship with the residents. In general, residents were calmer and friendlier than the middle-class people who live in TTDI Jaya, not leading the same sort of hectic lifestyle even though they are poorer. When the author visited the area in the morning during weekdays, she was able to meet with some of the womenfolk who have more spare time and often wait at home for their children to return from school and their husbands from work. Residents entertained no prejudices towards a researcher wanting information so long as the purpose of the visit was frankly explained to them.

The unplanned development of Kampung Haji Abdullah Hukom has resulted in a pattern of housing that is not arranged in any particular order. No fences have been constructed to separate the houses, which are situated very close to one another, only allowing one person to squeeze between them at a time (see figure 7.2). Kampung Haji Abdullah Hukom wears an unplanned and haphazard appearance. Since most of the inhabitants originated from rural areas, even though the houses are close to one another and without fences, some kind of a village lifestyle exists (Ishak Mansor). Most of the Kampung is taken up by houses, and only about five per cent is open space where children can play (author's observation, 2005). As the existence of Kampung Haji Abdullah Hukom has never been officially recognised by the authorities, people who wish to can build more or less whatever type of house they want. Hence, different sizes of informal housing can be found, most of it built using cheap materials such as zinc, plywood and other materials that are susceptible to fire or flood. Ninety-eight per cent of the respondents' houses use a mixture of materials: bricks for the walls from the ground to a height of about 75 cm, with wood up to and including the roof, which is covered with corrugated iron (see figures 7.2 and 7.3). Given the materials used for their construction, these houses can be categorised as semi-permanent houses.

There are three different types of house that can be found in Kampung Haji Abdullah Hukom -- single storey houses, two storey houses and longhouses[2] (see Figures 7.4). However, it was difficult to count accurately the number of each type of house as the structures are too close together and do not follow any particular path. Even though this area is a squatter settlement, no back-to-back houses were found during the observation. Most of the houses were built directly from the ground without any staged or raised foundations, except for the longhouses in one area,

[2] Longhouse is the name given by the local residents for terrace houses built of a mixture of brick and wood. Longhouses were built by the government to replace houses damaged after a fire in 1973 as a form of unofficial compensation (Haji Kamarul).

which have four steps up to their entrance. The houses normally have two bedrooms, a family area or living room, and a kitchen; most of them are relatively small spaces, but no exact measurements were made because the houses vary so much in design (author's observation, 2005).

At the time of the author's first visit in 1994, electricity was the only utility provided to every house while water was drawn from five standing taps that supplied free water to the whole settlement. However, by 2005, all the houses had water facilities, and the residents now need to pay for its use (Haji Kamarul). As a squatter area, Kampung Haji Abdullah Hukom does not have a systematic drainage system, which would normally have been built by the local government. Villagers have therefore constructed their own. The system involves a mixture of half-buried pipes and small concrete drainage that removes excess water. However, for the main drain in front of the settlement area was constructed without any concrete and this just led to increasing sedimentation from its own bank and makes the drain become shallow and not effective to flow water out from the area.

Because this is an unauthorised development, the residents pay no council tax, but their rubbish is now removed by the Kuala Lumpur authorities. Previously, much of it had been burnt by residents, and then, due to restrictions on fires in open spaces, it was thrown into the river or just left by the road that leads out of the settlement. This, however, was seen as problematic, given Kampung Haji Abdullah Hukom's location in the city of Kuala Lumpur. The city authorities decided, therefore, to provide one large rubbish bin and place it as close as feasible to the entrance to the Kampung. Rubbish collections were, however, infrequent (Haji Kamarul). Once again, villagers threw their rubbish into the Klang River with predictable consequences on the water's flow. The Federal DID ended up installing a rubbish trap across the river in front of the Kampung (see Figure 7.5). Realizing that the potential link to flash floods, in 2000 Kuala Lumpur City Hall took to emptying the bin on a regular basis (Haji Kamarul).

Kampung Haji Abdullah Hukom, as a squatter settlement, is not provided with the schools, clinics or banking facilities that are found in the properly planned residential area of TTDI Jaya. However, given its location in the most rapidly growing part of the Federal Territory of Kuala Lumpur, the Kampung shares in the many facilities of the big city -- public transport, shopping complexes, schools and many more amenities. During the interviews and questionnaire surveys, respondents noted with appreciation their ease of access to urban amenities, and with the city's light rapid transit (LRT) passing alongside the Kampung, all respondents stressed the convenience of public transport. When residents have health problems, they go to the University

of Malaya Hospital, located about six kilometers from the Kampung. The most common response from the community is expressed in this comment: "I don't need to worry if I get sick because I can easily go to the University Hospital, which is the nearest government hospital" (Farahana, a housewife). Even closer at hand is the mega shopping complex just opposite the village across the Klang River. As Noraini Ismail, a factory worker, puts it:

> Living in Kampung Haji Abdullah Hukom is so convenient, especially when I want to go shopping. The Carrefour hypermarket is just opposite our living area, thus even at night we can still go shopping because it takes less than ten minutes to get there.

During the author's visit to Kampung Haji Abdullah Hukom, there was a car pool organised among the villagers to go to the mega shopping complex (Mid Valley Mega Mall, see Map 16).

On the other hand, few basic facilities are provided to Kampung Haji Abdullah Hukom by the federal or city authorities; one simple community hall is all. There is also a *surau*[3], a kindergarten and a World Wildlife Fund (WWF) Club operating in the village. As stated in KL 84, in order to improve the squatter areas, one of the interim programmes before the squatters' allocation to their permanent settlement area was to provide a community hall, the objective of which was to ensure that government programmes could be diffused (Kuala Lumpur City Hall, 1984). The community hall, built more than 15 years ago, has benefited most of the residents, primarily when people need a spacious place for occasions such as wedding ceremonies or visits by dignitaries. However, the most important role of the community hall and *surau* is to provide emergency shelter in case of flooding (Haji Kamarul). The kindergarten, provided by the Ministry of Women, Family and Community Development, was welcomed by the community and its parents as a means of giving early education to their children before they start primary school at the age of seven. According to Haji Kamarul, the WWF Club in Kampung Haji Abdullah Hukom is operated by a lecturer from the National University of Malaysia (UKM). However, during the author's frequent visits to Kampung Haji Abdullah Hukom, the place has always been closed.

One of the most important aspects of community life is the existence of a committee and a kampung leader to run the village. The committee consists of a leader, chosen by the community, assistant leader and a number of other members. Some squatter committees in Kuala Lumpur have been recognised by the government since 1984; in KLSP 84, it is acknowledged that:

[3] A *surau* is a small prayer place for Muslims generally built for the local community of a residential area.

> The squatter communities are quite socially and politically organised. Each settlement usually has its own village committee and internal conflicts and complaints are normally channelled and resolved through these committees.
>
> (Kuala Lumpur City Hall, 1984:117)

Kampung Haji Abdullah Hukom is an example of a settlement where the committee has played an important role. The Kampung leader was chosen by the community through majority voting during an election meeting. The committee includes the assistant leader and a variable number of other members. Squatter village committees in Kuala Lumpur are very important bodies in the eyes of the government, as they can assist in carrying out administrative and supervisory duties (Kuala Lumpur City Hall, 1984).

Even though this settlement is a squatter settlement, unofficial acknowledgement by the authorities makes the leader of Kampung Haji Abdullah Hukom a respected figure in the community (although it should be stressed that the existence of the Kampung has never been legally authorised). For example, during a meeting with the Kampung leader, in a small stall near the village, the author noticed that Haji Kamarul was accompanied by two residents. During the meeting, a wedding ceremony was being prepared, and he invited the author to witness the ceremony in the community hall. He went up to a group of women and introduced the author, explaining the reason for her presence and the nature of the research. The difference with TTDI Jaya was clear; TTDI Jaya's committee leader was always busy and did not often meet with the community. Haji Kamarul frequently undertakes a tour of the village and meets with the community to listen to their problems. He has a strong voice in Kampung deliberations. He noted to the author that:

> If there is a problem in this area and we cannot solve it, we (the committee members) will contact the Member of Parliament for assistance.

Haji Kamarul also asked the author to inform him if she had any difficulties during the survey, especially if there were respondents who would not cooperate. This helped the survey run smoothly.

Figure 7.2. A typical house in Kampung Haji Abdullah Hukom. Note the mix of bricks and wood (see arrow a), the distance between the two houses (arrow b) and the protection against flooding in front one of the houses (arrow c).

Source: Author's photograph.

Figure 7.3. Houses in Kampung Haji Abdullah Hukom with the Mid Valley multi-function development on the far bank of the Klang River.

Source: Author's photograph.

Figure 7.4. The longhouses.

Source: Author's photograph.

Figure 7.5. The rubbish trap across the Klang River (see arrow).

Source: Author's photograph.

7.3 Kampung Haji Abdullah Hukom: origins and development

Even though Kampung Haji Abdullah Hukom is regarded as a squatter settlement by most of the people in the Klang Valley and by the government, its emergence in the city of Kuala Lumpur and the process of its development has its own history which makes this area different from other squatter settlements in the valley. This section will discuss how Kampung Haji Abdullah Hukom came to be and the how the community fought to win rights to remain there. During the last 11 years from 1994 to 2005, according to the author's observations in 1994, 1998 and 2005 and her interviews with the leader of Kampung Haji Abdullah Hukom and other respondents, the squatter settlement has shown considerable improvement, as a result of which some of the conventional characteristics of squatter settlements (as discussed in Chapter 2) no longer apply.

Despite extensive searches, the author has not been able to find documentary material on the history of Kampung Haji Abdullah Hukom. This is perhaps not surprising given the nature of the settlement. Haji Kamarul told the author that 0.8 hectares of land in the Kampung belong to the family of Haji Abdullah Hukom, after whom the Kampung is named. However, he said that he had no detailed information on Kampung Haji Abdullah Hukom's history and referred the author to Haji Abdullah Hukom's granddaughter. Not without some difficulty, the author managed eventually to find and meet the woman in question, Hajjah Zainab. The following text is based on her recollections. Given her position within the community, we can presume that her memories are authoritative, although clearly their very authority brings with it a certain perspective.

Kampung Haji Abdullah Hukom was bigger than it is today before 1995, when a part of the area, consisting of 111 houses, was cleared. The 111 families from those houses moved into the nearby Apartment Putra Ria block 94 (Bunnell, 2002). Currently, Kampung Haji Abdullah Hukom covers an area of 9.6 hectares of land, including the 0.8 hectares which are legally owned by Haji Abdullah Hukom's family (Haji Kamarul; Interviewee D, Planning Department of Kuala Lumpur City Hall, 2005). The land belonging to Haji Abdullah Hukom's family is located at the north end of the Kampung (see Map 16). According to Hajjah Zainab, during the early years of the Kampung's history, most of the community built their houses close to this plot of land. Without a fence between Haji Abdullah Hukom's legally owned land and the squatter camp, the settlement merged together into a single area called Kampung Haji Abdullah Hukom (see map 16). This account was supported by Interviewee D, who told the author that, "With [Haji Abdullah Hukom's] land being legally under private ownership, it is difficult for the

government to improve the physical conditions of the area unless action is taken by the landowner". Haji Abdullah Hukom's land is in a similar state to Malay reserve lands in Kuala Lumpur, which are characterised by stagnation and lack of development, as discussed in Chapter 3.7.1. Built, as they are, of wood in kampung style, houses on the land of Haji Abdullah Hukom are no longer in keeping with the modern developments surrounding the area. It is also difficult for Haji Abdullah Hukom's land to be supplied with proper drainage systems, as in planned settlement areas. The squatter houses surrounding it have gradually eroded the appearance of the land legally owned by Haji Abdullah Hukom.

Haji Abdullah Hukom's granddaughter, Hajjah Zainab, who was 79 years old at the time of the interview (2005), explained how the Kampung was founded. She explained that there are five houses on Haji Abdullah Hukom's land, and these houses belong to the old man's sons and daughter and their families. Haji Abdullah Hukom himself lived there from around 1870 to 1930. He served the King of Selangor, Sultan Idris Shah, as a warrior from around the 1860s to the late 1890s. Due to his loyalty and his efficient work, he was honoured by the King and given the title Dato. In addition, the king also gave him some land, including 0.8 hectares in the area that was to become Kampung Haji Abdullah Hukom. Later, because of the construction of the railway from Kuala Lumpur to Klang, completed by 1886 (Gullick, 1956), Haji Abdullah Hukom's land holding was shifted closer to the Klang River. Significantly, though, his land is the highest area in Kampung Haji Abdullah Hukom. This suggests that the land was occupied before 1886, or between 1870 and 1885.

During early years of the settlement, it was known simply as "the land owned by Haji Abdullah Hukom". Hajjah Zainab added that at that time Haji Abdullah Hukom was considered a wealthy person due to the property he had in several parts of Kuala Lumpur and his 20 or so bullock carts. At the same time, many people came to work for Haji Abdullah Hukom. In the early 1900s, the land where the houses of Kampung Haji Abdullah Hukom are now located was a coconut orchard, and some people who worked for Haji Abdullah Hukom started to build their houses in the orchard in order to be close at hand. However, Hajjah Zainab was not so sure about who actually planted the coconut trees because this surrounding land was owned by the state. From the early years of the 1900s, the land nearby owned by Haji Abdullah Hukom started to be known as Kampung Haji Abdullah Hukom (Hajjah Zainab).

In Chapter 2, some of the features of typical squatter settlements were discussed. From the above description of Kampung Haji Abdullah Hukom, it is clear that it does not fully fit into the conventional pattern of squatter settlements, especially because its existence has been

unofficially acknowledged by the government and local authority in KL 84 (this will be discussed in further detail below). However, some of its features are typical of squatter settlements -- among them, the fact that it is located on land owned by the government, consists of wooden buildings, is a congested space and has poor drainage systems.

While this would not have been the case for those who settled in the area in the early 1900s, most people who built their houses in Kampung Haji Abdullah Hukom after independence in 1957 knew that it was considered illegal. As related to the author by Haji Kamarul, the government urged rural people to move into the city and specifically to the Klang Valley in the 1950s to become urban pioneers and together with the government to develop the country's new capital and its surrounding area. The creation of job opportunities encouraged migration. The Communist insurgency in what was then Malaya from 1947 to 1957 had been a further factor inducing people to move into the city in order to protect themselves (Aiken *et al.*, 1982). Rapid urbanisation of the Klang Valley since the 1960s increased migration into the region, but in 1970, housing developments were concentrated primarily on the middle classes (office employees, professionals, civil servants, etc.), and this impacted on the housing situation for the less affluent and on their right to live in legal housing (Aiken *et al.*, 1982). No solution was found; squatter settlements became the only possible way to live in the city.

Kampung Haji Abdullah Hukom eventually became a well-known residential area for the urban poor. Without any planning or management, Kampung Haji Abdullah Hukom became crowded and packed with migrants and their houses (Haji Kamarul). On account of the situation in squatter settlements, as part of the Third Malaysia Plan (1976 to 1981) the Federal Government undertook to construct low cost houses for the urban poor (Aiken *et al.*, 1982). However, most of the squatters preferred to live close to their place of work, where there was little available land (Aiken, *et al.*, 1982). One solution during that time, as set out in KL 84, was to build modular longhouses on vacant plots. Selected residents could than be moved into these longhouses. The government also tried to improve affordability by addressing the problem of "squatter landlords". KL 84 stated that:

> The presence of a high percentage of squatter households who are tenants implies that there are certain groups of people (squatters and also non-squatters) capitalising on the housing needs of new migrants to the city by building squatter dwellings for rent. The Authority will not condone the activity of these people and immediate steps to eliminate the unwarranted squatter landlords will be taken.
>
> (Kuala Lumpur City Hall, 1984:120)

Kampung Haji Abdullah Hukom eventually developed into a settlement without landlords and tenants (with the exception of one resident who was found in the author's survey to be renting a house belonging to Haji Abdullah Hukom's family). Kampung Haji Abdullah Hukom committee became the eyes and ears for the local authority in order to testify and report to Kuala Lumpur City Hall if rented houses were found in the area (KL 84, Kuala Lumpur City Hall, 1984; Haji Kamarul, 2005). By eliminating squatter landlords (as mentioned in Chapter 3.4.2) with the assistance of Kampung Haji Abdullah Hukom's leader and its committee, Kuala Lumpur City Hall was able to update the squatter register and monitor the growth of the Kampung (Kuala Lumpur City Hall, 1984). Because in time all residents of the Kampung were registered, they became eligible for government-built housing

Aiken, *et al.*, (1982) reported that in the early 1970s, 21.7 per cent of squatter family leaders in Kuala Lumpur did not have permanent jobs. Economic problems in some cases led to social problems such as drug addiction and crimes such as burglary. Kampung Haji Abdullah Hukom did not escape these problems. In order to address the problems, the government set up a number of programmes in the squatter villages; these included youth training programmes, student guidance schemes and youth business programmes (Kuala Lumpur City Hall, 1984). With the construction of the *surau* and community hall, there was finally a place for the community to meet and discuss matters of concern. With support from the government, improvement gradually occurred in Kampung Haji Abdullah Hukom. Indeed most of the villagers told the author during her survey that the area is now free from drug addiction and there are no more burglaries. As noted by Jamilah Dasuki, a housewife:

> Now, if I leave something outside my house, nobody will take it. I can hang the clothes, I can leave shoes outside, and they will stay there.

Hajjah Zainab (Haji Abdullah Hukom's granddaughter) concurred:

> Previously, around the 1980s, my family could not leave shoes outside. If we left any of our belongings outside the house for only a few minutes, the things would disappear. But it is really safe now. I can even leave the door wide open without any stranger getting into the house to steal my things. I think that the leader and the unity of these villagers has brought the situation back on track.

In order to improve the living condition of the squatters, in 1994 new resettlement apartments were constructed, the aforementioned Putra Ria apartments, built by the federal government particularly for the urban poor who live in squatter settlements in order to provide proper shelter for them (Bunnell, 2002). As these apartments are located beside Kampung Haji Abdullah Hukom, an offer was made for Kampung residents to move in. According to a survey conducted by the author in 1994, from the information given by the local community only 20 households chose to move into the new housing (Mariney, 1995). After deliberation and a tour of the new 22-storey buildings, the Kampung leader, together with other members of the community, decided that the apartment blocks were unsuitable for a number of reasons: they were too small and there was nowhere to meet. (The normal size of low cost housing is 60.75 sq m, with three bedrooms and one separate bathroom and toilet [Ministry of Housing and Local Government, 2005]). They rejected the offer, and Kampung residents signed a memorandum in support of this decision (Mariney, 1995). The author was told by a number of Kampung residents that they had lived in Kampung Haji Abdullah Hukom for most or all of their lives and they liked the Kampung lifestyle. Their houses were built on the ground, and this allowed them to lead a simple life, walking out to meet their neighbours and allowing their children to play outside. And when there was a big occasion, everybody could lend a helping hand. What worried the Kampung residents was that if they were lived in a high building, the village-style community would suffer. According to Sarina Nordin, a housewife:

> I don't want to live in a high rise flat. It makes me feel trapped because I am used to walking out of my house every day to meet with my neighbours and friends. Also, the children are used to playing outside every day and I don't know how to monitor them if adults are up in their flats.

By 2004, most of the squatter settlements in the Klang Valley had been demolished, as new low cost apartments had been developed by the government in order to achieve its objective of zero squatter settlements in Kuala Lumpur city centre by 2005 (Kuala Lumpur City Hall, 2003). Kampung Haji Abdullah Hukom was included in this plan. However, in view of the Kampung's special history, with its residents being seen as urban pioneers who supported the government in the development of the city, the community leader appealed to the government to provide a different design of house if they really needed to move from the area and requested a location close to the Kampung (Haji Kamarul, 2005). The Kampung's residents understood that their settlement looked out-of-place in a city like Kuala Lumpur, so they accepted the government's modernisation plan but said the design concept must reflect an understanding of their needs (Haji Kamarul). The Kampung committee put forward a counter-proposal that the area be made

into a "modern Malay village" (Haji Kamarul). However, this proposal was rejected, because the area where the Kampung is now situated had already been earmarked for development by the Kuala Lumpur City Hall (Interviewee D, Planner, Kuala Lumpur City Hall, 2005).

With their strong voice and leadership, Kampung Haji Abdullah Hukom residents won their battle for suitable housing. By the end of 2004, the government had constructed new semi low-cost apartments on land adjacent to Kampung Haji Abdullah Hukom (see Map 16). These apartments are the only accommodation provided for urban pioneers in the Klang Valley bearing the status of semi low-cost apartments (Haji Kamarul, 2005). Kampung Haji Abdullah Hukom is a strong base for UMNO, the main political party in the Barisan ruling coalition. Haji Kamarul is a prominent local member of UMNO. In addition, Datuk Shahrizat Abdul Jalil, the Member of Parliament for the constituency (Lembah Pantai) within which Kampung Haji Abdullah Hukom is located, has served for the past 10 years as Minister for Women, Family and Community Development, and has strong links both with the leader of Kampung Haji Abdullah Hukom and with leading members of the Barisan ruling coalition, and this has led to the government listening to the voices of the residents of the Kampung (Haji Kamarul). Therefore, support from the political party has become a significant element to be considered by the government in relation to the desires of the Kampung Haji Abdullah Hukom community.

The new semi low-cost development contains 500 residential apartments, a community hall, a *surau*, a sports hall, a kindergarten, several shop lots and a car park. Every apartment has three bedrooms, two bathrooms, a living room, a dining room and a kitchen. Haji Kamarul told the author that the apartments are 67.5 metres square, with three bedrooms and two bathrooms. When compared with other housing developments for the urban poor, this is the only semi low-cost settlement that has been provided with such facilities. For every house that will be demolished, the owners will receive compensation of RM 3,000 (Haji Kamarul). Even though the new apartments are provided by the government, people must still pay for them at the semi low-cost price, but loans can be applied for under the Tabung Bantuan Perumahan (housing loan) scheme for the urban poor. According to Haji Kamarul, the house price is RM 45,000 and only those who earn a monthly salary of more than RM 1000 qualify. Haji Kamarul added that after the census conducted by Kuala Lumpur City Hall to survey the economic status of the residents, it was found that all residents had sufficient sources of income to qualify them for the houses. Those who were already retired were expected to ask family members earning a monthly salary above the requirement target to undertake the payments (Haji Kamarul). It was hoped that the new accommodation would be ready for the residents to move into by early 2007.

With all the changes that have occurred, Kampung Haji Abdullah Hukom is not like other squatter settlements in the Klang Valley, and the voices of this community have been taken into consideration by the government. The strong committee, united community and absence of squatter landlords have gradually strengthened Kampung Haji Abdullah Hukom's position as the home of urban pioneers who remain in the city of Kuala Lumpur, setting it apart from less organised squatter communities. In addition, the author has noticed that the economic status of the community has also shown incremental improvements since she first visited the area in 1994 Some of the economic improvements can be seen physically in the settlement area, and this was confirmed by the Kampung leader.

7.4 Socio-demographic composition

The socio-demographic composition of Kampung Haji Abdullah Hukom can be divided into six categories: type of employment, place of origin, age, size of family, number of income-earners in the family, and vehicle ownership. This discussion is based on Section D of the questionnaire survey questions 1, 2 and 4 (see Appendix 1).

One-hundred residents completed the questionnaire survey from 500 households in the Kampung (see Chapter 4.5 2). From the analysis, most people were in private employment (38 per cent), followed by self-employment with 34 per cent, and public service with 9 per cent. Seventeen per cent were in retirement. Two per cent of respondents said they were out-of-work but seeking employment (see table 7.1). It was difficult to be specific about the employment characteristics of the respondents because they gave a mixture of exact and general information. However, Haji Kamarul informed the author that residents work in the government sector, in factories, or are self-employed or work for small entrepreneurs; he did not say anything about the more informal working practices that are typically found in the "kampung", as discussed by Ghazali (1999).

Table 7.1. Work characteristics of the head of household in Kampung Haji Abdullah Hukom.

Employment characteristics	Frequency (n = 100)
Private employment	38
Self-employment	34
Public service	9
Retired	17
Unemployed	2
Total	**100**

Source: Author's survey (2005).

People who live in Kampung Haji Abdullah Hukom have come from various states in Peninsular Malaysia (see figure 7.6). From the questionnaire survey, the highest percentage of respondents were from Selangor (27 per cent), followed by respondents from Perak with 24 per cent and from Kampung Haji Abdullah Hukom itself with 23 per cent. Very few or no respondents came from the largely rural, northern states of Terengganu, Kelantan and Perlis. The attractions of Kampung Haji Abdullah Hukom were expressed by Ishak Mansor, a 79-year-old pensioner originally from Selangor, who said it was related to location and job opportunities. As Ishak Mansor said:

> Moving from my village to Kuala Lumpur did not make much difference. Selangor and Kuala Lumpur are like the same place. I decided to live in Kuala Lumpur and look for a job here as Kuala Lumpur offers more of jobs opportunities compared to any place in Selangor about 40 years ago.

A respondent who was originally from Perak, a pensioner named Jaafar, gave a simple reason why he and his family moved to Kuala Lumpur:

> It was the distance factor. Perak is not too far from Kuala Lumpur so I do not feel burdened by moving to Kuala Lumpur for work.

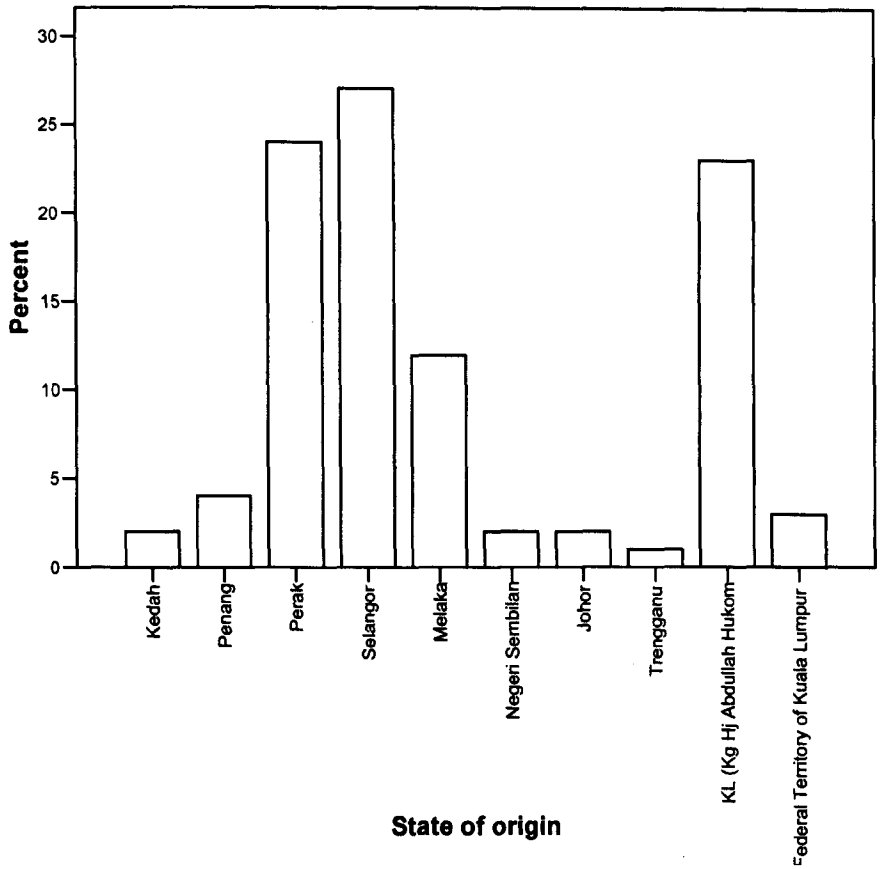

Figure 7.6. Place of origin of survey respondents.
Source: Author's survey (2005).

This compares interestingly with McGee's findings (1976). McGee found that there were two types of migrant to Kuala Lumpur between 1957 and 1970. The first were married men migrating with their families to the capital city; they had already obtained work with government or in other sectors, and the second were unmarried migrants, mainly young men, seeking a good education and job opportunities. This situation is in some ways different from the migration situation in other Southeast Asian cities such as Jakarta, where as the lack of employment in the villages is seen by some scholars as the main reason behind rural-urban migration rather than the attractions of city life (Donner, 1987).

Concerning the age of the respondents, the highest percentage were aged 55 and above (39 per cent), while the second highest came from the age group 41 to 50 years, 26 per cent; and 15 per cent were aged from 51 to 55 years old (see table 7.2). Altogether, 80 per cent of the respondents were 41 years old or above. Thus, most of the respondents were mature and have

substantial family responsibilities. Even though this community is considered a lower-class community, the significance of their experience should not be underestimated.

Table 7.2. Age of respondents in Kampung Haji Abdullah Hukom.

Age	Frequency (n = 100)
18 – 30	9
31 – 40	11
41 – 50	26
51 – 55	15
55 years and above	39
Total	**100**

Source: Author's survey (2005).

The families in Kampung Haji Abdullah Hukom can be considered medium-sized, with 43 respondents having a family size of 5 or 6 people and 35 respondents a family size of 3 or 4. This shows that even though this area is a squatter settlement and most of the respondents are not highly educated, they generally feel that family planning is important. As Dave, a lorry driver, put it:

> Having three children is enough. You cannot afford a big family if your financial status is not high enough.

Fifty-six per cent of respondents said that two or more family members were working, while 42 per cent reported only one family member working. As most respondents were aged over 40, many of their families already have grown-up family members who can work, thus making the family more secure. Besides, when visiting residents, the author could see that most of the houses were furnished with all the basic facilities, and all questionnaire survey respondents have televisions, refrigerators and washing machines. Twenty-one per cent of respondents even have a satellite television in their houses. This shows that several categories of domestic appliances can now be considered as standard even for those seen as constituting the urban poor.

In a normal squatter community, most residents depend on public transport, and this was the case in Kampung Haji Abdullah Hukom a decade ago. However, there is an increasing trend towards car ownership. Fifty-five per cent of questionnaire respondents have a car, 21 per cent have a motorcycle, 5 per cent have a car and a motorcycle, 3 per cent have a van, and 16 per cent do not have a vehicle at all (see table 7.3). Due to the increase in vehicles, there is now a

car parking area in the Kampung. This is needed because people cannot park their car close to their houses as a result of lack space, and the narrow alleys are all but impossible to drive down. In any case, cars are only allowed into certain parts of the Kampung. Even though public transport is very convenient, levels of household income mean that a majority of residents are able to buy cars (see Figure 7.7). The cars are not all bottom of the range; Haji Kamarul introduced the author to a

Table 7.3. Vehicle ownership among residents of Kampung Haji Abdullah Hukom.

Type of vehicle	Percent n= 100
Car	55
Van	3
Motorcycle	21
Car and motorcycle	5
Van and motorcycle	-
None	16
Total	**100**

Source: Author's survey (2005).

resident who owns a new BMW. Haji Yusof commented that people can own cars and other household goods:

> Because when people live here they are not subject to council tax, and have no household payments except for the water and the electricity that they use. Besides, some families have three to four people working. If they are able to save their money for quite some time, it is not impossible that they can buy a car and other household appliances.

This suggests that the residents of Kampung Haji Abdullah Hukom have increased the standard of living, taking advantage of the city growing around them. This is another way in which Kampung Haji Abdullah Hukom is different from the squatter communities discussed by the literature reviewed in Chapter 2.

Figure 7.7. The car park for residents of Kampung Haji Abdullah Hukom.

Source: Author's photograph.

7.5 Kampung Haji Abdullah Hukom: hazard, risk and disaster

The development of Kampung Haji Abdullah Hukom has not been without its problems. In the late 1960s, flash floods started to threaten the community. Hence, the purpose of this section is to examine the natural environment of Kampung Haji Abdullah Hukom and how it relates to the problem of the flash floods that frequently affect the area. A flood plain is a risky area for development; whether the development is planned or not, the risks associated with flood plains remain. Kampung Haji Abdullah Hukom is located on a flood plain and is just eight meters away from the Klang River. It has experienced flash floods more than 30 times since it was developed (Haji Kamarul). This is not a "natural" risk, any more than is the risk of disasters faced by the urban poor elsewhere in Southeast Asian cities. It is constructed and enlarged by the economic and political system of the country (Bull-Kamanga *et al.*, 2003:196).

From personal observation, it is clear to the author that the natural environment of the flood plain in and around Kampung Haji Abdullah Hukom has been totally disrupted. The original vegetation has been cleared and replaced by squatter houses. Previously, the Klang River had experienced a few major floods, such as those of 1875 and 1926 (Gullick, 1956). The flood

plain of the Klang Valley, including this section, was actively used as storage for overflow water from the Klang River and also as a retention pond in the event of floods (Hajjah Zainab). In the late 1800s, there were tin mines at the confluence of the Klang River and the Gombak River. As a consequence, the bed of the Klang River grew shallower with the deposition of mud and silt from mining activities. Thus, from the early days of the development of Kuala Lumpur, the Klang River was very sensitive to extra input of water.

Kampung Haji Abdullah Hukom is an example of an informal urban settlement becoming surrounded by new urban developments. In the early 1960s, enclosed areas near Kampung Haji Abdullah Hukom such as Bangsar, Lembah Pantai and Kerinchi were still small. A housing development project in Bangsar and the University of Malaya campus at Jalan Pantai Baru were the main development projects proposed at that time. Nevertheless, in the last two decades, the use of land for development started to increase and was especially rapid in the 1990s.

In the new millennium, Kampung Haji Abdullah Hukom is now surrounded by fully developed areas such as Mid Valley, Bangsar Baru, KL Sentral, Lembah Pantai and Kerinchi (See Map 15). Generally, all of these areas are higher than Kampung Haji Abdullah Hukom. Housing developments, commercial buildings, intelligent towers, highways, train and light rail tracks have all been constructed, apparently oblivious to the existence of this village. The mega development project of Mid Valley, which is located on the floodplain opposite Kampung Haji Abdullah Hukom, obstructs discharge water from the Klang River to that area. Hence, Kampung Haji Abdullah Hukom receives a greater volume of water from the Klang River during floods than it should. The railways that pass by Kampung Haji Abdullah Hukom are built on raised land only about five meters from the nearest house. All the roads that loop around the area are elevated to avoid floods. Thus, during heavy rainfall, Kampung Haji Abdullah Hukom becomes a retention pond when the water that fills the area is trapped because the higher ground of the surrounding districts stops the water from flowing out. The impermeable surfaces of the surrounding developments have increased surface runoff, which gradually flows into the low-lying areas before it goes into the river (see figures 7.8a, 7.8b, 7.9a and 7.9b).

The cross sections that were sketched by the author to aid observations during fieldwork show that there are two situations that obviously occur (see figures 7.10a and 7.10b). The first cross section (see figure 7.10a) illustrates that the construction of roads and buildings has failed to take into account the impact on the Kampung of the Klang River receiving a volume of water that exceeds its capacity. Indeed the transport arteries and new developments around the Kampung have been disastrous for the Kampung's residents (Haji Kamarul). All that can be

said is that the higher ground on which they are built can be used as an evacuation point when floods occur. The LRT station is particularly well suited for this purpose.

Figure 7.8a. The flood plain opposite Kampung Haji Abdullah Hukom in 1994 before the development of Mid Valley.

Source: Author's photograph.

Figure 7.8b. The flood plain disappeared with the development of Mid Valley in 1998.

Source: Author's photograph.

Figure 7.9a. The roofs of Kampung Haji Abdullah Hukom houses are nearly level with the road (see figure 7.10b).

Source: Author's photograph.

Figure 7.9b. Another indication of the problems of low-lying land in Kampung Haji Abdullah Hukom.

Source: Author's photograph.

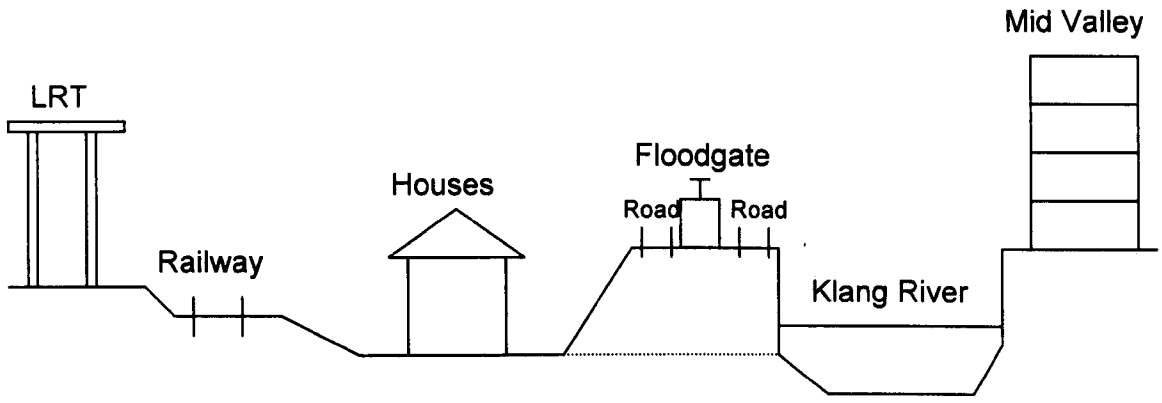

Figure 7.10a. Schematic cross section AA' of Kampung Haji Abdullah Hukom (see Map 16).

Source: Author's observations (2005).

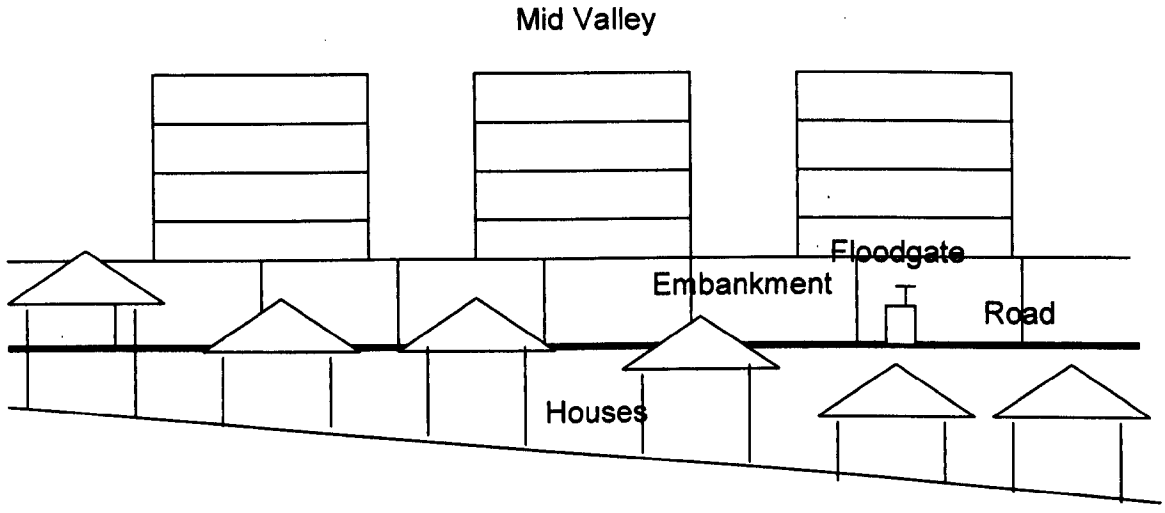

Figure 7.10b. Schematic cross section BB' of Kampung Haji Abdullah Hukom (see Map 16).

Source: Author's observations (2005).

7.6 Residents' experiences of flash floods

In order to understand how people perceive the flash floods that frequently occur in Kampung Haji Abdullah Hukom, this section will consider some experiences. Section A of the questionnaire survey (questions 2, 3, 4, 5 and 10) gathered information regarding flash flood experiences, residents' knowledge of the area before they moved in, preparations for flash floods, level of flooding in houses, and people's priorities during flash floods.

From the questionnaire, 70 per cent of respondents said that they had experienced flash floods more than ten times since moving into Kampung Haji Abdullah Hukom; 29 per cent of respondents had experienced them from two to nine times, and one per cent of respondents had only experienced one flash flood. Due to the uneven nature of the land in Kampung Haji Abdullah Hukom, there is no direct co-relation between length of residence and number of floods experienced. Early residents were able to choose where to build their house, and most of them will have chosen areas away from the river. During the survey it was found that the ground was gradually rising towards the railway (see figure 7.10a). The houses which are away from the river only remain unaffected if the flood magnitude is not too high. However, if the flood volume is high, all houses in the area are affected. For example, Haji Abdullah Hukom's granddaughter, Hajjah Zainab, has lived in Kampung Haji Abdullah Hukom for 79 years but on land that is higher than other areas in the village:

> Since living here, I have only experienced two flash floods that got into my house. I never really expected that a flood could get into my house. The first time was around the end of the 1990s and the second one was in 2001. Before that, even though other areas were flooded, the flash floods never reached my house. But that time I do not know why; maybe because there are so many developments around this settlement.

By way of contrast, Farahana, a 34-year-old housewife who has lived here for 15 years, reported that she and her family had experienced flash floods that got into her house more than ten times.

The typical maximum flood level reported by respondents was 150 cm, with 54 per cent of respondents having experienced that level in their own homes. The typical minimum level was 17.5 cm, reported by 25 per cent. According to Haji Kamarul, when the flood level reaches 60 cm, most adults leave their houses for safety reasons, but for the children, once the water enters the village boundary, people hurry to save the children first. Ninety-nine per cent of respondents stated that the priority during flash floods was their family.

Before personally experiencing flash floods, a large majority (86 per cent) of respondents were aware that their house's location, close to the river, would mean the possibility of being flooded. They had either been told this by the earliest settlers or they knew from their own experience. Those who had been living there in 1971 had already noticed the impact of the Klang River if there was heavy rain because in 1971, Kuala Lumpur had been hit by the great flood. Nevertheless, 75 per cent of respondents said that they did not make any preparations ahead of their first experience of flash floods.

7.7 Community perceptions of flash floods

Having discovered some experiences of flash floods amongst residents of the Kampung, a further understanding of how people perceive flash floods will be developed in this section, which analyses responses to Section A question 12 of the questionnaire survey.

From the questionnaire survey, the people of Kampung Haji Abdullah Hukom rated the flash floods as "extremely severe", "severe" or "moderate" (see table 7.4). "Extremely severe" was the most frequent rating given by the respondents, with 54 per cent, followed by "severe" with 45 per cent and finally "moderate" with only 1 per cent. A number of factors contributed to these results, although these essentially reflected the extent of flash flood experience that respondents had encountered. Most respondents related the "extremely severe" response to the magnitude of water during the event, the velocity of floodwater that rushed into their houses, the damage to their property, the location of their house in relation to the river and whether or not their house had a basement As Sarina Nordin reported:

> My house has a basement and some of my household goods are down there because the house is not very spacious. So, if the flood starts to flow into the village, in a few minutes my basement also starts to fill with water and I need to bring my things up as fast as I can, because by the time the flood water covers most of the area in the village, the water level in the basement is above head height, and this happens every time the area is flooded. When the flood subsides, my basement is still full of water, which needs to be pumped out.

Razali, a private sector worker who has lived in Kampung Haji Abdullah Hukom for 40 years, sees the flash floods as very severe. As he noted:

> When water from the Klang River gets into this area, residents here are absolutely trapped. They cannot get out by the normal route, which is just beside the river, as it is too dangerous because the current is too strong. Therefore, most villagers use the railway to get out to the higher ground. I think that is the worst part of the flash floods.

Haji Yusof, whose experience of the flash floods led him to the opinion that they are "extremely severe", reported the impact of a flood episode in 2000:

> My family were hosting a ceremony for our daughter's wedding. The weather that day was not so good. The clouds had been gloomy since morning. In the afternoon it started to rain, but not heavily. At about three o'clock in the afternoon, when most of the guests had gone home and the ceremony was nearly over, suddenly the Klang River started to increase rapidly. With so many things inside and outside the house, things for the wedding ceremony such as dining tables for the guests, the bridal dais, food -- these and many other things were all damaged within just ten minutes because of the high speed with which the water rose. All the people in the house needed to get out to stay safe.

Dave, whose house is located 9 metres from the Klang River, said that during the flash floods the water poured into his house very rapidly. For him, the experience of the flash floods is very severe. He explained how sudden and dramatic one of the events had been:

> One morning in 2001, it was raining but it was not too heavy, just moderate rain, and I was about to get ready to go to work. I went out and walked to the river just to see the situation. In my opinion, with that kind of rain, I didn't think that the river would overflow and I went into my house to clean my teeth. Before I had finished, my wife suddenly shouting that the water had come in! I was really shocked: only a few minutes before, when I went out, the river level was still below the alert level (there was a scale in the river to measure the height of the water). When I opened the door the water burst into the house and I could not save anything in the house. All I could do was save my family's lives. We went out of the house and waded through the water to the LRT station nearby. But it was really dangerous to walk out, actually, because the house was too close to the river and if we had not been really careful we would have been swept

into the river. Besides, on my way out, I could see my car, which had been parked in front of my house, floating in the water. It was terrible.

Table 7.4. How the respondents saw flash floods.

Rated	Frequency (n = 100)
Extremely severe	54
Severe	45
Moderate	1
Total	**100**

Source: Author's survey (2005).

The questionnaire survey responses suggest that the perception, "extremely severe", was given when flash floods had serious effects on both people's lives and their belongings. For those who rated the floods as "severe", their perceptions were related mainly to household damage, the velocity of the flash floods, water coming into their houses and the floods' magnitude. For these respondents, because their houses are quite far away from the river, the fear of the flood waters' velocity is somewhat reduced. For those whose houses are located close to the river, there is the serious danger of being swept away by the current. Burch (1987) supported this situation when he mentioned that when the site is in close proximity to deep water, people can easily lose their way and wander off the edge. Besides, as mentioned in Chapter 2, the flood plain of Kampung Haji Abdullah Hukom is categorised as a flow-plain, as mentioned in Chapter 2.4.4.3, as floodwater may flow through this area, and development on this area will be at a high risk of damage. Safety is particularly important here because of the high velocity of water that is in the process of flowing further down the channel. Moreover, for those who have basements, their houses are among the first to be breached by the floods (see figure 7.11). Several respondents who perceived the floods as "severe" explained that during flash floods, as well as damage to their household belongings, there was also structural damage to the house, such as broken doors, windows and walls. The material used for these houses is mostly semi-permanent, and the fact that Kampung Haji Abdullah Hukom, which is located at a lower elevation than the road, definitely means that the water rushes into the settlement at high velocity.

Figure 7.11. Basement of a longhouse.

Source: Author's photograph.

Siti Nabila, a private sector worker, reported that normally when flood water gets into people's houses it reaches a depth of about 45 cm to 60 cm, soaking mattresses and clothes. These then have to be washed several times before they can be used again, and in some cases they have to be thrown away. This situation causes great distress, she said, when people need to buy new things to replace damaged goods.

Only one survey respondent answered that he perceived the flash floods as "moderate". This respondent had only lived in Kampung Haji Abdullah Hukom for two years. Even though he had experienced one flash flood, less than 30 cm of water had got into his house. This respondent does not have any children.

Again, there is no relationship between perceptions of the floods as "extremely severe" and how long people have lived in Kampung Haji Abdullah Hukom. Hajjah Zainab, the granddaughter of Haji Abdullah Hukom, lives on her grandparents' land, well away from the Klang River. She told the author that she has only experienced two flash floods that got into her house. However, she said that they were not too severe. The water seeped into the house slowly, but did reach a height of 60 cm.

Ninety-nine per cent of respondents said that they put family safety first during flash floods, rather than their belongings. In the words of Sarina Nordin, a housewife:

> During the frequent flash floods, there was nothing to save except for the family. Most of the belongings had been damaged in the previous flash floods and the things left inside the house were the only things that could still be used, so I'd just leave them.

Thus, the discussion above brings a further understanding of the impact of flash floods on the community of Kampung Haji Abdullah Hukom.

7.8 Flash flood impacts

Flash floods have had a tremendous impact on the Kampung community due to their frequency and magnitude. This section will explore the impact of flash floods on the residents of Kampung Haji Abdullah Hukom and how these impacts may vary among the affected people. To understand the impact of flash floods on residents, a questionnaire survey and interviews were used. The results were merged together in order to understand what types of impact flooding has had on Kampung residents. As with the TTDI Jaya community, the impact of flash flooding on Kampung Haji Abdullah Hukom society can be divided into tangible and intangible impacts, with tangible further divisible into physical, economic, and environmental and intangible into psychological impacts

7.8.1 Physical, economic and environmental impacts

In order to obtain suitable information from the respondents, Section A questions 7 and 8 and Section B question 5 of the questionnaire survey provide data on flash flood impacts. Interviews accompanied the questionnaire survey in order to gain more information on the community's experience of flash floods and to understand the psychological impacts.

Physical impacts can be seen immediately after flash floods have subsided: damaged materials and goods, such as buildings, house structures and household items. The houses, which are normally built from cheap materials, are susceptible to damage from the high velocity of water rushing into this area. Doors and walls are sometimes broken and household goods such as televisions, refrigerators, sofas, beds and clothes are also destroyed. Consequently, the physical damage is followed by economic impacts on members of the community.

Some of the economic impacts in Kampung Haji Abdullah Hukom were different from those in TTDI Jaya, due to the contrast in living status and culture. Kampung Haji Abdullah Hukom, as a squatter settlement, has not faced any impact on its house prices; the economic impacts are based on the loss of household goods and belongings. As Haji Kamarul pointed out, every time flash floods occur in the area, it affects most of the residents' belongings, such as rugs, kitchen appliances, sofas and other household items. The results from the questionnaire shows that an average of 72 per cent of respondents highlight that their maximum losses due to flash floods are between RM 1000 and RM 2000 and the minimum losses between RM 200 and RM 250. The high amount of losses for these squatter residents is due to increasing family income when grown-up children are at work but still living with their parents.

Five per cent of respondents had experienced significant losses of more than RM 10,000. Selvi, a shop owner in Kampung Haji Abdullah Hukom, remembered experiencing flash floods that got into her shop:

> Flash floods that sweep into the village are sometimes extraordinarily fast. In one event, I noticed the flood coming when the villagers started to shout that the river had overflowed its banks. I rushed to move the things in the shop to the higher shelves and moved some of the stock to my house, but within a few minutes, the floodwater had already got into the shop. Generally, most of the things left in the shop were damaged and could not be sold. It was a terrible moment when I realised that the losses were more than RM 10,000.

Great losses were also experienced by Haji Yusof, whose daughter's wedding reception was curtailed by flash floods:

> My losses on that occasion were more than RM 10,000, although for me, the loss was actually incalculable.

Some residents have had their cars sunk in floods or severely damaged. Dave the lorry driver is one who lost his car during a flash flood event.

The economic impact has been greatest for those who are self-employed (as stated above, 34 per cent of respondents have their own businesses). For some of them it has not been possible to re-open their businesses for several days after the flood.

As Hussain Latif, a satay maker, reported:

> I could not open my stall for a few days because I needed to clean my house from mud after a recent flash flood.

It is inevitable that after any flash flood event, the environment will suffer, especially because in the unplanned settlement of Kampung Haji Abdullah Hukom, the drainage and sewerage systems lack proper planning and have been constructed in ad hoc fashion. Therefore, when the floods sweep through Kampung Haji Abdullah Hukom, water contaminated by the drains and sewers comes out of the system. This is compounded by silt and rubbish from further upstream. In the questionnaire survey, 88 per cent of respondents said they had faced problems with unpleasant smells and unclean areas after flooding. According Siti Nabila:

> During flash floods, the water that comes into the area is so contaminated. When it subsides, it normally leaves rubbish, mud and all the pollution from the drainage and sewerage systems. It is really disgusting.

Having tackled the tangible impacts, the residents of Kampung Haji Abdullah Hukom have to face the intangible impacts. The following section looks at these intangible impacts.

7.8.2 Psychological impacts

Section A question 6 (see Appendix 1) was used to garner a general picture of the psychological impact sustained by respondents. The results from the questionnaire are combined with the interviews in order to gain a fuller understanding. Generally residents of Kampung Haji Abdullah Hukom suffer intangible impacts such as anxiety, stress, and increasing tension. Faezah Ramli, a self-employed resident expressed it thus:

> My house is among those that suffers most from flash floods because I live in the lower area of Kampung Haji Abdullah Hukom. Whenever the river starts to spill over its banks, my house will be among the first to fill with water. I really do not have time to put everything in a safe place if there is no warning or sign of a flood and has not rained heavily in the centre of Kuala Lumpur. I cannot move from the house because I hope that we will be resettled by the government in a suitable place, as promised. Therefore, whenever the clouds look dark, I start to worry, and I feel tense when it starts raining.

However, most respondents experienced some difficulty in explaining the psychological impacts they suffered. There were two possibilities for this: firstly, residents had to ignore their feelings because they needed to live there, and some of them had become so familiar with the repeated flash floods that it was hard for them to express the exact feelings they experienced. Secondly, perhaps due to their lack of schooling, it was difficult for them to rationalise and articulate the psychological impacts.

As with the TTDI Jaya respondents, the psychological impacts on Kampung residents can be sensed before, during and after the flash floods. However, in explaining their feelings, the explanations were less reflective than those given by the TTDI Jaya respondents. It was quite different when they were talking about their losses and property damage, when their expressions revealed the extent of the losses incurred as a result of the flash floods. Nevertheless, even though their expressions were flat, all of the respondents said that they felt anxiety and tension before the event when they noticed that it was raining heavily. The anxiety was more about the safety of the household, and was even greater for those with many children and elderly relatives who would need to be monitored if flash flooding occurred. Some of them, including some of the children in Kampung Haji Abdullah Hukom, also had difficulty in sleeping when it was raining heavily. Rohaya Osman, a teenager, said that if there is heavy rain during the night, her parents stay up, and therefore she too cannot sleep. During flood events, 94 per cent of respondents said that they felt scared and worried about whether the flood waters would continue to rise. After the flood, there were mixed feelings among residents. However, not all respondents were able to vocalise their exact feelings after the flash floods had subsided; 92 per cent of respondents said they were tired from cleaning up their houses. One resident, Aziza Asri, a housewife said:

> I don't know what I actually felt after the flood was cleared from the area; after cleaning the house, I felt tired because it took a few weeks to get everything properly clean. Sometimes I felt sad, sometimes tense; I don't know: it was a mixed feeling actually.

Even though the psychological impacts existed in the lives of this community, from observation, the author discovered that the residents have to be tough in order to survive the flash floods. Hence, in order to minimise the impacts of the frequent flash floods in Kampung Haji Abdullah Hukom, some adjustments have been implemented by the residents and these will be discussed further in the next section.

7.9 Preparation for and adjustment to the flash flood problems in Kampung Haji Abdullah Hukom

In order to enable people to continue living in the vulnerable area of Kampung Haji Abdullah Hukom, a number of adjustments have been made by residents. Section B questions 1, 2 and 3 (see Appendix 1) were used to obtain information about the adjustments people made as a result of flooding.

7.9.1 Individual adjustments

Individual adjustment was the first action that could be taken in order to minimise future losses from flash floods. Questionnaire responses indicate that 59 per cent of respondents made adjustments by limiting the amount of furniture and electrical goods in the house, while 30 per cent planned to move and only four per cent chose to make structural adjustments. The remaining seven per cent of respondents had undertaken a combination of the three adjustments outlined above. However, even though respondents limit the amount of furniture and electrical goods they possess, items such as sofas, dining tables, televisions, refrigerators and washing machines are still needed. Therefore, when there are flash floods, these household goods are often damaged if the flood level is high. According to Sarina Nordin:

> There is nothing left in the house except for the basic necessities. I don't replace things that are not so important to me like side-tables and racks because one day they will be damaged again.

The most important findings from the questionnaire survey and interviews were that all respondents said that they had used their ceiling space for storage during floods because this was the highest place in the house where belongings could be kept safe, but that only light objects could be put there because the attic was not securely built and its floor was liable to break easily. Nevertheless, simple activities such as moving things to higher levels of the house is one of the acts of preparation that some, but not all, household can take to avoid flood damage (Buckland and Rahman, 1999).

For respondents who planned to move, their hope was to live in a good environment that was free from flash floods. However, for various reasons, these residents needed to delay their plans until a more suitable time. Adjustments to houses in order to minimise the amount of floodwater that can enter are not a common feature in Kampung Haji Abdullah Hukom as they are in TTDI

Jaya. Structural adjustments to houses made by respondents include the construction of simple flood protection in front of the house (see Figure 7.2). However, this is not very effective as water can still enter the house if the water pressure is strong enough. Additionally, two respondents had built a second storey onto their house, while one respondent had increased the level of the front of his house with cement. While completing the questionnaire, other respondents who had not made any such adjustments gave their own reasons. For example, Hj Yusof said:

> It would be no use to build a flood protection or raise the land on which my house stands because if the flood water is high, it can still get in, and even if I raised the house, this village is still below the road. Also, I cannot put my house on stilts because the floor of the house was constructed using permanent material; therefore, it would cost a lot of money if I wanted to make such big adjustments, so I just keep it like this.

Generally, individual adjustments in Kampung Haji Abdullah Hukom need to be accompanied by other adjustments due to the vulnerability of the area. Individual residents need the support of the Kampung Haji Abdullah Hukom community leader and committee members in order to highlight the residents' problems with flash floods to the government. The next sub-section will discuss the adjustments made by the committee of Kampung Haji Abdullah Hukom.

7.9.2 The role of Kampung Haji Abdullah Hukom's community leader and committee and community action in fighting flash floods

The Kampung Haji Abdullah Hukom committee leader plays a very important role in easing the impacts of flash floods on the community. Strong leadership and assistance from committee members working closely with the area's Member of Parliament resulted in Kampung Haji Abdullah Hukom residents receiving compensation for the first time ever after the flash floods in 2001. The compensation was received after residents had been hit by a flash flood on 29th October 2001 (DID, 2002). From the questionnaire survey, 98 per cent of respondents stated that they had received compensation due to the extent of their losses after being surveyed by an officer from the Ministry of Women, Family and Community Development. According to Haji Kamarul, all villagers who had been affected by the flash flood on that occasion had to register their names with himself as committee leader before the damaged property could be valued. When they received the compensation from the government, most of the respondents felt relieved, as reported by Jamilah Dasuki:

> At least with the money given we were able to replace our damaged household goods such as refrigerators and washing machines. If not, we would have had to find extra money to buy new ones, but who knows when [we would have had enough money].

Kampung Haji Abdullah Hukom residents traditionally support each other during flash floods. Normally, the men of the Kampung who have already finished moving their belongings to a safe place go around the village in order to help those who need it, especially the elderly and families with young children (Sarina Nordin, Jamilah Dasuki and Siti Nabila). Hussain Latif, a *satay* maker, added that if a home-owner is not at home during flash floods, they normally allow other members of the community to break into their homes in order to save the most important household goods if there is time to do so. That is why it is important for every resident to inform their neighbours or other members of the village if they are going to be away from home for a few days.

7.9.3 DID, Ministry of Works and Kuala Lumpur City Hall precautions and assistance with flash floods

Since the Klang River has spilled its banks on so many occasions in the last two decades and more, the DID has monitored settlements along the Klang River (DID, 1992). In 1992, a floodgate was constructed by residents of Kampung Haji Abdullah Hukom in order to be able to release into the river water that was getting trapped in the Kampung (see Figure 7.12). Previously, when floodwater from the river got into the area, if it was raining heavily, the Kampung would hold the rainwater and the whole area would be flooded (see figure 7.10a). However, according to the residents, the floodgate was not effective because when it was opened, the water from the river would pour into the village rather than the other way round. Therefore, the floodgate only functioned well if the area was flooded with rainwater but the river was still below the flood alert level. Additionally, a flood-warning siren was also located on the river bank near the village. However, according to most respondents, by the time the siren sounded, there were only a few minutes before the water came into the area because flash floods are by definition sudden events. Sometimes, the siren did not work, so the community could not really depend on this device to warn them about flash floods.

As the Klang River regularly spills its banks, the alternative proposed by the Ministry of Works was to raise the road, which would function as an embankment against floods. Hence, the increase in the level of the road turned Kampung Haji Abdullah Hukom into a stagnant pond during the more severe flash flood events. However, as reported by the DID, in a four-year

period from 2001 to 2004, six flash floods occurred in the Kampung (DID 2002, 2003, 2004 and 2005a). This indicates that actions such as constructing a floodgate were only effective if the river did not reach its peak discharge level. The adjustments made by the DID and the Ministry of Works, which were focused on structural rather than non-structural measures, were by and large ineffective.

As reported by Haji Kamarul, during flash flood events the Kuala Lumpur City Hall sends a rescue team to the village in order to help the people of Kampung Haji Abdullah Hukom move their belongings to a safe place and leave the area. Hence, as a long-established squatter settlement, the people of Kampung Haji Abdullah Hukom are not alone in facing the flash floods even though the adjustments made had not yet achieved success.

Figure 7.12. The underground floodgate is actually higher then the settlement area (see arrow). Source: Author's photograph.

7.10 Living for hope?

Even though the floods mean that the quality of life in Kampung Haji Abdullah Hukom is low, some factors need to be borne in mind to understand why people choose to continue living in the area. Answers to question 3 of Section D help explain people's motives.

Broadly, the respondents highlight the fact that the houses are not subject to any payment and are close to their workplace; there are facilities provided in the surrounding area; it is a good

neighbourhood and is in a strategic location close to Kuala Lumpur city centre and the Bangsar area, while a few respondents said they live there only because of its strategic location. A further four per cent live in Kampung Haji Abdullah Hukom because they own the land and live in houses that have been in the family for several generations. These latter respondents are descendants of Haji Abdullah Hukom.

As has already been mentioned in this chapter (section 7.3), the government built three 22-storey low cost apartment blocks called Apartment Putra Ria in 1994 for the inhabitants of Kampung Haji Abdullah Hukom. The main objective of re-housing the squatter area was to up-grade the landscape of the national capital in keeping with its mission to become a world class city by 2020. The process of moving out the remaining residents was, as we have seen, a tortuous one and had not been resolved in the summer of 2005, when this survey was carried out. Reflecting on the long years of uncertainty, Dave, the lorry driver, commented:

> Due to the frequent flash floods in this area, I really plan to move out, but when all is considered, I need to delay my plans. And the government has promised us that suitable houses will be constructed. So I wait and wait: it is almost ten years now from when the promise was made, but I know the government will keep their promise and we need to be patient.

As reported in section 7.3, the promise made by the government to the community of Kampung Haji Abdullah Hukom to construct good quality apartments for these villagers has been fulfilled: new apartments to relocate this community are now under construction and will be ready for habitation in 2007.

However, the family of Haji Abdullah Hukom are living on their own land and they therefore wish to remain. The development project that will take place on the site of Kampung Haji Abdullah Hukom will also affect Haji Abdullah Hukom's land. Therefore, Haji Abdullah Hukom's family has hired a lawyer to claim compensation from the government if they need to leave their land. According to Haji Abdullah Hukom's granddaughter, Hajjah Zainab, if the claim is successful, the family will receive millions of Malaysian Ringgit, such is the value of land in this central part of the Klang Valley.

Before long Kuala Lumpur will become a squatter-free city and Kampung Haji Abdullah Hukom will live on only in the name of the Abdullah Hukom light railway station.

7.11 Conclusion: the future of Kampung Haji Abdullah Hukom

This chapter has discussed the problem of the flash floods that have had a tremendous effect on the lives of the residents of Kampung Haji Abdullah Hukom. The Kampung has a distinctive history, different from that of other urban kampung. It retains its link with its founder, Haji Abdullah Hukom, and its leading members today have strong political ties with the local Member of Parliament.

However, Kampung Haji Abdullah Hukom provides one example of how the urban poor of the Klang Valley have suffered as a result of flash floods. Not every person in the city is lucky enough to have the sort of good living environment that the people of TTDI Jaya have paid for. Many did not have the luxury of choosing the best possible place to live when they migrated into the city more than four decades ago. Their motive had been simply to find the best jobs that the city could offer and to try to live as close as possible to the workplace and other facilities such as schools and shopping areas, and this had to be achieved at the lowest possible cost. Such people were willing to accept discomforts, such as flash floods, as an unfortunate concomitant of meeting their other objectives. What they could do was to hope that the government would understand their situation and help them overcome the problem of flash floods. Even though structural flood control techniques have been constructed at Kampung Haji Abdullah Hukom, these measures have not protected the community during the repeated and serious flash flood events. Besides, as urban pioneers (Bunnell, 2002:1691), the residents of Kampung Haji Abdullah Hukom fought for their right to live in the village and not simply be moved any place the government plans to relocate them.

In future, the site of Kampung Haji Abdullah Hukom area will be turned into a high-class development in keeping with the government's modernisation aims. Plans being developed by Kuala Lumpur City Hall will still use the flood plain area as a development site. The question now is how the development will be carried out, and what consideration has been made of the regular flash floods. When the author met Interviewee D, planning officer of Kuala Lumpur City Hall, the officer explained that Kuala Lumpur lacked suitable land for development, and that therefore, the flood plain area in and around Kampung Haji Abdullah Hukom would be developed when the squatter settlements been demolished.

Therefore, it is crucial that the new development does not affect the development areas downstream, particularly settlement areas such as TTDI Jaya. Interviewee D said that he was not sure whether the development will take on board the issue of flash floods because the entire

development procedure would be managed by the developer. Structural measures have been applied in order to address the flash flood problems in the Klang Valley. But if non-structural measures are not part of the solution in the future, the lower area of the drainage basin will suffer greater impacts from flash floods due to the imbalance in development between nature and material construction.

CHAPTER 8

CONCLUSIONS -- FINDING A PROPER BALANCE BETWEEN LOCAL COMMUNITIES AND THE NATURAL ENVIRONMENT

8.1 Introduction

The discussion in the previous chapters has focused on the issues of development planning, flash floods and their impact on urban society in the context of the rapid urbanisation of the Klang Valley. In this chapter, section 8.2 provides a synopsis of the research, while section 8.3 integrates the findings from the study areas of TTDI Jaya and Kampung Haji Abdullah Hukom. Section 8.4 summarises flash flood problems in the two study areas. In section 8.5, we return to some of the literature presented in Chapter 2 and attempt to draw lessons from it and build some recommendations for future measures for the authorities. Finally, section 8.6 raises some limitations of the research, and suggests possibilities and directions for further research.

8.2 Summary of the study

The emergence of the Klang Valley as an urbanised region is not without its problems. In this research, three central issues of urbanisation have been discussed: planning, people, and flash floods. The dissertation started, in Chapter 1, with an outline of the general theme, an examination of development planning in the Klang Valley in relation to flash flood problems and the impact of flooding on the urban community. The rapid urbanisation of the Klang Valley described in Chapter 1 was caused by a number of factors, and the discussion in Chapter 2 illustrated the development process in Southeast Asia cities and the process by which urbanised areas emerged as metropolitan regions. It examined how imbalances and disequilibria in development status affect the poor most, and how intensive development has damaged natural environments and led to pressure on natural systems, thus making communities vulnerable to various environmental problems. Chapter 3 went into more detail on the urbanisation of the Klang Valley and showed how urbanisation here has rendered local communities vulnerable to flooding.

As discussed in Chapters 1 and 3, the Klang Valley has been given priority for development over other parts of the country, with development focusing on Kuala Lumpur, the national capital, whose urban expanse has spread over into the Klang Valley region, and yet there has been no comprehensive planning policy covering the whole of the valley. However, in 1972, the

development planning proposed for the Klang Valley, when the government realised the development pattern had spread over the entire Klang Valley, ignored the border between the State of Selangor and the Federal Territory of Kuala Lumpur. The Klang Valley has become a key location for those who seek to make a profit from urban development projects. The rapid development of the Klang Valley and its proximity to Kuala Lumpur has brought a rising demand for housing and transport infrastructure. Indeed, enquiries regarding land resources for development projects are increasing, and the natural environment has been sacrificed for human needs.

The first structure plan by Kuala Lumpur in 1984 (KLSP 84) and the second structure plan in 2003 (KL20) were designed to ensure that Kuala Lumpur would be able to cope with the development of the Klang Valley. Besides, in 2005, the State of Selangor took similar measures with the adoption of its own structure plan, which was drafted when the government noticed the state's potential, with the Klang Valley as the centre point of development for the state. The structure plans KLSP 84 and KL20 led to the construction of new satellite towns and other development projects. The text of KL20 records that the new satellite towns planned in KLSP 84 were a success, and that the towns had been developed according to plan. In addition, the structure plans laid the ground for work in improving infrastructure and amenities. Thus, the structure planning basically encouraged the rapid economic development of the Klang Valley, as it offered a positive prospect for those who wanted to invest, leading them to expect greater profits from their investment in property and the commercial development of the Klang Valley compared to other regions in the country. However, the adoption of structure plans by the Federal Territory of Kuala Lumpur and the State of Selangor will not solve the problems caused by rapid development: problems that manifest themselves particularly in the form of flash flooding. The study areas of TTDI Jaya and Kampung Haji Abdullah Hukom discussed in Chapters 6 and 7 reveal that conflicts of interest that occur in the development of the Klang Valley are a main contributing factor to the problem of flash floods. Besides, Chapter 3.4.4 shows that development projects in the Klang Valley have proceeded with government support and have sometimes been undertaken by the government itself, for example in the construction of roads and light rail transit routes -- even though they are clearly located in sensitive and hazardous areas of the river channel and flood plains.

Chapter 4 explained how this research has been undertaken. The fieldwork was conducted over a period of six months, using several methods to obtain the information needed. However, during the fieldwork, methods and plans sometimes needed to be changed to adapt to situations that occurred in the study areas. For example, when collecting samples for the questionnaire, the

author experienced difficulties, as cooperation from one of the communities was sometimes hard to obtain. Ironically, the author also had to deal with frequent afternoon rainfall, which sometimes slowed down the process of the questionnaire survey. It was necessary, therefore, to change methods to ensure that the data collection would be finished on time. The fieldwork made the author more adaptable in interacting and communicating with people. By the end of the fieldwork, the methods chosen finally enabled most of the necessary data to be collected, allowing the discussion in Chapters 5, 6 and 7 to proceed.

The discussion in Chapter 5 illustrates that the two structure plans adopted by the Kuala Lumpur government and introduced in Chapter 3 actually led to an increasing convergence of development in the Klang Valley. Chapter 5 demonstrated that the ill-informed pursuit of development planning guidelines and procedures led to hazardous developments, and was the starting point for the spread of environmental problems related to land use development in the Klang Valley. These problems were the result of large scale developments in the Klang Valley which were not based on an understanding of the nature of the valley as a drainage basin system. With the flash flood problems still a major environmental issue in the region, as indicated in Chapter 5, various solutions have been proposed by the Department of Irrigation and Drainage (DID) of the Federal Territory of Kuala Lumpur. However, the interviews conducted by the author suggested that the DID is working alone to solve the problem of recurring flash floods in the Klang Valley.

As mentioned in Chapter 5.7, the DID is referred to for advice in the development planning approval process. However, the advice has not always been followed, especially when it is not supported by bye-laws or other legal regulations. It is hardly surprising, therefore, that when people moved into developments on the flood plain, they started to experience flood problems. Again, the DID needed to solve the flood problems, for example, by widening and deepening the rivers and building retention ponds, which required a budget to cover the work. It is as if one group of people were digging a hole while, at the same time, another group was filling it in. Thus, the problems will never be solved so long as the flood control programme is separated from land use development and land use development does not take into account the impact of flooding on residential communities, not only for the development area itself but also for other development in the drainage basin. Besides, as has been suggested, the flood mitigation programme in the Klang Valley has not considered environmental approaches that could keep the floods at bay as discussed in Chapter 5.7.1. Possible solutions to the flood problems need to be revised in order to achieve a satisfactory outcome (some of these possible solutions were discussed in the literature review in Chapter 2).

Chapters 6 and 7 discussed the study areas of TTDI Jaya and Kampung Haji Abdullah Hukom as evidence of how flash floods have had a severe impact on local communities. People who inhabit those areas live in hope of benefiting from what the Klang Valley can offer. The residents of TTDI Jaya and Kampung Haji Abdullah Hukom are particularly affected because they work in the Klang Valley and choose to live there because of the strategic location of the area. However, flash flood problems have damaged their perception of the place where they live and, more broadly, of urban life in the Klang Valley. They have little choice but to pin their hopes on government taking coordinated action to deal with the flooding.

The next section discusses the author's findings regarding the flash flood problems in the two study areas related to these and other developments and linked with the river system. The findings in these study areas clearly suggested poor knowledge of the need to integrate an urban environmental component in the development planning of the Klang Valley.

8.3 Integration of the case study

The section below considers issues concerning the study areas discussed in Chapters 6 and 7. Issues regarding the development of the study areas, the development of the surrounding areas and the link with the river system adjacent to TTDI Jaya and Kampung Haji Abdullah Hukom will be discussed in the context of conflict over land use development in the settlement areas themselves and development of sensitive parts of the Klang Valley such as flood plains and hillsides.

8.3.1 TTDI Jaya and Kampung Haji Abdullah Hukom settlements: locating people at risk

In Chapters 6 and 7, hazard, risk of disaster and vulnerability of the study areas were discussed. The flash floods in TTDI Jaya and Kampung Haji Abdullah Hukom were not expected by the local community, but the repeated nature of these events is reflected in the disappointed and sad stories of the residents. The flash floods that occur in TTDI Jaya and Kampung Haji Abdullah Hukom are examples of environmental problems related to the river system's failure to accommodate water during heavy rain. However, it could be argued that the river is not the only natural system that has borne the brunt of environmental modification.

As mentioned in Chapters 6 and 7, nearly 80 per cent of the settlement areas of TTDI Jaya and Kampung Haji Abdullah Hukom have been developed into built-up areas, and this has changed the hydrological processes in these areas. Once vegetation has been cleared for development,

the process of natural interception of surface runoff will not happen. Trees function as a canopy area during periods of rainfall and allow a certain amount of water to pass to the ground through stem flow. Thus, when part of the system has gone, the water is absorbed promptly into the soil system without any barrier. For the settlement development of TTDI Jaya, football fields and playgrounds covered by grass are not functioning to intercept the rain, and in other parts of the area, precipitation becomes surface runoff, as the house compounds have been sealed with concrete and the integrated roads are covered with bitumen. In the case of Kampung Haji Abdullah Hukom, even though the area is improperly planned and no permanent structures have been built there, the closely packed houses intercept the rain before it falls to the ground. As this area has very few open spaces, the ground that exists is not enough to allow all the water to infiltrate during heavy rain (see figure 7.3).

The base platform of the settlement areas, which is also part of the original topography, clearly shows that the areas are located below mean sea level, which means that they are very prone to accumulating incoming water. In the case of TTDI Jaya, as the area has a layout plan, the calculation of the height of the area has proved useful for further action on flood planning, but for Kampung Haji Abdullah Hukom, as the area is considered a squatter settlement, the readings of how low the area is in relation to mean sea level and how high it is supposed to be have not been documented. However, figure 7.9a clearly shows that in parts of the settlement area, the roofs of the houses are nearly level with the road. The lower platforms of those two areas make them more sensitive and vulnerable when the river reaches its peak discharge.

Overall, TTDI Jaya has been developed without a full understanding of the environment and the impact of developments located in flood plain areas. Even though some adjustments have been made to the Damansara River (as discussed in Chapter 6), the fact that TTDI Jaya is located in a flood plain area cannot be changed. As discussed in Chapter 6, the developer of TTDI concealed these important facts about the development, and people who bought houses there assumed that a development launched by an established developer could be considered well planned, and expected it to be designed for good interaction with the environment. However, TTDI Jaya was carried out without due care. The developer accepted the wrong measurements when erecting the platform, which is two metres below the expected level, as mentioned in Chapter 6. This error should have been picked up in the planning stage. At the same time, it is important to note that the development was approved by the City Council. As discussed in Chapter 6, the planner from Shah Alam City Council considered the Damansara River to be a drain and not a river with important functions in the environmental system. Moreover, while the development was being carried out, there was a lack of monitoring from other authorities such as the local council and

officers from the Department of the Environment. If approval has been given, regular visits from the local authority and other authorities involved in approving development projects should be conducted. Regarding the settlement of Kampung Haji Abdullah Hukom, the area was developed without planning approval and people live there because they have limited choices of where to live, but development of the surrounding region has made the area more vulnerable.

The drainage systems of the two areas were basically not built for flood preparation which was small. Moreover, for Kampung Haji Abdullah Hukom, the entire drainage system was under-specified for conveying rainwater into the main drain (see Chapter 7.2). The drainage was only suitable for carrying domestic water used by households. Even though the very small concrete drains were not blocked, as they were well managed by residents, the main drains were built without any concrete or culvert to protect them from soil erosion and this led to increasing sedimentation. Eventually, during heavy rains, the area was flooded by rainwater before the actual overflow from the river got into the area.

For the proper development of TTDI Jaya, the type, condition and height of the drainage system that would have been required has been discussed in Chapter 6.4. From the survey, it is clear that the depth of the drainage system provided is not suitable for a housing area located on a flood plain. Furthermore, as there is a sealed soil system covering 80 per cent of the area, surface runoff is increased. With the increased volume of running water, a more extensive drainage system is needed. In addition, during flash floods, the current drainage system, which was not designed to cope with floods, leads to a further increase in the magnitude of the floodwater. Living in a flood plain presents an absolute risk in itself, but if the drainage system is prepared for the event, at least during relatively minor flash floods, the magnitude of water is minimal. Nevertheless, what happens in TTDI Jaya illustrates that the developer has no understanding of (or care for) the reactions of nature when the natural system is changed. The drainage was built according to planning guidelines that asked for a drainage system to be constructed. However, in the application stage for the development, it was stated that approval for development would only be given if the development proposal fulfilled all the criteria and guidelines provided, including those regarding the drainage system. From the observation and analysis of the design structure for the drainage of TTDI Jaya, it is clear that the drainage was only suitable to cope with rainwater, not floods. No urban flood drainage system was constructed.

Overall, the houses constructed in the two study areas were not tailored for flood intervention, as they were all generally level with the surrounding terrain. However, the frequent flash floods

have encouraged some residents, particularly in TTDI Jaya, to make some adjustments to their houses in order to adapt to the phenomenon, such as constructing ramps for their carports. For the houses in Kampung Haji Abdullah Hukom, house adjustment is not a popular choice for residents, given their financial restrictions and the limited land available for modification. Therefore, the people of Kampung Haji Abdullah Hukom are forced to focus on survival, because for this lower income community, living close to the workplace and other facilities is more important than other factors. There was one similarity between TTDI Jaya and Kampung Haji Abdullah Hukom, and that is that both communities protected their right to live in these areas and urged the responsible bodies to find a solution to control flooding.

8.3.2 Land use development of the Klang Valley: increasing risk and vulnerability in TTDI Jaya and Kampung Haji Abdullah Hukom

The Klang Valley development shows that the issue of conflict over land use development is crucial. It is important to note, however, that the flash flood problem in TTDI Jaya and Kampung Haji Abdullah Hukom results not only from the fact that the developments are located in hazardous areas but also because they are affected by other developments located in other sensitive flood plains and hill areas of the Klang Valley. As mentioned by Douglas (1981:49), "complex socio-economic-ecological systems interact within river basins and are affected by social, political and economic pressures from outside". Furthermore, he adds that "planners and administrators must recognize the potential risks of activity within river basins", as risks may vary depending on the season and the location within the drainage basin. In this section, conflicts over land use in the Klang Valley are examined. It is argued that development of these areas contributes to the repeated and tremendous flash flood events in TTDI Jaya and Kampung Haji Abdullah Hukom, as it does to other areas in the Klang Valley.

The development of TTDI Jaya proceeded with approval from the local authority of Shah Alam City Hall. The site of TTDI Jaya, which is located on the flood plain of the Damansara River, clearly shows the interaction between the river and the flood plain area: the Damansara River has been reported by the DID of Petaling District (DID of Petaling District, 2000) as experiencing overflow, with the flood plain accommodating its excess. However, this area was chosen for development as a result of its strategic location, close to Shah Alam city centre and major routes to other parts of the Klang Valley.

The DID of Petaling District laid down certain guidelines for the development of TTDI Jaya. However, the lack of awareness of the importance of these guidelines illustrates that the

developer did not understand the nature of the flood plain, which was part of the river system and the drainage basin system as a whole, and did not appreciate that the settlements would one day be affected by the natural process of the drainage basin, which served the area as a flood storage area. Two years after the new residents moved into housing in TTDI Jaya, the area experienced flash floods.

As mentioned in Chapter 6.4, the height of the platform for the new development area of TTDI Jaya was raised, as the earlier development had taught the developer the lesson that inaccurate calculation of the platform height would mean that the new settlers would also suffer from flash floods, as in the older settlement. However, the new development showed again that the developer and all the authorities involved in giving approval for the new development only considered the development area itself, without awareness of the interconnections of the natural system, which could lead to an increase in the vulnerability of the old settlement of TTDI Jaya (see figures 6.6a and 6.6b). The new development, also located in the flood plain area, has once again reduced the storage area for peak discharge. Hence, because the new development is two metres higher than the first TTDI Jaya and is constructed behind a two-meter flood wall, during the latest flash flood in early 2006 the first TTDI Jaya development received unusual amounts of excess water from the river after just one hour of heavy rain. This event clearly illustrates the importance of the flood plain in overcoming the flood situation in TTDI Jaya and the Klang Valley as a whole.

Three-quarters of the Damansara catchment is an urbanised area, while the remainder is in the planning stage of development (SWMA, 2002). In 1971, 44 per cent of the Damansara catchment was covered with rubber plantations and the surface runoff was 63.8 per cent of the annual rainfall; this percentage was 14 to 24 per cent higher than the average for the drainage basin, much of which was still covered with natural forest (Goh 1971 in Aiken, *et al.*, 1982). As reported by SWMA (2002) and as discussed in Chapter 5, development projects covered 75 per cent of the total Damansara catchment area, making it inevitable that any further replacement of rubber plantations with concrete structures would increase the surface runoff of the catchments. TTDI Jaya, located on the flood plain of the lower stretch of the Damansara River, would then be unable to escape being severely affected by floods when the river exceeded its limit.

The increasing frequency and magnitude of flash floods in Kampung Haji Abdullah Hukom is linked to the loss of flood storage areas in the Klang Valley together with the development of the upper catchment, which increased the already high sediment yield and surface runoff; the recent cases of overflow demonstrate that the river is continuously affected by high

sedimentation and needs more space for water storage. According to Hamirdin Ithnin (2001) the catchment of the Klang Gate Dam was constantly threatened by human activities as well as the catchment of the Gombak River when the development of the International Islamic University replaced the natural environment with built-up surfaces (see Chapter 3.4.4).

Kampung Haji Abdullah Hukom had been reported by the DID of the Federal Territory of Kuala Lumpur as a flood-free area. However, the worst of the flash floods to hit it occurred in 2000. This flood astonished officials working for the DID of the Federal Territory. They had told the author in 1998 that the area would no longer experience flash floods because no such events had been reported there since 1995. Because of this, they considered the flood control management of the area to be a success. From the author's observation, the return of flash floods to Kampung Haji Abdullah Hukom was due to the development of Mid Valley and other flood plain losses in Kuala Lumpur. Unfortunately, the flash flood in 2000 caused the community to experience massive losses. This marked a historic event for the community, because for the first time, they received compensation from the responsible ministry, as mentioned in Chapter 7.

As mentioned in Chapter 7.5, the development of Mid Valley, opposite the flood plain of Kampung Haji Abdullah Hukom, has changed the natural function of the area (see figures 7.8a and 7.8b). As a result of the reclamation and the high embankments of the area, the Klang River has once again lost one of its storage sites. As mentioned in Chapter 7, the flash floods in Kampung Haji Abdullah Hukom were also related to the Anak Ayer Batu River, which frequently overflows from its channel due to massive development along the upper reaches of the river. As a result of the development of the surrounding areas, the ground on which Kampung Haji Abdullah Hukom stands has sunk, and the settlement thus receives all the excess water from the rivers and from the surface runoff, and this has made the community vulnerable.

Thus, an increase in the number of development projects -- be they government or private sector -- in the flood plain areas will worsen the flood situation for settlements located in this sensitive area. As an integrated dynamic drainage basin system, human disturbance leads the system to find suitable adjustments to ensure that environmental processes continue to function, even though humans have chosen to change the land status for economic benefit. The community will face the consequences of these adjustments made to the drainage basin system, suffering flash floods because the processes need to continue even though the system has been robbed of its adaptive capacity.

8.3.3 Searching for comfort in TTDI Jaya and Kampung Haji Abdullah Hukom: leadership, committee support and political ties.

This section will discuss issues around leadership and committee support in reporting flash flood problems to the authorities. It will also consider the ways in which political connections can ease the lives of the affected residents. The impacts of flash floods in TTDI Jaya and Kampung Haji Abdullah Hukom can generally be categorised as severe, as we saw in Chapter 7.7, with the result that the affected communities are searching for a suitable lifeline in order to be able safely to continue living in their homes. Chapter 6.10 and Chapter 7.10 highlight a number of relevant factors, some of which differ between TTDI Jaya and Kampung Haji Abdullah Hukom. However, the most obvious factor, common to these two areas, is ease of access to the workplace. Both the urban middle class and the urban poor will be more likely to be attracted to live in an area if the location is close to where they work. Shorter journeys to work were among the top priorities in both communities, as traffic conditions in the Klang Valley are notoriously bad: for people living 20 to 30 kilometres from their place of employment, it can take anything from 40 minutes to an hour and a half, or even more, to reach their destination.

The facilities provided in the surrounding areas have become a pull factor for those who chose to stay in the vulnerable areas of TTDI Jaya and Kampung Haji Abdullah Hukom. Therefore, in order to continue living in the affected areas after experiencing different levels of flash floods, it is not just flood control management that is necessary, but also mental preparation to overcome the situation. Learning to live with and adapt to flooding is something that has to be achieved by those who still live in these areas. However, this is not a simple adjustment to make when people want to live in a normal living environment.

Flash floods in TTDI Jaya and Kampung Haji Abdullah Hukom have placed the community in a great dilemma, as the frequency and magnitude of the flooding seem to be increasing rather than decreasing. Adjustments made by the community under their own volition only give a minimal level of control and only when the flood magnitude is not particularly high: below 30 cm in height for houses where ramps or small flood barriers have been constructed at the front and back doors, as mentioned in 6.8.1 and 7.9.1. Minimising the number of household items owned works up to a point, but if more severe flooding occurs, remaining household belongings will also be affected. This was the case during the latest flash flood on 26th February 2006 in TTDI Jaya, when many residents lost their cars in the flood waters.

Thus the only hope is to rely on leadership, community support and political ties to find a solution to these problems. Kampung Haji Abdullah Hukom presents a good example of an area suffering from flash flood problems for more than 30 years receiving attention from the responsible bodies. Even though Kampung Haji Abdullah Hukom is a squatter settlement, the presence of a strong leader has benefited the community, as people from this area will be moved into a new high-rise development, which will at least mean that flood waters no longer enter people's homes. However, without such a good relationship with political figures, most of the problems, especially for the urban poor, take longer to solve, and poorer communities generally need to follow all the plans made for them without the possibility of negotiation. Kampung Haji Abdullah Hukom could be considered fortunate -- setting aside the question of the flooding -- as the Member of Parliament for the Pantai Valley area where Kampung Haji Abdullah Hukom is located is also the Minister for Women, Family and Community Development. Hence, as the nature of the minister's political duties is to work closely with the community, the leader of the kampung, with support from the committee and its community, has been able successfully to bring the issues of the Kampung to the attention of those in the upper level of the administration. In addition, in order to gain further support from the government due to the area's problems with flash floods and other issues, Kampung Haji Abdullah Hukom has become a base for UMNO, Malaysia's ruling party, in the constituency, where the majority of residents are Malay. Therefore, as discussed in Chapter 7.10, the community of Kampung Haji Abdullah Hukom is being moved to new, authorised accommodation in 2007.

In the case of TTDI Jaya, the efforts of the committee to support the area were rewarded to the extent that a few meetings were held with the responsible bodies involved with the development of TTDI Jaya such as the project developer, Shah Alam City Council, and officials from the Selangor DID, together with the local Member of Parliament to discuss the flash flood problems in the area. In the aftermath of the latest flood, the anger of the community led the committee to present their problems directly to the King of Selangor after all other action had failed (personal communication with Salasiah Borhan, TTDI Jaya resident, 27th May 2006), and TTDI Jaya was paid special attention by the Selangor Chief Minister when he visited the area for the first time.

8.4 Summary of problems that lead to flash floods in the two study areas

In concluding our discussion of flash floods in TTDI Jaya and Kampung Haji Abdullah Hukom, we can say that both study areas show similar factors that cause the residential community to experience hazardous flash flooding. Firstly, the development of the areas has modified their nature so that they can no longer act as flood plains. Secondly, homes are constructed without

any specific measures to counter flooding. Thirdly, the loss of water storage capacity at nearby locations increases the risk to the areas. Finally, attempts to solve the flood problems in these areas by using structural techniques need to be revised, as the methods fail to prevent flooding, and unfortunately the latest events (on 26th February 2006 in TTDI Jaya and in December 2005 in Kampung Haji Abdullah Hukom (infobanjir online) indicate that the problem is worsening. Figure 8.1 summarises the flash flood problems in TTDI Jaya and Kampung Haji Abdullah Hukom.

Indeed, history has shown that the process of urbanisation in the Klang Valley illustrates the complex and dynamic nature of problems in urban planning. The main challenge is to learn how to live in an urban environment and how to plan urban development planning better and manage it more effectively, thus alleviating hazard, risk and disaster in the city while realising the positive potentials of city growth. However, the findings of this research suggest some of the problems of flash flooding arising from the rapid urbanisation development of the Klang Valley. These are:

a. the attraction of Kuala Lumpur outweighing arguments for a balanced approach to in the Klang Valley;

b. little understanding of the process of environmental systems and little respect for the environment in land use development projects;

c. political disruption in the process of development planning approval;

d. lack of interest in flood control management involving the application of soft techniques and approaches;

e. no integration between flood control and land development planning.

The following sections will examine each of these problems in more detail.

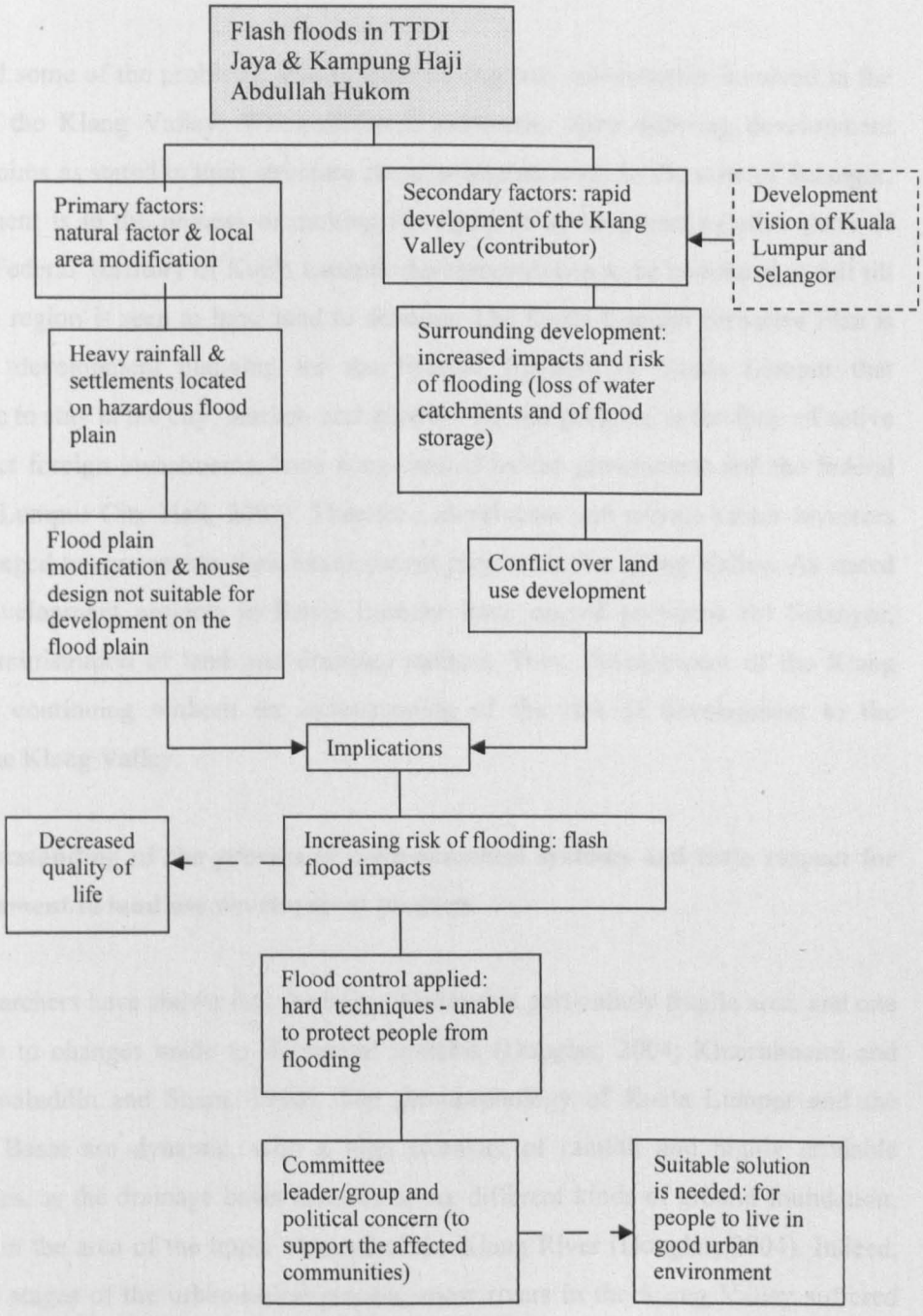

Figure 8.1. Summary of flash flood problems in TTDI Jaya and Kampung Haji Abdullah Hukom.

8.4.1 The Klang Valley: the attraction of Kuala Lumpur

Chapter 5 covered some of the problems arising from having two governments involved in the administration of the Klang Valley. When different authorities have differing development plans, vision and aims as stated in their structure plans, problems arise. In the state of Selangor, the state government is in the process of moving the focus of development to other parts of state, but for the Federal Territory of Kuala Lumpur development has to be continued at full tilt for so long as the region is seen to have land to develop. The Kuala Lumpur Structure Plan is clearly aimed at development planning for the Federal Territory of Kuala Lumpur that encourages people to stay in the city; market- and growth-oriented policies, in the form of active strategies to attract foreign investments, have been created by the government and the federal authority (Kuala Lumpur City Hall, 2003). Therefore, developers and private sector investors have been encouraged to concentrate their development projects in the Klang Valley. As stated in Chapter 5, development projects in Kuala Lumpur have caused problems for Selangor, chiefly in the administration of land and drainage matters. Thus, development of the Klang Valley has been continuing without an understanding of the risk of development to the environment of the Klang Valley.

8.4.2 Little understanding of the process of environmental systems and little respect for the environment in land use development projects

A number of researchers have shown that the Klang Valley is a particularly fragile area, and one that is vulnerable to changes made to its natural systems (Douglas, 2004; Khairulmaini and Fauza, 1998; Jamaluddin and Sham, 1990). The geomorphology of Kuala Lumpur and the Klang Drainage Basin are dynamic, with a high intensity of rainfall and highly erodable weathering profiles, as the drainage basin consists of six different kinds of ground foundation, and steep slopes in the area of the upper channel of the Klang River (Douglas, 2004). Indeed, even in the early stages of the urbanisation process, most rivers in the Klang Valley suffered from an inefficient system unable to hold huge amounts of water during heavy rain when the Klang Valley frequently received high rainfall.

This research has shown that the authorities involved in development planning have not really understood how fragile the Klang Valley is. Interviewee B, the head of the Technical and Research Department of the Ministry of Federal Territories, was quoted in Chapter 5 as saying that his office had no intention of allowing development to occur along the Klang River due to the basin's sensitive environmental characteristics. Indeed, developers continue to dig up the

most fragile parts of this environment in search of development profits. It has been said that only developments of more than 50 hectares need to be subjected to an Environmental Impact Assessment (EIA). However, the EIA examines only the project site but not the overall impact of the projects, for example, in the context of the drainage basin or small catchments (Department of Environment, 1997). Besides, developments of less than 50 hectares, such as the development of Mid Valley, which is unquestionably located on the flood plain area of the Klang River, can be developed without the need to refer to an EIA. However, this project has had a huge impact on the river systems and surrounding development. As Rahani (1996) stated, 45 per cent of the river pollution in Malaysia is due to land use development and earthworks.

8.4.3 Political disruption in the process of development planning approval

As discussed in Chapter 5, land use development planning in the Klang Valley is sometimes controlled by the state government, particularly when the development takes place on land owned by the government. Therefore, given the power of the state government, development planning is proposed without any need to refer to the proper planning authorities and ensure that the development procedure follows the relevant regulations. Land clearance for housing development projects, for example in the Sungai Buloh forest reserve and the Bukit Cahaya Seri Alam forest reserve in Selangor, has resulted in the occurrence of frequent flooding in the lower areas. These development projects have clearly been undertaken irresponsibly, because the objective of the establishment of the forest reserves was to protect the ecology and the natural catchments.

8.4.4 Lack of interest in flood control management involving the application of soft techniques and approaches

Much effort has been devoted to finding a solution to the problem of flooding in the Klang Valley through the SMART tunnel engineering project (Chapter 5.7.1). However, residents of the Klang Valley became sceptical about the effectiveness of the hard flood control projects, sensing that they were only successful for a very short period. Since the early days of large-scale development of the Klang Valley in 1960s, the Klang River and Gombak River in particular have carried massive sedimentation due to construction sites that created open spaces during land clearance. According to Douglas (1972, cited in Aiken *et al.*, 1982), in the early 1970s, rocks and boulders have been used to protect the banks of the Sungai Anak Ayer Batu from erosion and to stop the river from becoming straight and shallow. However, these methods were changed by the DID of the Federal Territory of Kuala Lumpur in the belief that the river

should be concretized in order to ensure that the water flows more efficiently during periods of increased discharge. This changed approach seems to be effective for areas close to the concretized stretch of river, for example in this case the frequent flooded parts of the University of Malaya campus. However, while this might be effective on a localized basis, it transfers the problem downstream and magnifies it; in this case one of the areas particularly badly affected was Kampung Haji Abdullah Hukom.

8.4.5 No integration between flood control and land development planning

As was indicated in Chapter 6.9 the DID of Petaling District which is responsible for managing flood control programme for the TTDI Jaya and the DID of Federal Territory of Kuala Lumpur, which is responsible for flood mitigation programmes in the Klang Valley, is frequently faced with the problem of actually reaching the river channel as a result of developments having been undertaken so close to the river that no space has been left for excavating machines to deepen and clean the river. Developers and planners are not in the habit of assessing the impact on the environment and the possible outcome in terms of flooding of the development of specific plots of land.

8.5 Review and recommendations

Chapter 2 started with a review of the literature on rural to urban migration and on urbanisation in the context of the rapidly growing economies of Southeast Asia. Much of the discussion has been built around the contribution of Terry McGee and in particular his concept of *desakota* urbanisation (McGee, 1991; Chapter 2.2.4). In the intervening years, the debate has moved on considerably, and fruitfully. Nevertheless, it remains surprising that neither McGee himself nor others who have contributed to this discussion have made much of the Klang Valley. Surprising too is that in over a decade of research on the urban process in Southeast Asia more has not been written on the role of the developer. The case of the Klang Valley clearly shows that large and influential developers are able to use their political clout to win support for their plans. Indeed the importance of political connections is something that comes through clearly from this study -- of special interest precisely because the political is so frequently absent from development studies, as anthropologists such as James Ferguson (1990) have forcefully argued. But the discussion in this dissertation has shown that in a number of ways the decisions that have mattered have been taken as part of political deals or have been a result of long term political relations. Thus, for example in the case of land use development of the forest reserve in Selangor, political relationship between developers and Shah Alam council seemed to be one of

the major factors for the development to be proceed even though without approval document. However, for the case of Kampung Haji Abdullah Hukom in order to search for a quality living in the city, strong relationship between the community leader and the political leader of the area, has resulted in this squatter community win on their fight for suitable accommodations provided by the government if they need to leave their settlement area of more than 50 years inhabitant.

Even if the literature is largely quiet on the subject, it should come as no surprise that planning and development decisions issue from political deals. Nor too should it be a surprise that one of the potential consequences of rapid urban spread into rural areas is damage to the environment. It is clear from the foregoing research that rapid urbanisation in the Klang Valley has increased the vulnerability of urban communities in the Klang Valley. If we consider Pelling's interpretation of vulnerability in terms of exposure, resistance and resilience (Chapter 2.3.3), and apply this to TTDI Jaya and Kampung Hukom, we see that in conditions of frequent exposure, resistance is considerably impaired in the case of the Kampung by the nature of the settlement and the difficulty of taking preventive measures. On the other hand there is an interesting case to be made, based on the evidence presented here, that the residents of Kampung Haji Abdullah Hukom have shown greater resilience that their richer counterparts in TTDI Jaya.

Indeed, various writers stress the importance of a holistic approach to the natural and human environment. Thus, according to Cooke and Doornkamp (1990:162), "to understand and manage successfully the flood problem requires an understanding of the physical problem; but it also requires an understanding of the threatened communities". The issues discussed above show that development planning for the Klang Valley should attempt to apply methods that can benefit both local communities and the natural environment. As Saha (1981:9) writes, "River basin planning, conceptually and in programme terms, transcends natural and social systems providing planers with both a challenge and an opportunity for adopting a comprehensive approach in which the management of physical, biological and social systems interface harmoniously". Indeed, without integrated action in development planning, urban communities and urban environments will suffer from more environmental problems. But in the Klang Valley such a holistic approach has been totally lacking.

When we look at the literature on flood management techniques, we realise that in the Klang Valley the authorities are still very much at the beginning of the road. There are specifically two areas in which the literature suggests that planning authorities should be moving, and in both cases, as this discussion has shown, the authorities in Selangor and even more so those in the

Federal Territory are only at the start. These are the introduction of integrated drainage basin management and soft management techniques including principally river restoration programmes. In the remaining part of this section, we will examine these two issues, highlighting them as the principal policy recommendations that come out of this work.

8.5.1 Development planning in a context of integrated drainage basin management

The Klang Valley incorporates both a human use system and a drainage basin system. Therefore, as development planning for the Klang Valley requires an integrated management in the context of the drainage basin, management should not focus only on the human dimensions but must take into account the drainage basin's physical aspects. The establishment of a legal framework for drainage basin development is important and the federal government should take this matter seriously. Once that is in place, federal and state government policy on development planning should comply with this framework and the government should enforce it consistently, with amendments introduced as urban conditions change. A policy framework for drainage basin development could do no worse than follow that of New South Wales, Australia (Hampton and Varley, 2000). The policy in New South Wales which has been tested for 30 years emphasis integrated drainage basin development and management involved in primary production, environmental conservation, land use planning, river engineering and other aspects of natural resources (Hampton and Varley, 2000). Hampton and Varley (2000) pointed out that there are numbers of state policies that set for management of natural resources including management of development on flood plains and flood control. Besides, they add that, New South Wales legislation also requires licences for extraction of surface and ground water and disposal of effluence into waterways. Under policy in New South Wales, it must be shown that development work is not going to exacerbate flooding in any areas within the drainage basin (Hampton and Varley, 2000). A Flood Plain Management Committee is also formed for a given river catchment, and then engages consultants to carry out detailed flood studies, including flood behaviour under future development scenarios. As mentioned by Hampton and Varley (2000), development that is carried out in accordance with an approved flood plain management plan is indemnified against legal challenge for damages and development that does not comply leaves the owner or approval authority (local government) exposed to expensive damage claims and penalties. Therefore, according to Hampton and Varley (2000), the drainage basin development policy has proven to be very effective in decreasing flood damage and losses. As in Malaysia, land and environment matters are under state jurisdiction as stipulated in the Constitution. Therefore, in Malaysia as in Australia agreement between federal and state

governments should be essential in order to ensure that integrated drainage basin management for the Klang Valley is successful.

Drainage basins are integrated systems in which the processes and responses of dynamic sub-systems are portrayed, and land use planning that understands and respects the fundamental integrity of the drainage basin could reduce the problem of the flash floods that frequently occur in the Klang Valley, and thereby contribute to the process of long-term flood management. In recent years, the whole Klang Valley has undergone a major transformation (Douglas 2004). The development of natural resources has brought about marked changes in the process-response regimes of geomorphological systems in several ways, from micro splash erosion on valley-side slopes to changes in the sediment-deposition budget of river channels and the overall response of the drainage basin system. Human activities, characterized by a lack of understanding of the nature of the Klang Valley, have accelerated the natural processes until the basin has lost its equilibrium, and this has resulted in a set of new processes that can lead to the emergence of environmental hazards and disasters.

As Douglas has written (1988:63), "to know the ground the city is built upon; to understand the present day of geomorphic processes as modified by urbanisation; and to predict future geomorphic changes which are likely to result from urban development. Essentially these tasks require knowledge of the past, understanding of the present and the ability to forecast the future" -- all of this is important for urban planning. This means that a knowledge of past and present development scenarios is required, as well as an ability to predict future changes, is essential for planning in harmony with nature. However, in the context of the development of the Klang Valley less attention has been paid to forecasts of the environmental impacts of urban developments. In order to find a solution to the flash flood problems in the Klang Valley, a diverse understanding of the nature and the growth of the valley is very important. Environmental problems usually occur in conjunction with socio-economic and political problems (Huong, 1999). The sudden increase of urbanisation in the Klang Valley and the size of the urban area has yet to lead to significant political problems, perhaps because of the relatively consistent pace of economic growth, but the potential is there, unless measures are taken to introduce a degree of integrated drainage basin planning.

Development in the context of integrated drainage basins is important to ensure that there is a link between development and the environment in every part of the catchment. The upper catchments of the Klang Valley are under the State of Selangor and the lower catchments are also situated in Selangor State. The government of Selangor needs therefore to understand the

impact of rapid development of the upper catchments because of its effect on middle and lower catchments. Equally, the government of the Federal Territory should take responsibility for impacts on the lower catchments, but the current situation is due to conflict over land use, with developers showing little or no concern for what might happen downstream. Thus, the advantages of the basin to human settlement and resource-utilisation patterns disappear as the system degrades (Cooke and Doornkamp, 1990:198). As mentioned in Chapters 3 and 5, the new centre of government administration, in Putrajaya, is an example of a massive new development, located in the drainage basin of the Langat River. There are three administrations managing the Langat Basin region: the Selangor State Government, the Federal Territory of Putrajaya, and the Negeri Sembilan State Government, which is responsible for five per cent of the region. At present, the Langat Basin is still not suffering from a land crisis in the same way as the Klang Valley, but Putrajaya, the Multi-media Super Corridor and Kuala Lumpur International Airport are likely to lead to the same pressures in the Langat Basin. Thus, if the government does not take any action regarding the problem of development in the Langat Basin, the same problems that have been experienced in the Klang Valley will appear. Moreover, as reported by SWMA (2002), the Langat River is already one of the most polluted rivers in the country. Even though the Langat Basin is currently being studied by several bodies such as the Department of Irrigation and Drainage of Selangor and Selangor Waters Management Authority, the studies basically focus on the environmental impacts to the area of the development, and integrated river basin management does not feature.

Problems resulting from shared administrative responsibilities are of course not limited to Malaysia and the Klang and Langat valleys. For example, river management authorities in the Santa Clara Valley, California, face similar difficulties as responsibility for the valley is shared by three bodies: South Santa Clara Valley Water District, Santa Clara County Parks and Recreation Commission, and Santa Clara County Flood Control and Water Conservation District (Cooke and Doornkamp, 1990). From the previous discussion it can be seen that the situation of the Klang Valley is much more complicated as environmental problems in the region, particularly flash floods, are severe. As discussed in Chapter 5, there are two government administrations with seven local authorities serving the Klang Valley region and two Drainage and Irrigation Departments, namely the DID of the Federal Territory of Kuala Lumpur and the DID of the State of Selangor, managing the river in the Klang Valley. However, the responsibility for managing the Klang river basin has been handed over to the DID of the Federal Territory, as mentioned in Chapter 5.7, in order to improve flood mitigation and to avoid overlapping jurisdiction. However, when it comes to the problems of floods occurring in the state of Selangor, the DID of Selangor still has a responsibility in managing the

flooded rivers. What was clear from the author's meeting with officers from the DIDs of the Federal Territory of Kuala Lumpur and the State of Selangor was that, regardless of its responsibilities, the DID of the Federal Territory was concerned only with rivers in the Federal Territory. However, in the context of the rapid development of the Klang Valley, when flash floods occur frequently, most officials will point to the DID's failure in managing the river and most members of the public to the city authorities for not maintaining the urban drainage system well enough; neither will blame those who permitted rapid development of the flood plain areas.

Hence, the effort made by the Selangor State Government in setting up the Selangor Waters Management Authority (SWMA; Chapter 5.8), which is trying to plan development strategies using the concept of the drainage basin, should receive significant support from the Federal Territory of Kuala Lumpur administration as a body that manages development planning for the Klang Valley. The Department of Irrigation and Drainage (DID) of the Federal Territory of Kuala Lumpur and the State of Selangor should understand the function of the SWMA in order to create a good relationship and to avoid any overlap of jurisdiction between the development planning management of the drainage basin and the management of the river; however, the author's meeting with DID officers indicated that they saw the SWMA's only function as being to manage water resources in the drainage basin with no oversight over development planning. They seemed to be unaware of that statute that promulgated the SWMA, as mentioned by interviewee G (section 5.8) for the protection zone area guidelines for physical development and engineering that determines standards, procedures and regulations for catchment development.

Formulating an integrated river basin management is not going to happen without public support. Therefore, the government should incorporate into the training of officials and more broadly the education of the public information on development planning and local environments to ensure that lay people and the public alike understand the importance of integrated basin management.

8.5.2 Using river restoration programmes to improve the image of the Klang River, as well as living conditions

Waley and Purvis (2004:4) write of Japan that, "Water has traditionally been accorded a particular cultural, aesthetic and economic significance ..., as a source of life, beauty and agricultural prosperity". Besides, Waley (2000:199) adds, "Rivers are expressions of culture and source of rebirth. Rivers possess immense symbolic power. They are deeply embedded within the collective and individual human make-up." In Malaysia the meaning of rivers and of water

is inevitably somewhat different. The Klang River has not contained clear, clean water for many decades; this is due in part to the tin mines at the confluence of the Klang and Gombak rivers. The muddy brown colour of the river gave Kuala Lumpur its name, which means 'the muddy confluence'. However, during those early years, the Klang River served as a major route along which people moved from lower to upper parts of the river catchment by boat. All products from the tin mines were carried by boat down the river directly to Port Klang. Also the river was used to transport merchandise, as at that time no major road had been constructed (Gullick, 1956). Indeed, the Klang River fulfilled a particular function as waterway transportation during its heyday as a centre for the tin mines in Peninsular Malaysia. However, flood events have existed in this river basin since mining activity began in 1876 (Gullick, 1956). Given the early acknowledgement that the valley was at risk of flooding, the development that took place in it should have been designed to be environmentally friendly and there should have been an understanding of the impact of further development on the river system. However, recently the urbanisation of the Klang River Basin has transformed it into a different environment, from the tourist and recreation facilities in the hills to the port installations in the delta (Douglas, 2004). Hence, the changes that took place in the river basin shaped the Klang River into a new environment where the river was no longer suitable for water transportation due to high deposition that reduced the depth of the river bed. Subsequently, any nostalgia there might have been for the Klang River sank together with the silt and mud deposition.

The Klang River is now categorised as among the most polluted rivers in the country (Department of Environment, 1997). Today, most discussion concerning the Klang Valley and the Klang River revolves around the flash flood problems that have had such a negative impact on urban society. Never is the Klang River mentioned in the context of recreation or leisure pursuits more generally. Nor has the departure of the government administration from the centre of Kuala Lumpur south to Putrajaya inspired confidence that the valley's environment might have a chance to recover. Despite this southward thrust of urban development (as shown in Map 2), urbanisation of the Klang Valley looks likely to continue to expand over every inch of available land considered economically suitable.

In order to improve not only the environment but also the image of the Klang River and its tributaries, the introduction of river restoration programmes is essential. This will surely involve stripping the river's bed and banks of the concrete into which much of it is now cast (see figure 5.2 and figure 5.3).

From the discussion in Chapters 5, 6 and 7 it was seen that those who are involved with development planning and the citizens of the Klang Valley need more explanation and greater understanding of the river's functions, the connection between the river and river basin activities, and the effects on the natural environment where the development actually took place. Even though the SWMA was leading to the introduction of soft measures in river management, the programme was still under consideration, as the whole concept of coordinating the river with urban life that the programme planned needed the support of the authority of the Federal Territory so that the integrated river basin management could proceed (see Chapter 5.8).

It is still not too late to improve the condition of the river and bring back the image of the river to a level of which the citizens of Kuala Lumpur could be proud. The river restoration programme in Japan gave a great deal of consideration to land use with a series of 'soft' techniques including re-landscaping the embankments, the reactivation of retention ponds, the use of basins and flood meadows to slow down the flow, and to policy and planning co-ordination (Waley, 2000:204). Indeed, many flood plains have degraded due to land use development, therefore, flood plain restoration will need to be carefully planned and will need to consider the appropriate level of service for flood protection purposes, for example improved data on the extent of flood plains (Brookes, 1996; Penning-Rowsell and Tunstall, 1996). A sensitive application of river restoration programmes, combined with a better understanding of the process of the drainage basin, would mean that in future flash floods should not be a major issue for local communities in the Klang Valley.

8.6 Limitations and future research possibilities

The present study has combined several areas of investigation and several methods. However, not all that the author set out to do could be accomplished; the intention had been to conduct the research in the study areas by using stratified sampling according to socio-demographic characteristics of committee members in order to get various perceptions of flash flooding from respondents of different backgrounds, but this could not be done as insufficient members of the relevant committees were forthcoming and ready to help. It was particularly difficult to get socio-demographic data for the study areas due to a lack of adequate time, except where the recorded data had already been produced by the committee of the residential areas. Difficulties in obtaining information from the developer of TTDI Jaya meant that it was not possible to include them within the scope of this dissertation. However, it is recognised that the role of developers could profitably be examined in future research.

The worst ever flash floods in the Klang Valley, at the end of February 2006, which also affected TTDI Jaya, led to reported losses of millions of Malaysian Ringgit as more than 4,000 houses were affected. Prompted by the severity of this event, millions of Malaysian Ringgit have been given by the federal government to the state government of Selangor to prevent the recurrence of similar flooding and to solve the flood problems (Utusan Online, 12/9/2006). This clearly opens the way for further research to monitor this expenditure and its effectiveness.

This study was planned before it had become clear that Kampung Haji Abdullah Hukom was to be demolished and its residents moved to modern apartment buildings, in what is, after all, a classic move of its kind. The author had already conducted research in Kampung Haji Abdullah Hukom, and when it became known that Kampung Haji Abdullah Hukom was to vanish, it seemed sensible to continue with the investigation. In this sense, and in this dissertation, Kampung Haji Abdullah Hukom stands for any spontaneous settlement (and there are many) near the centre of growing cities in Southeast Asia with claims to a global role, just as TTDI Jaya can be seen as representative of new or fairly new developments for the growing middle classes in Southeast Asia.

The resettlement of the residents of Kampung Haji Abdullah Hukom opens the way for a study of the many issues that this process raises. What will happen to Kampung Haji Abdullah Hukom residents when they move to their new houses, new facilities, and new environment? Will they be able to cope with their new accommodation, given that so few if any of them are used to living in high rise buildings? What will happen to the village culture that has been observed during their residence in Kampung Haji Abdullah Hukom? Will the neighbours be able to spend time in the morning as usual chatting and having the *gotong-royong,* when the flats have less space for the people to get together, and there are no open spaces inside the building? These were some of the concerns raised by the residents during the author's visits as they are worried about losing what they believe to be the good points of kampung life. Beyond those considerations, the most important problems for the residents have been related to the flash floods that has been part of the community's life. Will living in the new flats enable them to sleep soundly during heavy rain? Will the psychological impacts such as the traumas and phobias suddenly disappear from peoples' lives when they live in their new homes? One thing that cannot be hidden is that the Klang River is still just a few steps away from their new homes.

Obviously, this research does not represent an end to the issues discussed in the previous chapters. Development of the Klang Valley will continue, and it can be expected that the urban environment will continue to face great challenges in integrating the built environment, the

social environment and the natural environment in a harmonious way. Conflict over land use becomes critical when development is regarded as more important than environmental protection. However, in the case of residential areas that have frequently suffered from flash floods, environmental problems become a human problem when humans create the modern landscape, changing the environment without understanding the importance of the natural system.

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APPENDIX 1

QUESTIONNAIRE

SCHOOL OF GEOGRAPHY,
UNIVERSITY OF LEEDS, UK

Klang Valley Flooding Impact Survey

I would be most grateful for your participation in this survey of flash floods and their impacts. The survey is being undertaken as part of my university research work for the University of Leeds, UK. Your responses will be treated with complete confidentially and will only be used as part of this academic project.

Sample no: ____

Please fill in the blanks, circle or tick when necessary)
Section A: Opinion about flash floods in your area

1. Which year did you move into this area?

2. How many times do you experience flash floods either in your house or in your compound?

3. What is your feeling when you first experienced flash floods that got into your house?

Frighten		Sad	
Worried		Angry	
shock		disappointed	
All above			

Others, please specify: _____

4. During the first flash floods, were you prepared for it?

Yes	No

i) If the answer is yes, can please tell why?

Already know the risk of living close to the river		Had been told by a few parties about your living area that one day might be flooded	

Others, please specify: _____

ii) If the answer is no, can you please tell why?

Never been told by any responsible bodies about the risk of this area	
Had been told by developer/house owner that this area is free from flash flood problems	
You settlement area has been announced as flood free area due to flood control projects in the area	

Others, please specify: _____

5. If the water enters dwelling, what is the typical level in the house?

_____

6. Has this household experienced the effects of floods?

Yes	No

i) If yes, what are the specific problems related to flash floods in this area? Could you please explain?

a. Before the event, for example, if there heavy rain occurs in the Klang Valley generally and specifically in your area.

Worried		Keep belongings to the safe place	
Tension		All above	

Others please specify:

_____

b. During the flash flood event.

_____

c. After the flash flood event.

_____

Others, please specify:

_____

7. Please tick which of the following consumer goods had been damaged during flash floods:

	Television	Rice cooker	
	Computer	Mixer	
	Refrigerator	Blender	
	Electric/gas stove	Radio	
	Oven	Video/DVD	
	Microwave	Iron	
	Vacuum cleaner		
	Washing machine		

Other electrical goods, please specify:

_____

8. Were you normally at home when your house was flooded?

Yes	No

(if the answer is yes go to question no i. If the answer is no go to question no ii)

i. Were you able to save your belongings from flood damages?

Yes	No	Apart

ii) If the answer is No, could you please tell why?

The flood water enters dwelling so fast		The furniture are too heavy	
Too many belongings to save		Need helper to bring things up stairs	

Others please specify: _____

9. If you were not at home during the event, how did you feel when you saw your house had been flooded?

Sad	Angry	Disappointed	Shock

Others please specify:

_____

10. What is your first priority during the flash floods?

Family safety	Safety of belongings

Others please specify: _____

11. If you continuously experienced flash floods how did you feel?

Sad	Angry	Disappointed

12. In your opinion, how severe are the flash flood events in your area?

Extremely severe	Severe	Moderate	Mild

Section B: Adjustment to flooding

1. Has any action been taken by your household in order to minimised the flash flood impacts into your house?

Yes	No

i) If the answer Yes, how did you prepare for it?

Flood insurance		Limited the house furniture and electrical goods	
House adjustment		All above	

Others please specify: _____

ii) If the answer is No, why did you not prepare for it?

Don't know what to do		Planned to move out from the house	
Hope responsible bodies to solve the flood problems		It cost to much for the house adjustment	

Others please specify:

_____

2. Has the action been successful or not?

i. If successful, how?

_____

ii. If failed, why?

_____

3. Have you received any compensation for flood damage?

Yes	No

If the answer is Yes, how much compensation did you receive for one single flash flood event?

i. the maximum: _____
ii. the minimum: _____

4. Can you estimate the flood losses in one time event?

i. the maximum: _____
ii. the minimum: _____

SECTION C: Housing history

1. Type of house

Single storey house	Single storey terrace house	Two storey house	Two storey terrace house	Long house

2. House ownership

Landlord/Owner	Tenant	Sub-tenant

Others, please specify:

_____

3. Height of house from ground

< 15 cm	≥15cm < 30 cm	≥ 30cm, <50m

4. House compound

Exists	Does not exist

If it exists, what is the nature of the surface?

Covered (concrete)	Covered (bitumen)	Grassy	Bare

Others please specify:

_____

5. Drainage system of the house

Type	
Depth	
Conditions	

6. Opinions about facilities provided for the area and your house. Are they present or not. If these facilities are present, are you satisfied with them?

Facilities	Reliable	Quite reliable	Unreliable
Grocery			
Clinic			
School			
Public transport			
Garbage collection			
Bank			

Other facilities, please specify:

_____

SECTION D: Socio demographic information

1. Information about respondent

Name	
Age	
Sex	
Birthplace	
Occupation	

2. Household information

a) How many people live in this house?

b) Could you please specify?

Age 0-17	
Age 18- 30	
Age 31- 40	

Age 41- 50	
Age 51- 60	
Age 61-70	
Age over 70	

c). How many people are working live in this house?

d) Is it husband and wife working?

Yes	No

3. What are the factors that make you chose to live in this settlement area?

Size of the house	
Price of the house	
Close to work place	
Facilities provided in this area	
Good neighbourhood	
Strategic location	

Other, please specify:

_____

4. Vehicle ownership (could you please write the number of each vehicles if you have more than one)

Car		Lorry	
Motorcycle		Bicycle	
Van/mpv		Other (please specify)	

Thank you very much for completing this survey.

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United Kingdom.

APPENDIX 2

(QUESTIONNAIRE IN MALAY VERSION)

SOAL SELIDIK MENGENAI KESAN BANJIR KILAT DI LEMBAH KELANG (BIL: ___)

Borang soalselidik ini adalah untuk memenuhi keperluan ijazah kedoktoran. Segala maklumat yang diberikan adalah untuk tujuan akademik sahaja.

Arahan: Sila isikan tempat kosong, bulatkan ataupun tandakan pada mana-mana yang bersesuaian.

BAHAGIAN A: PENDAPAT MENGENAI BANJIR KILAT DI KAWASAN ANDA.

1.Bilakah anda menduduki rumah ini?

[ ]

2. Semenjak menduduki rumah ini sudah berapa kalikah anda mengalami kejadian banjir kilat?

[ ]

3. Apakah perasaan anda apabila pertama kali mengalami kejadian banjir kilat yang memasuki rumah anda?

Takut	Sedih
Bimbang	Marah
Terkejut	Kecewa
Semua di atas	

Lain-lain sila nyatakan:

_____

4. Adakah anda telah bersiap sedia sewaktu kejadian banjir kilat yang pertama memasuki rumah anda?

Ya	Tidak

Sekiranya Ya, boleh anda nyatakan kenapa?

Telah mengetahui berkenaan petempatan yang berhampiran sungai berkemungkinan akan mengalami banjir		Telah diberitahu oleh pihak tertentu berkenaan kemungkinan kawasan yang anda diami mungkin akan dilanda banjir	

Lain-lain sila nyatakan:

_____

Sekiranya Tidak boleh anda nyatakan kenapa?

Tidak pernah diberitahu oleh mana-mana pihak berkenaan kawasan tempat tinggal yang berkemungkinan akan mengalami banjir	
Telah diberitahu oleh pihak pemaju bahawa kawasan ini bebas drp sebarang masalah banjir	
Kawasan tempat tinggal anda telah diisytiharkan sebagai kawasan bebas banjir berikutan usaha-usaha mengatasi masalah banjir telah dilakukan	

Lain-lain sila nyatakan:

_____

5. Sekiranya banjir memasuki rumah anda, boleh anda nyatakan takat banjir tersebut?

_____

6. Secara umumnya adakah banjir kilat mendatangkan masalah kepada anda?

Ya	Tidak

Sekiranya Ya, bolehkah anda nyatakan bentuk masalah tersebut? Boleh huraikan?

a. Sebelum, banjir berlaku, sebagai contoh, sekiranya huajn lebat di Lembah Kelang umumnya dan di kawasan and khususnya.

Risau		Menyinpan barang-barang ke tempat selamat	

Cemas		Semua diatas	

Lain-lain sila huraikan:_____

b. Sewaktu kejadian banjir:

_____

c. Selepas kejadian banjir:

_____

Lain-lain sila jelaskan:_____

7. Sila tandakan barang-barang rumah yang pernah mengalami kerosakkan akibat banjir kilat

Kerosakan brg elektrik		Kerosakan kenderaan	
Kerosakan perabot		Kerosakan brg elektrik, perabut & kenderaan	
Kerosakan perabut & brg elektrik		Kerosakan pada bahagian rumah	
Semua di atas			

Lain-lain sila nyatakan:

_____

7. Sila tandakan barangan elektrik yg anda miliki dan barangan elektrik yg pernah mengalami kerosakan akibat banjir kilat.

Brg elektrik	Rosak	Brg elektrik	Rosak
Televisyen		Periuk nasi	
Komputer		Radio	
Peti ais		Video/DVD	
Dapur elektrik/gas		Seterika	
Oven		Blender	
Microwave			
Mesin basuh			
Penyedut hampagas			

Lain-lain sila nyatakan:

_____

8. Sewaktu kejadian banjir kilat melanda kawasan anda, pada kebiasaannya adakah anda berada dirumah?

Ya	Tidak

Sekiranya 'Ya', sila ke soalan i. Sekiranya 'Tidak' sila ke soalan ii.

i. Adakah anda berjaya menyelamatkan barangan anda?

Ya	Tidak	Sebahagian

ii. Sekiranya tidak boleh anda nyatakan kenapa?

Banjir memasuki rumah terlalu cepat		Perabot terlalu berat	
Terlalu banyak barang rumah yg perlu diselamatkan		Perlukan pembantu untuk menyimpan barang	

Lain-lain sila nyatakan:_____

9. Sekiranya anda tidak berada di rumah, apakah perasaan anda apabila mendapati rumah anda dilanda banjir?

Sedih	Marah	Kecewa	Terkejut

Lain-lain sila nyatakan:

_____

10. Sewaktu banjir kilat melanda, apakah keutamaan anda?

Keluarga	Harta benda

Lain-lain sila nyatakan:

_____

11. Kawasan petempatan anda telah berulang kali mengalami kejadian banjir kilat apakah perasaan anda?

Kecewa	Sedih
Marah	Bimbang
Semua di atas	

Lain-lain sila nyatakan:

_____

12. Pada pendapat anda apakah tahap banjir kilat yg melanda kawasan petempatan anda?

Terlalu dahsyat	Dahsyat	Sederhana	Biasa

BAHAGIAN B: UBAHSUAIAN TERHADAP MASALAH BANJIR KILAT

1. Adakah sebarang tindakan diambil oleh isi rumah untuk mengurang kesan banjir kilat terhadap kediaman anda?

Ya	Tidak

i. Sekiranya 'Ya', apakah persediaan anda?

Mengambil insuran banjir	Mengurangkan perabot rumah dan barangan letrik
Mengubah suai rumah bagi menangani masalah banjir kilat tersebut	Semua di atas

Lain-lain sila nyatakan:

_____

_

ii. Sekiranya 'Tidak', kenapa tiada persediaan utk menghadapi banjir?

Tidak tahu apa yg patut dibuat		Merancang utk pindah	
Berharap pihak yg berwajib menangani masalah banjir tersebut		Kos pengubahsuaian rumah yang tinggi	

2. Adakah usaha-usaha yg anda lakukan di atas tadi dapat membantu mengurangkan masalah banjir kilat yg anda alami?

Ya	Tidak

i. Sekiranya tidak, boleh anda nyatakan kenapa?

_____

ii. Sekiranya tidak boleh anda nyatakan kenapa?

_____

3. Adakah anda ada menerima sebarang gantirugi berikutan kerugian akibat banjir kilat?

Ya	Tidak

Sekiranya jawapan anda Ya, berapakah anggaran gantirugi yg diterima pada satu kejadian banjir kilat?

i. Maksima:

_____

ii. Minima:

_____

4. Boleh anda anggarkan kerugian yg di alami setiap kali banjir kilat memasuki rumah anda?

i. Maksima:

_____

ii. Minima:

_____

BAHAGIAN C: SEJARAH KEDIAMAN DAN STRUKTUR RUMAH

1. Jenis rumah

Rumah teres setingkat		Rumah panjang	
Rumah teres 2 tkt		Rumah setingkat	

Lain-lain sila nyatakan:

_____

2. Hak milik rumah

Milik sendiri		Sewa		Sewa di atas sewa	

Lain-lain sila nyatakan:_____

3. Ketinggian rumah drp tanah

<15cm	≥ 15cm & < 30cm	≥ 30, < 1 meter	≥1 meter

4. Halaman rumah

Ada	Tiada

Sekirannya ada, apakah jenis permukaan halaman tersebut?

Berturap (simen)	Berturap (Tar)	Berumput	Berpasir

Lain-lain sila nyatakan:

_____

5. Sistem perparitan

Jenis	
Kedalaman	
Keadaan	

6. Pendapat mengenai kemudah yg ada di tempat tinggal anda, Sekiranya kemudahan tersebut wujud adakah anda berpuas hati dengannya?

Kemudahan yg ada	memuaskan	Sangat memuaskan	Tidak memuaskan
Kedai runcit			
Klinik			
Bank			
Sekolah			
Pengangkutan awam			
Pengambilan sampah			

Lain-lain kemudahan yg ada sekiranya anda ingin nyatakan pendapat anda sila nyatakan:

_____

BAHAGIAN D. INFORMASI SOCIO DEMOGRAFI

1. Maklumat peribadi

Nama	
Umur	
Jantina	
Asal	
Pekerjaan	

2. Maklumat isi rumah

a. Berapa ramaikah yg tinggal di dalam rumah ini?

[ ]

b. Sila khususkan mereka mengikut kumpulan umur masing-masing.

Umur 6 thn dan kebawah	
7 – 12 tahun	
13 – 17 tahun	
18 – 30 tahun	
31 – 40 tahun	
41 – 50 tahun	
51 – 55 tahun	
55 tahun ke atas	

c. Berapa ramaikah yg bekerja tinggal di dalam rumah ini?

[ ]

d. Adakah suami isteri bekerja?

Ya	Tidak

3. Apakah faktor utama menyebabkan anda memilih kawasan ini utk didiami?

Rumah yang besar	
Harga rumah yg berpatutan	
Dekat dgn tempat kerja	
Banyak kemudahan disediakan di kawasan ini	
Kejiranan yg baik	
Lokasi yg strategic	

Lain-lain sila nyatakan:

_____

4. Kenderaan (sila nyatakan jumlah kenderaan yg anda miliki sekiranya lebih drp satu).

Kereta		Lori	
Motosikal		Basikal	
Van/mpv		Lain-lain	

SEGALA KERJASAMA YANG TELAH DIBERIKAN DIDAHULUI DENGAN UCAPAN RIBUAN TERIMA KASIH

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APPENDIX 3

Interview questions for in-depth study in TTDI Jaya and Kampung Haji Abdullah Hukom

Part 1 (flash flood impacts and experienced)

1. Do you think that flash floods are becoming more frequent in your area?
2. Could you identify the last three occasions when you have experienced flash floods in your house?
3. Is the flash flood situation is getting better or worse?
4. Were you at home when flash flood first time entering your house?
5. How did you feel when you first experienced this event? Were you prepared for it?
6. In general, how flash floods affected your household?
7. What are the specific problems that you and your family experienced due to flash flooding?
8. Could you please tell me your experience with flash floods either in your house or your living area?
9. Could you please explain your feelings regarding flash flood problems that have given huge impacts to your life?

Part 2 (location of the house and government action)

1. Regarding to flash floods magnitude and frequency, do you think there is something wrong with your living area?
2. What was the primary reason why you decided to live in this living area?
3. Do you feel secure living in this area following to frequent flood event?
4. Why do you continue living in this area?
5. Do you understand the meaning of the term 'flood plain'?
6. Are you aware that your house is located on the watercourse?
7. Do you need to make some adjustment to your house in order to avoid flood water enters into your house?
8. Have the related government agencies inform people in this area how to prepare for flash flood emergencies?
9. Have the government or the responsible developer offered the people who live here the opportunity to move to other housing development?
10. Do you think that the government is serious in managing flash flood problems in this area?
11. What action has been taken by the government or responsible bodies to reduce flash flooding in this area? How successful has action been?
12. Do you want to continue living in this area?

APPENDIX 4

Interview questions with the government officers

A) The Ministry of Federal Territories

1. What is the function of this ministry?
2. How is this ministry deal in development planning of the Federal Territory of Kuala Lumpur?
3. How this ministry deal with the development of the Klang Valley as Kuala Lumpur is the major development centre for the Klang Valley?
4. Is this ministry taking into account the development planning in a context of drainage basin?
5. How this ministry manage the development with the state of Selangor?

B) The Department of Irrigation and Drainage of the Federal Territory of Kuala Lumpur

1. What is the current status of flash floods in Kuala Lumpur?
2. How is this department deal with flash flood problems in Kuala Lumpur?
3. The Klang River flows from the state of Selangor to Federal Territory of Kuala Lumpur and than back to Selangor, therefore how this department deal with the effected river in order to control flooding?
4. What is the latest project for flood control in Federal Territory/Klang Valley?
5. Which department manage the Klang drainage basin?

C) The Department of Irrigation and Drainage of the state of Selangor

1. What is the current status of flash floods in Selangor?
2. How is this department deal with flash flood problems particularly in relation with land use development?
3. What is the latest project for flood control in the state of Selangor?
4. Who manage the rivers in the Klang drainage basin?
5. How important is the DID in guiding development for development approval?

D) The Department of Irrigation and Drainage of the Petaling District

1. What is the function of this department in managing flash flood problems in TTDI Jaya?
2. What are the problems of flash floods in TTDI Jaya?
3. What is the advice made by this department in development approval of TTDI Jaya?
4. What is the action taken by this department in controlling flash floods in TTDI Jaya?

E) The Town and Country Planning of the state of Selangor

1. What is the function of this department in development planning of Selangor?
2. How to manage development planning in a context of rapid urbanisation?
3. Is the development planning in Selangor considers the development in Kuala Lumpur?

4. How this department link with other government agencies in development planning such as SWMA and local authorities?
5. What is the land use regulation for the sensitive areas?

F) Officer of Town and Country Planning of Peninsular Malaysia (the head quarters)

1. What is the function of this department in development planning?
2. How environmental elements were considered in development planning?

G) SWMA

1. What is the function of this agency?
2. How important is this new agency in development planning of Selangor and the Klang Valley?
3. Is there any overlapping in scope of work with other government agencies?

H) Kuala Lumpur City Hall (Planning department)

1. What is the development planning made by the Kuala Lumpur City Hall when Kuala Lumpur is planning to become a world class city?
2. What is the planning for flood plain areas which previously settled by the squatters when those squatter settlements have been demolished?
3. Is the development proceed on the flood plain areas were followed the specific guidelines provided by the DID?

I) Shah Alam City Council (Planning department)

1. What is the function of this department in development planning?
2. What is the regulation that has needed to be followed for development on the flood plain areas?
3. Is development project primarily housing settlement was encourage to build on the flood plains?
4. How development of TTDI Jaya has been approved to develop on the sensitive flood plain of Damansara River?

APPENDIX 5

Interviews undertaken with government officers

1) Interviewee B, the head of technical and research department, Ministry of Federal Territories. From the interview I had gain better understanding of the planning process in the Klang Valley after this new Ministry is operating (established end 2003).

2) Interviewee C, a senior officer of the technical and research department, Ministry of Federal Territories. The purpose of the interview was to know her thoughts about the management of this new ministry.

3) Interviewee A, an officer in the research unit of the Department of Town and Country Planning, Peninsular Malaysia. The interview covered issues related to the planning process in Malaysia, especially for the Klang Valley.

4) Interviewee D, an officer from Planning Department of Kuala Lumpur City Hall. The main visit was to confirm the role of this department in the planning process of Kuala Lumpur as the new Ministry of Federal Territories was just established in 2003.

5) Interviewee E, an officer from the Department of Town and Country Planning, State of Selangor. The objective of the interview was to understand the planning process and development in the State of Selangor and how this department links with the planning department of Shah Alam City Council.

6) Interviewee G, a senior engineer from the Selangor Waters Management Authority (SWMA). Information provided by interviewee G were very useful for me in order to gain better understanding of the establishment of this agency and how it operates with planning development in the State of Selangor.

7) Interviewee F, a senior engineer from the River Engineering Unit of Department of Irrigation and Drainage, State of Selangor. During the interview, interviewee F mentioned how important it is for

the developer to follow the planning guidelines at the river reserved area as this method can control flood problems in that area.

8) Interviewee H, an officer from Urban Drainage Unit of Department of Irrigation and Drainage, State of Selangor. The purpose of interview was to gain better understanding about the role of this unit and how it links with the Planning Department of Shah Alam City Council.

9) Interviewee I, an officer from Department of Irrigation and Drainage, Petaling District. The interview undertaken was to understand the current condition of TTDI Jaya due to flash flood problems that frequently occur.

10) Interviewee J, assistant Senior Director from Hydrology and Water Resources of Unit, Department of Irrigation and Drainage, Federal Territory of Kuala Lumpur. The purpose of the interview was to know about the general situation of flash flood problems in the Klang Valley.

11) Interviewee K, an officer of DID for the Klang River Flood Mitigation programme of Federal Territory of Kuala Lumpur. The purpose of the interview was to know about the flood mitigation programme for the Klang Valley.

12) Telephone conversation
Interviewee L, a Planner Officer from the Planning Department of Shah Alam City Council. Interview with this officer did not take place. However, a question regarding planning guidelines at the river reserved area under planning department was answered during the call.

Interview that did not take place

1) Project manager for TTDI Jaya. The objective of the interview was to understand the development concept of TTDI Jaya and guidelines that need to be followed during the construction. However I experienced difficulty in arranging an interview with him as he immediately refused to take part in any discussion or interview even though I told him that it was only for academic purposes.

APPENDIX 6

Table of name of organizations that involved in development planning and flood management in the Klang Valley (This table is provided to assist reader for a better understanding while reading Chapter 5)

Name of organisation	Function
Federal government organisation	
Economic Planning Unit (EPU)	Formulate policies and strategies for socio-economic development, prepare project budget, advise government on economic issues
Town and Country Planning Department	prepares guidelines and development planning for the country
Housing and Local Government Ministry	To establish & implement comprehensive and uniform nation wide rural and urban planning and to ensure adequate comfortable and balanced housing development
Department of Irrigation and Drainage (DID): head office DID of Federal Territory of Kuala Lumpur DID of Selangor (state) DID of Petaling District under DID of Selangor	-manage water resources, river basins, flood risks and coastal zones to achieve environmental sustainability -manage rivers in Federal Territory and manage flood mitigation project for the Klang River basin -manage all rivers in Selangor which also included some rivers in the Klang Drainage basin flow in the state e.g Damansara River -manage all rivers in the Petaling District include Klang river tributaries e.g Damansara River
River Engineering Unit	To ensure the river system is hydraulically efficient to minimise flooding, to provide information & comments on matter regarding river engineering
Department of Environment	To promote, ensure and sustain sound environmental management in the building and to administer and enforce the environmental quality act, 1974 (Amendments Section IV of the Exclusive Economic Zone Ac, 1984)
Land Office	To give permission of the changing land status
Selangor Waters Management Authority (SWMA)	Under state authority. Plan to propose development control zone in the basis of drainage basin.
Kuala Lumpur governmental organisations	
Ministry of Federal Territories	set up by PM Abdullah Ahmad Badawi replaces Secretariat, 2003
Klang Valley Planning Secretariat	set up 80s, by PM Mahathir Mohammad, disbanded 2003- federal level
Kuala Lumpur City Hall; Mayor of Kuala Lumpur	Administrative leader for KL before Ministry of Federal Territories was established. Now as administrative leader for local government of Kuala Lumpur City Hall
Kuala Lumpur Structure Plan (KL 20)	A planning document that lead KL to achieve as a world class city by 2020
Selangor Town and Country Planning Department	To act as an advisor for the Selangor State in development planning

Selangor Department of Irrigation and Drainage (Urban Drainage Unit)	To process and comment on drainage system plan to local authority and ensure all drainage system are well maintained and functioning effectively
Draft Selangor Structure Plan 2020	A planning document to lead and control physical planning in the State of Selangor
Klang Valley Urban Transport (KUTA)	To provide efficient public transport in the Klang Valley
Shah Alam City Council: Planning department	To prepare development planning guidelines focus on physical urban aspects. To approve development project less than 100 hectares or for population less than 10,000.
Selangor state government	Own all the state lands and have power on state land Development- can change land status.
National catchment areas	
Integrated river basin management (IRBM)	To promote harmonious balance between human population level, economic development and natural environment in river basin
Urban Storm Water Management Manual (MSMA)	replaces DID's 30 yr old Urban Drainage Design Manual and more environmental friendly
Urban Drainage Design Manual	Was published by DID in 1975. Prepared guideline for engineers in designing drainage system
Klang Valley catchment	
DID of Federal Territory of Kuala Lumpur Selangor Waters Management Authority (SWMA)	Flood mitigation project in Klang Valley Catchment River basin management for the Klang River Basin
Acts, ordinances and codes	
Environmental Quality Act	1974 (Amendments Section IV of the Exclusive Zone Ac, 1984
Local Government Act	1976
National Forestry Act	1984 (Forestry Rules 1986)
Drainage Work Ordinance	1954 (Amendments 1988)
National Land Code	1965
Land Conservation Act	1960
Development Proposal Document (LCP)	To determine the rational of development proposal that has been proceed

Klang Valley projects	***Date***	***organisation responsible***
Storm Water Management and Road Tunnel (SMART) project	Early 2003- end 2006	Federal government and DID Malaysia
Klang River Basin Flood Mitigation project & Environmental Improvement	Dec 1996- March 2003	Federal Territory Department of Irrigation and Drainage
Selangor Flood Mitigation Project	2001	Department of Irrigation and Drainage, Selangor
Ten-Year Klang River Clean-up Programme	1992-2002	Federal Territory Department of Irrigation and Drainage

Klang Valley projects, master plans, reports	*Date*	*organisation responsible*
Kuala Lumpur Flood Mitigation Project – Drainage Improvements – Master Plan 1978	1978	DID Federal
Study on the Flood Mitigation of the Klang River Basin	1989	Japan International Cooperation Agency (JICA)
Klang River Basin Integrated Flood Mitigation Project	1994	Kinhill in association with Ranhill Bersekutu Sdn. Bhd., 1994
Review Report for Klang River Improvement Works	1996	Dr Nik & Associates Sdn. Bhd
Rehabilitation of the Klang River from Jln Sultan Ismail Bridge, Federal Territory of Kuala Lumpur	1998	Erinco Sdn. Bhd 1998.

dams and other retention features	*Date constructed*	*organisation responsible*
Selangor Heritage Park	2005	State Government of Selangor
Batu Dam	1987	DID Federal Territory/flood mitigation project
Klang Gates Dam	1980	DID Federal Territory/flood mitigation project
Gombak Diversion	1994	DID Federal Territory/flood mitigation project
Batu Retention Pond	1997	DID Federal Territory/flood mitigation project
Kg Baru Pump House	1993	DID Federal Territory/flood mitigation project
Puchong Drop	1982	DID Federal Territory/flood mitigation project

APPENDIX 7

Population, density and population growth by zones in Extended Metropolitan Regions (EMR), 1980 and 1990

	EMR and Year		EMR and Year		EMR and Year		EMR and Year	
	Bangkok		Jakarta		Manila		Taipei	
Item and Zone	**1980**	**1990**	**1980**	**1990**	**1980**	**1990**	**1980**	**1990**
A. Population ('000)								
Core	4,697	5,876	6,481	8,223	5,926	7,948	2,268	2,761
Inner zone	1,947	2,706			2,820	4,107	3,070	4,035
Outer zone	2,513	3,061	5,413	7,676	2,932	3,908	709	757
Whole EMR	9,157	11,643	11,894	15,899	11,678	15,963	6,047	7,553
B. Density (Person/km sq)								
Core	3,000	3,754	9,760	12,384	9,318	12,497	8,344	10,157
Inner zone	314	473			964	1,403	3,450	4,534
Outer zone	130	158	1091	1446	312	416	282	301
Whole EMR	337	429	1991	2661	901	1,231	1,644	2,053
C. Growth 1980-1990 (%)								
Core		25.1		26.9		34.1		21.7
Inner zone		39.0				45.6		31.4
Outer zone		21.8		41.8		33.3		6.8
Whole EMR		27.1		33.7		36.7		24.9

DEFINATIONS

Core	Bangkok=	BMA (Bangkok Thonburi)
	Jakarta =	DKI Jakarta
	Manila =	Metro Manila
	Taipei =	Taipei Municipality
Inner zone	Bangkok=	changwats of Samut Prakan, Nonthaburi, Pathum Thani, Samut Sakhon and Nakhon Pathom.
	Jakarts =	parts of the kabupatens of Bogor, Tanggerang and Bekasi, plus kotamadya Bogor.
	Manila =	parts of provinces of Cavite, Pampanga, Rizal, Batangas, Belucan and Laguna.
	Taipei =	Keelung city, the urban part of Taipei County and the urban part of Taoyuan County.
Outer zone	Bangkok=	changwats of Ayuthaya, Saraburi, Chachoengsao, Chonburi and Rayong.
	Jakarta =	parts of the kabupatents of Bogor, Tanggerang and

		Bekasi.
Manila	=	parts of the provinces of Cavite, Pampanga, Rizal, Batangas, Bulacan and Laguna.
Taipei	=	the rural part of Taipei County and the rural part of Taoyuan.

Source: Jones (2001)