

SPATIAL URBAN METABOLISM FOR LIVABLE CITY

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ABSTRACT

'Livable city' involves many interdependent factors contributing to the quality of life in the urban area. The urban forms with their complete physical and social infrastructures are an essential base to enhancing the quality of life of the urbanites. The livable city imperative is important for Malaysia today because the urbanization process in Malaysia is moving towards harmonizing with the principles of sustainable development. The concept of livable city is used as the representation of sustainable city. The urban metabolism concept is mobilized to show both the livability and also the vulnerable areas of the city. This paper examines a conceptual city metabolism framework, and then goes to consider the various factors that are involved in making the city livable for all ethnic groups in Malaysia. The Seremban municipality area – a growing and prosperous spaces situated in Negeri Sembilan about 80 kilometers south of Kuala Lumpur, Malaysia is the base of the study. Multi-disciplinary and collaborative research contributions are necessary for making cities in Malaysia more livable due to the rapid progress in making Malaysia a developed nation by the year 2020. This paper also presents some preliminary results of the livable city project focusing on the physical and social infrastructures such as water consumption, land properties, crime and health to reflect on the livability of the city or otherwise.

Keywords: Urban metabolism, livability, sustainability, livable city, Malaysia.

Introduction

This paper articulates the concept of livable city for Malaysia whose modern urbanization experience is still relatively young, and whose energy was spent to grapple with what McGee's (1971) - a noted Malaysian urbanist - narration of its urbanization experience as that of pseudo-urbanization about four decades ago. The discussion will pin on the concept of urban metabolism to look into the process of internal urban development and consequently to identify the spatial aspects of livable areas as opposed to vulnerable areas in the city. It will then move to discuss the factors shaping the livable and vulnerable areas before ending the paper with suggestions to take steps to sustain the livable areas and to ameliorate the vulnerable areas.

Infrastructure – physical and social provides the basic needs for society, and sustainable infrastructure systems are essential for the survival, health and well-being of a society. These are complex, interdependent and dynamic systems in need of greater understanding and recognition. Key to this understanding is recognizing the dependence on

environmental systems and services, the interdependence on other infrastructure systems, and on social, technical and economic systems. The central argument revolves around the assertion that the physical and social infrastructures along with various factors are influential in making the city livable while some other parts are vulnerable for the city population.

Linking Livable City Concept to Spatial Urban Metabolism

Livable city as a vocabulary has been actively in circulation in Malaysia in the last few years. It has been linked to the increasing vibrancy and congeniality of the city following its improved quality of life. The city is also seen as being healthy, safe, economically growing, and socially, culturally and politically vibrant within its green ambience. We feel conceptually that a livable city as defined above has the basic ingredients of and therefore can capture the essence of 'sustainable city'. We feel too that using the livable city concept makes it easier to delve into the average city people's (the individuals, communities and the mass urbanites) understanding about what is involved in making the city sustainable, and then to relate their daily lives to the general sustainability of the city.

What is proposed for 'livable city' for Malaysia is not entirely an original conception. It has drawn heavily on ideas and meanings developed associated with cities in the developed west. The idea of the livable city in the Western World began, perhaps, with the question brought by Jacobs (1961) with respect to the rise and fall of American cities. Jacobs argued for the sense of livability that emphasizes the role of communities in cities that were becoming very impersonal in nature.

Writers on the subject (McGee 1971; Girardet 1992; Abdul Samad Hadi 2005) see it as an urban system that contributes to the physical, social and mental well being, and personal development of all its inhabitants. It is about delightful and desirable urban spaces that offer and reflect cultural and sacred enrichment. Key principles that give substance to this theme are equity, dignity, accessibility, conviviality, participation and empowerment. (Cities^{PLUS}, 2003). Palej (2000) however, maintains that a livable city has those elements that make the people friendly. These elements have been preserved or renewed in order to make those places an integral part of the people living there. Hahlweg (1997) extends the meaning for a livable city to enable people to have a healthy life in the city. There is the chance also for easy mobility – by foot, by bicycle, by public transportation and even by car where there is no other choices. In relation to that, the indicators of healthy cities were developed for better understanding of the city complexity (Lawrence 1997). Meanwhile Salzano (1997) maintains the livable city as a link between the past and the future: the livable city upholds the imprint of history-our heritage, and respects those who are not born yet (our posterity). A livable city then is a city that preserves the signs (the sites, the buildings, the layouts) of history. A livable city reflects also the city that conserves the natural resources for future generations. As a whole, livability allows us to experience ourselves as real persons in the city (Casellati 1997). The most comprehensive definition is provided by Vukan Vuchic (1999) who expresses that the concept should encompass those elements of home, neighborhood, and metropolitan area that all contribute to safety, economic opportunities and welfare,

health, convenience, mobility, and recreation. The adjective livable for a city connotes a desirable quality of life for its citizens - including social activities, attractive public places, provision of a certain level of privacy, as well as a sense of community. The term *livable* is defined even more broadly as encompassing the city's economic soundness, social health, and environmental viability.

The concept of livability does not appear directly in the Malaysian (Bumiputra, Chinese, Indians, others) vocabulary. Perhaps if we search deeper into the Malaysians (all ethnic groups') cultural practices we may find concepts close to it. Thus, Malaysians are generally regarded as being friendly, open hearted, accommodative to strangers, considerate and adaptive to the environment. A livable city for Malaysia may have the following characteristics, which are congeniality- where the city offers a home and living place for all ethnic groups to live mix and work in harmony; attractive to all people; vibrant; healthy; safe without the siege mentality over fear of being attacked; offers spaces of hopes and mechanisms for people to realize their full potential in life; and access to get the basic necessity of life

Urban Metabolism

The concept of urban metabolism was introduced by Wolman (1965), and later elaborated and expanded by Newman and Kenworthy (1999) and Newman (2004). Basically, these writers look at the city as a system, akin to the biological system, in particular the human system, that takes in resources, process them and at the other end the system sends out wastes. The metabolism of the ecosystem has been defined by ecologist as the production and consumption of organic matter; it is typically expressed in terms of energy (Odum 1971). Meanwhile Baccini and Brunner (1991) studies have more broadly included fluxes of nutrients and materials and urban hydrologic cycle. In this broader context, Kennedy et al (2007) define urban metabolism as a sum total of the technical and socioeconomic processes that occur in cities, resulting in growth, production of energy, and elimination of waste. Wolman (1965) viewed the urban environment as an ecosystem and began measuring the 'metabolic' activities. Based on his works, the concept of urban metabolism can be widely used to determine the livability of the study area as well as a vulnerability area. It has a great potential to help planners to understand the problem occurred in the area. Reading slightly deeper into the analogy of the urban metabolism to the human biological metabolism we can expect that the process taking place in the city can produce two expected outcomes; first, a positive outcome when components of the system function well to produce good outcome for the urbanites-hence the livability parts; second, a negative outcome when the components of the city system produce stress and problems-hence the idea of 'vulnerability'. The whole idea is adapted and represented in a diagram (Figure 1) below. The diagram allows for some expressions of the spatial aspect of the urban metabolism. It allows also for the observation of distribution patterns of both events for the livable and vulnerable aspects of the city area.

Using the landscape to represent the city space, the city is well endowed on the whole with both physical infrastructures such as roads, streets and covered monsoon drains as

seen in the well developed neighbourhoods' urban forms and the infrastructures for power and water supply, and social infrastructures such as educational, health and recreational. Governing infrastructures should also be provided to ensure a smooth, transparent and efficient running of the city. These infrastructures facilitate socio-economic activities as shown in the city's production, consumption and links with the hinterland and with other cities. Sub- areas with not only good infrastructures but also with good local participation and support in a working local and public partnership will render the place livable. On the other hand those city sub-areas that have poorly maintained and degraded infrastructures may show-case many localized problems. Such sub-areas are said to be vulnerable local areas. The back-loop for the livable sub-areas goes to the need for continuous maintenance, while for the vulnerable sub-areas require specific attentions. Socio-economic drivers, global and local move the whole urban system.

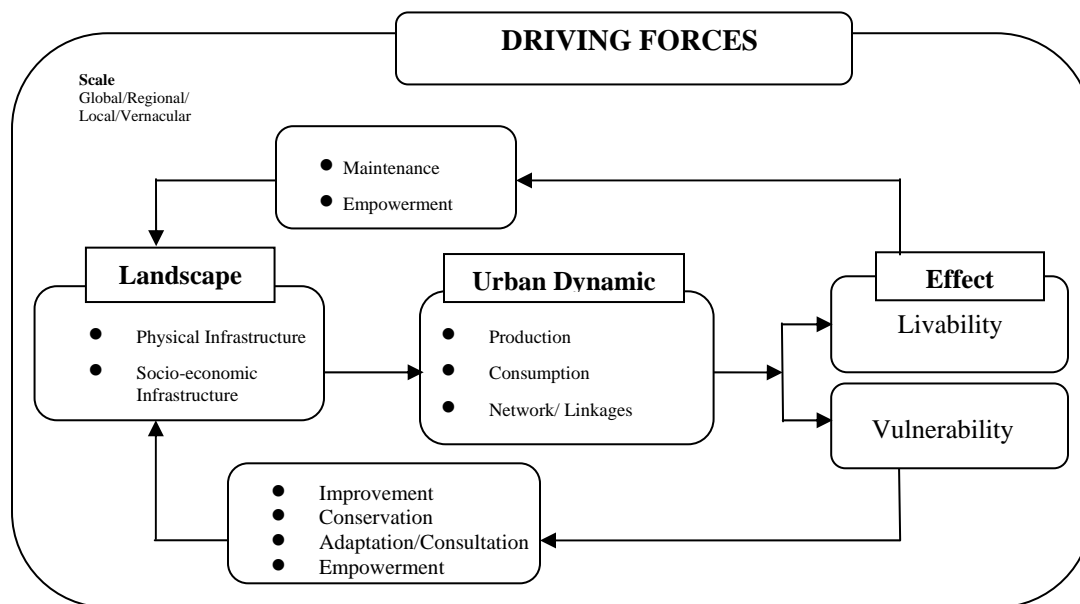


Figure 1: Simplified Model for Spatial Urban Metabolism for Livable City

Data

Data for the analysis are drawn from three sources, namely; a) water consumption by households data were obtained from the Department of Water Supply, Seremban municipality. The Department was generous enough to supply us with a ten year water consumption data by households and by neighborhoods. b) The data on dengue were extracted from the records held in the Health Department, Ministry of Health Seremban branch. The data are listed by neighborhoods for over ten years. c) The crime cases at the Seremban municipality we extracted from records of crimes committed in the city area from Police Department for about 10 years. d) Several field visits were also undertaken to observe the areas with high incidences of crime and dengue cases as well as the full green state of the art housing neighborhoods. With the time series data, the change in the distribution patterns, the spatial direction of change and the linkages in the direction of changes can be grasped.

The Study Area: The Seremban Municipality

The Seremban Municipality is located in the State of Negeri Sembilan in Peninsula Malaysia (Figure 2), and is currently experiencing vibrant economic, social and physical developments. All contribute to the slow but steady modification of the urbanites' life styles that began from pre-industrialised urban Malaysia. Like all other state capitals in Malaysia, Seremban has grown out of its 'sleepy hollow' image of yesteryears. Even the municipal boundaries have changed to accommodate these developments. Seremban is an intermediate city with a total estimated population today around 300,000. Over the last hundred years, the population of Seremban District has increased steadily. In 1891, the number of the total population was less that 3,000 people but increased to 383,530 in the year 2000. The Malays and other Bumiputeras were the majority with 46 percent of the total population. Meanwhile, the Chinese were about 30.6 percent and Indians were 18.5 percent of the population. These figures represent the multi-racial nature of the people of the Seremban District. The number of total population is expected to increase to about 594,000 by the year 2020 (Department of Statistic, Malaysia 2000).

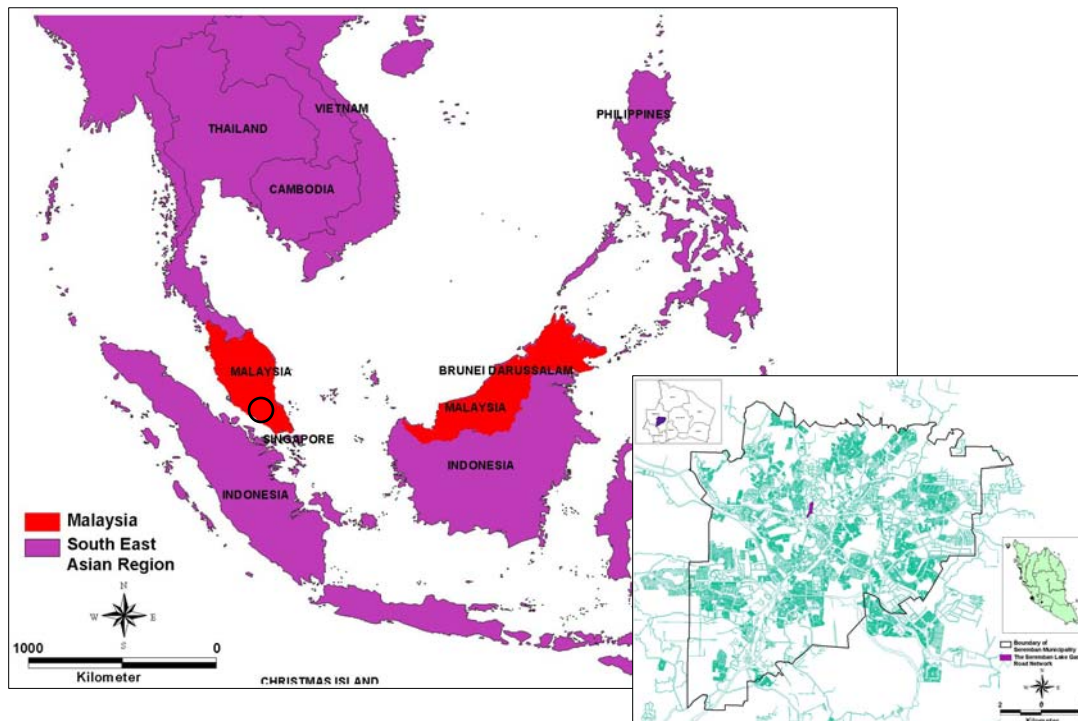


Figure 2: Peninsula Malaysia in the context of South East Asia and Seremban Municipality

Founded by the British colonial administration in the closing years of the 19th century, the Seremban town then served as the capital of Negeri Sembilan State within the Federated Malay States over the 1895-1947 periods until today. For over a century, like any other town with bustling economic activities, it grew in area following adjustments to its administrative boundary that took place in the decades after Independence in the year 1957 to accommodate the demand of jurisdiction over the growing urbanized areas taking place on the urban fringe. Seremban is about 70 kilometers south of the Malaysian

conurbation hub, Kuala Lumpur and the strings of city and towns in the Klang Valley has attracted interests about its sustainability. For decades the municipality has been a commanding southern most commuting boundary of workers to the Klang Valley.

Results of the Study

From the information gathered at the planning section of the municipality, we can assert that the Seremban municipality has been growing outwards from the commercial centre to the periphery in a more complex manner. Until the 1970-s the outward growth had been slow since much of the economic activities in the municipality were medium level retailing and support services despite the availability of good physical and social infrastructures. The people commuted to Kuala Lumpur, about 80 kilometers for high end shopping. Efficient public transport helped commuters. But since the 1970-s the municipality has attracted people to come and stay with the opening of the State to foreign direct investments in line with the opening of Malaysia to international investments. With the establishment of branch foot loose industries by international companies from the West and later on from Taiwan and Korea the municipality began to expand outwards faster. With the establishment of industrial areas in the 1970-s, hypermarkets, more supporting services and recreational facilities moved in along with new housing estates to cater for the new expanding demands. New housing neighborhoods spring up in all directions outwards to the periphery. Expanding with it are new state of the art infrastructures.

The time series data on water consumption can be used as a measure to show the expanding housing neighborhoods to the periphery but for the present paper, the whole dataset had been added into one total figure and the result is shown in Figure 3. The new housing areas have the most-up-to-date housing designs, facilities and communication infrastructures in addition to the existing physical and social infrastructures. In Figure 4 the distribution of current municipality population summarizes the spread of population all over the whole municipality area. The increasing vibrancy of the newer housing neighborhoods continue to attract newer buyers in respond to the calling by the Negeri State government to make Seremban municipality as a place to stay while working in the Klang valley where Kuala Lumpur is.

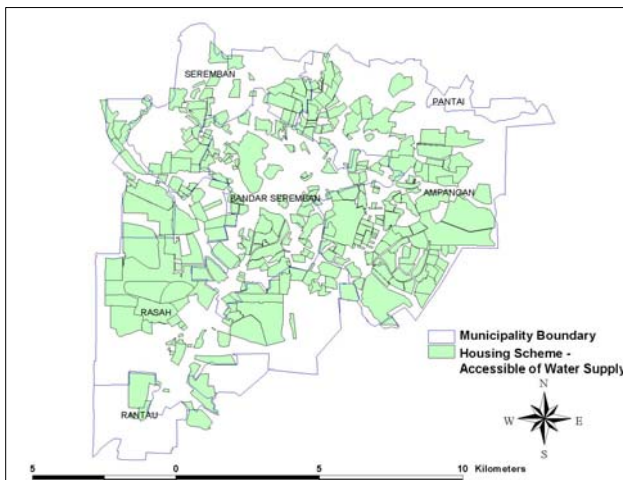


Figure 3: Total Water Consumptions and Housing Scheme in Seremban Municipality Area

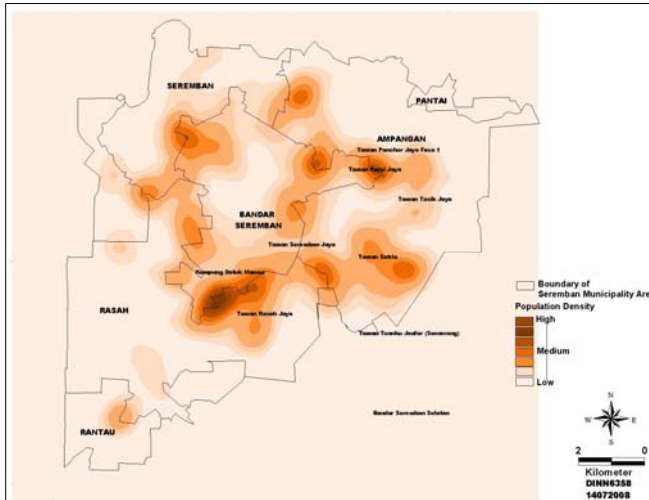


Figure 4: Population Distribution and Density in Seremban Municipality Area, 2000

Thus, the materials from Figure 3 and Figure 4 give some sense of the livability of the municipality.

However, there are sub-areas within the municipality, which can be classified as the vulnerable areas. One such sub-areas are those that have been prone to the dengue disease carried by mosquitoes. From Figure 5, areas with high incidence of the dengue problems seem to be concentrated in the older parts of the municipality. From our field observation the vulnerable areas are not necessarily due to lack of physical infrastructures. We were told by the health authority at the Department of Health, Seremban the ecology of the dengue mosquito carrier is small fresh but stagnant water bodies. Often in those affected sub-areas are people living in bungalow houses with large area and lots of ornamental trees grown in flower pots. Extra water collected at the base from regular watering when remain unchecked deems fertile for the mosquitoes. The spatial analysis of the dengue cases showing the distribution of the dengue cases for the past 10 years (1996-2007) focusing on the Ampangan sub-district area. The number of dengue cases increased yearly with the highest cases recorded in the Taman Paroi Jaya with 226 cases followed by Taman Seremban Jaya with 218 cases. This area is located in the middle class area – based on the income distribution that relates to ornamentation – beautification and embellishment of the area with the planting of flowers. Based on the spatial analysis, the dengue cases were clustered into six areas that showing the vulnerable area. The six clustered namely Taman Ampangan, Taman Paroi Jaya, Taman Seremban Jaya, Taman Senawang Jaya, Taman Rasah Jaya and Taman Satria. These locations have recorded more than 100 dengue cases for the past 10 years.

Thus, it is not that the infrastructures are insufficient in those sub-areas the failures lie with aspects of local area governance in the form of poor local area participation in ensuring mosquito free surroundings. There are sub-areas in some what high density localities that have water logged drains. But the aedes mosquitoes do not thrive in such areas. Other problems often crop up such as flash floods during heavy rains.

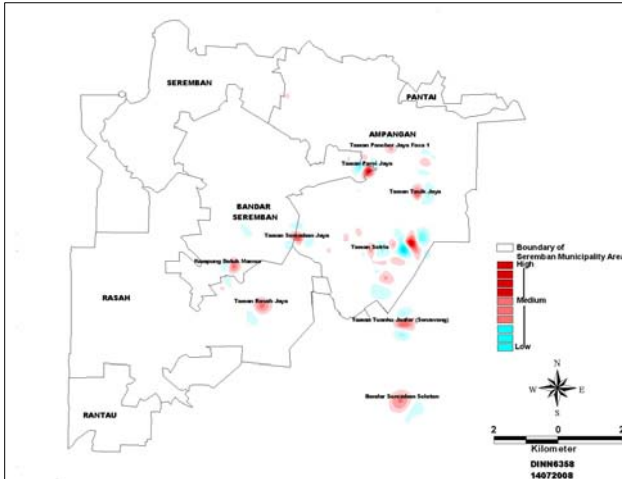


Figure 5: Dengue Distributions in Seremban Municipality Area 1996-2007

Source: Manipulated data by author. Original data from Department of Health, Seremban

Moving on to another example of vulnerable sub-areas in the municipality is the issue of crimes. Despite the increasing livability of the municipality, Seremban is not without crime. The police data show that while the issues are not running out of control the problems have increased in recent years. The bulk of the incidences are small crimes such as petty thefts. But lately, there have been reports of heavy crimes involving in some cases fire arms and murder. From Figure 6, the main concentrations of crimes committed are in the central municipal area, that is the commercial centre and in public spaces where the volume of people can be high at certain time. Pick pockets and hand-bags snatching are the norms.

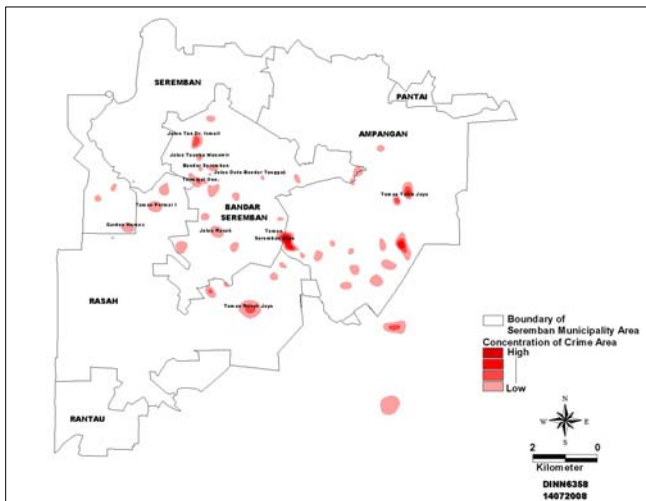


Figure 6: Concentration of Crime in Seremban Municipality Area, 1996 – 2007

Source: Manipulated data by author. Original source from Seremban Police Department

The problems cannot be linked directly to the lack of basic physical and social infrastructures or governance. Other factors have been widely cited and articulated including the increasing number of illegal immigrants, drug addicts and just plain delinquencies among the youths.

Based on crime cases that involved a few types of crime such as robbery, robbery with arm, theft and murder, the distribution and pattern of crime occurs is dispersed but mainly happened in the city centre mostly in the shopping areas and settlement. Taman Seremban Jaya recorded 426 cases, Taman Rasah Jaya recorded 204 cases, Terminal One recorded 145 cases and others Jalan Dato' Bandar Tunggal, Taman Tasik Jaya and Jalan Tunku Munawir recorded 142, 137 and 134 cases respectively. Other areas showing the crime cases recorded were less than 120 cases for the past 10 years.

The crime cases recorded showing the people living in the urban area more vulnerable now and the social infrastructure such as police officers and police station have to work closely with the residents of the areas. Reading the whole results of the study, we can say that Seremban municipality is becoming more vibrant economically, socially, attractive, congenial, healthy although there are negativities.

Conclusion

The fact the Seremban municipality is still relatively small in size with a total population Of around 380 000 in 2008 it has still lots of room for more economic and social development. Since the municipality is about 80 km from the national capital and being efficiently served by good road and rail links the travel time has been shortened to about 45 minutes. The quality physical and social infrastructures are an attraction. More importantly, the municipality is also getting itself wired the broadband thus making it closer to the rest of the world. On the ground, the municipality is about 30 minutes to the Kuala Lumpur International Airport, (KLIA). In sum, the municipality is increasingly vibrant, with its economy growing, relatively safe and healthy, socially congenial and culturally diverse contributing to the attractive colors of Malaysia. The various racial groups continue to sustain their harmonious relations. Together they support the municipal development initiatives for the common good. The municipality is certainly a livable one, as argued earlier.

Yet, like any other city, the municipality is also having a fair share of city problems. As shown earlier the vulnerable sub areas are often areas with some social, cultural and health problems but not directly due to lack of physical, social and governance infrastructures. Some problems lie with the local people themselves to do their fair share of social work such as in the case of the dengue incidences. Others may be due both to internal factors in the municipality and also externalities such as in the rising crime cases. For the latter the municipality has to depend partly on the Federal government to weed out some of the roots of the problems, such as the increasing incidences of drug trafficking and drug abusers, and to curtail illegal immigrants among whom are bad hats in their own countries of origin.

Overall, the use of urban metabolism to organize and analyse the livability and vulnerability of the Seremban municipal space proves useful. Linking it with the availability of physical, social and governance infrastructures helps to identify sub-areas that are vibrant and growing with least problems in contrast to sub-areas that are facing

many issues. The latter sub-areas especially require a more integrated action involving the local people and the municipality in a new partnership.

Acknowledgement

The group of researchers would like to thank the YDP and officers at the Seremban Municipality for the permission to put the municipality under scrutiny for the research on livable city. Special thanks also go to the Department of Water Supply Seremban, the Department of Health Seremban, and the Seremban Police Department for giving us access to some data. Thanks are due to the Ministry of Science, Technology and Innovation (MOSTI) for the Science-fund research project (06-01-02-SF0228); and UKM-GUP-ASPL-07-06-009 without it the study would not have materialized. To the Institute for Environment and Development (LESTARI), thank you for the congenial atmosphere to do research. Above all, UKM has been supportive of all research.

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