Chapter 30
Reimagining the "Peri-Urban" in the Mega-Urban Regions of Southeast Asia

T.G. Mc Gee and I. Shaharudin

The very notion of urban ecology has become multi-scalar, extending from individual urban systems to systems of cities and towns, and from ecosystems within urban settlements to urban settlements as ecosystems, to the way in which cities and towns shape ecosystems beyond as well as within urban boundaries

(Haughton and McGranahan 2006).

Abstract Defining urban spatial expansion, this chapter examines the role of mega urban regions (MURs) in Southeast Asia. These MURs can be regarded as economic integration regions. Globalization is integrating the MURs into global economy. Globalism is embraced at the national level but functions at the local level. Hence, urbanisation is made up of the interaction between national scale, provincial scale, urban scale and individual scale of individuals and households. Urbanisation in the MURs is driven by a complex array of social, economic and political processes.

Keywords Mega-urban areas • Globalism • Global economy • Economic integration • Southeast Asia

30.1 Introduction

This chapter explores the major challenges posed by the spatial expansion of urban areas in Southeast Asia. For the purposes of this presentation we define "urban spatial expansion" as having two general features. First, it refers to the territorial expansion of urban activities outside the cores of urban areas. Secondly urban expansion

T.G. Mc Gee (✉)
University of British Columbia, Vancouver, BC, Canada
e-mail: tmcgee@geog.ubc.ca

I. Shaharudin
Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia

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also includes all the changes that occur in the urban system defined on the basis of population both within urban areas and in the national urban system. An example of changes in the urban system is the ongoing increase in the population and spatial expansion of the secondary cities in the urban hierarchy. This chapter analyses changes in the one component of the urban system in Southeast Asia within the selected Mega Urban Regions (MUR's) of Manila, Jakarta, Bangkok and Kuala Lumpur. For the purposes of this chapter MURs are defined as urban agglomerations of more than five million in size that function as an integrated economic region.

In the contemporary era the interpretation of urban expansion is influenced by the following arguments. Firstly, is the argument that globalisation processes are bringing about the increasing integration of these MURs into the global economy. This is leading to an increasing convergence in governmental policy responses among nations. On the face of it this argument seems strong as governments react to the integration imperatives of the global economy with policies that are designed to create more efficient and productive MURs. This enables them to position these MURs so as to capture income from investment industrial production, improvements in the built environment and higher-order services. For this they need increasingly efficient MURs that can compete with other MURs in the Southeast Asian region. Many of these policies focus on 'investment' in improving the transactional flows of MURs such as transportation systems, digital networks, providing services such as sanitation, energy and the amenity spaces orientated to globally influenced activities.

A second argument emphasises that at the same time of this convergence of urban policy responses local populations located in urban local spaces are adapting, accommodating and resisting to the environmental, economic and social consequences of these globally influenced processes. It is central to the argument of this chapter that this reshaping of urban space driven by globalisation processes should be positioned in a more interactive and local paradigm that emphasises the contextual setting on which these global processes impact. This is because the contemporary processes have different dimensions from the early phases of urbanisation in the developed countries and because the reshaping of urban space is occurring at a much faster rate than in earlier periods of the urban transition in developed countries. In support of this position Marcotullio and Lee have argued with respect to this urban transition that the "…unique feature of the present era is the compression of the time frame in which the transitions are occurring" (Marcotullio and Lee 2003: 331) For example Indonesia achieved a level of urbanisation of almost 50 % in 2010 from 25 % in 1950 in almost half the time that it took England and Wales starting from a similar low level of urbanisation. Marcotullio and Lee further argue that transitions are now overlapping "in a telescoping of the transition process in a much shorter time-frame than earlier." (Ibid. 331).

A third argument is that these telescoping transitions are being driven by accelerated transactional flows of people, commodities, capital and information between, and within, countries. The international components of this transactional revolution are generally referred to as part of a new era of globalisation in which foreign invest-

ment, encouraged by national states, is an important component. Fourthly it is argued that this transition is best seen in a dynamic sense as a process of transformation of national and urban space in which interaction, networks and linkages reflect a new urban reality and permeates both rural and urban areas. This is leading to a rapid change in the conventional polarising between rural and urban space. In contemporary Southeast Asia a network of international, national, regional and local linkages provide a dynamic spatial framework in which flows of people, commodities, information and capital drives both the rural-urban transformation and changes within the urban system.

The acceptance of the reality of "transcending networks" means that the restructuring rural and urban space is occurring simultaneously particularly in the intense transaction networks focused on mega-urban regions and corridors that link the urban system (Martin 2000).

So "globalism" is embraced at the national level but acted on at the local level, In this way the urbanisation process is made up of the interaction between national scale, provincial scale, urban scale and at the individual scale of individuals and households of which they are a part (Kelly 2000). This idea is captured well by Forbes. "Macro-representations of globalisation subsume the internal dynamics of urban development, the subtleties of local politics, the resilience of urban patterns of life, the tensions embedded in fractured social structures, the multiple strands of modernity and the resistance to the imposition to change" (Forbes 1997: 462).

It is therefore important to stress that the urbanisation process as it works its way out in the mega-urban region is driven by a complex array of social, economic and political processes. Rather than simply reflecting the imprint of global capital what we see are processes of both "articulation" with global flows in certain urban spaces and "disarticulation" in others. Thus "global spaces" are intertwined with "local spaces". For example as the mega-urban regions of Southeast Asia urban space has been reconfigured into articulated networks of interaction between middle and upper class dwellers while excluding "much of the intervening or peripheral spaces from accessing networks, because the networks pass through the spaces without allowing local access" (Graham 1997: 112).

Finally it is important to emphasise the importance of the Asia region in the processes of global urban change in the twenty-first century.

For a chapter that is focused on urbanisation in Southeast Asia it is important to recognise that a major part of this global urban increase will occur in Asia. Thus between 2000 and 2030 58 % (1.3 billion) of all global urban population increase will occur in this region most of it in the population giants of China, India, Pakistan, Indonesia and Bangladesh. It might be argued that since Southeast Asia will account for only for 16 % of the Asian urban increase in this period that it is less important at a global level but this does not detract from its importance in the regional and national contexts (UNO 2002, 2008)'.

The chapter is organised into three parts. Part One; The Spatiality of Southeast Asian MURs, Repositioning the Peri-Urban Region. Part Two; The Spatial Analysis of Southeast Asian MURs 1990–2010. Part Three; Policy Challenges of the Urban Expansion of Southeast Asian Cities.

30.2 Part One: The Spatiality of MURs in Southeast Asia, Repositioning the Peri-Urban Region

The understanding of these processes of urban growth described in the introduction has implications for the definitions that are adopted for mega-urban regions and their analysis. This also affects the definition and delineation of the zonal analysis of the growth of population approach most frequently used to analyse population change in mega-urban regions. This conventional analysis using the concept of three zones stretching from the core of the mega-urban region, to an inner ring of increasing urban activity and a outer zone region of mixed urban and rural activity under-estimates the intra-zonal changes that occur within zones particularly as they are affected by the transactional system of mega-urban region (Fig. 30.1).

There are many debates concerning how the term "peri-urban" fits into these zonal models of MUR space (Adel 1999) including an interpretation that focuses on the "peri-urban interface" (Atkinson 1999). In this chapter we have used a broader definition to the zones within the MUR that lie outside the MUR city core. Defining peri-urban in this way thus encompasses what are often described as the peri-urban fringes of the MUR and the inner zone of urban activity that abuts the core of the

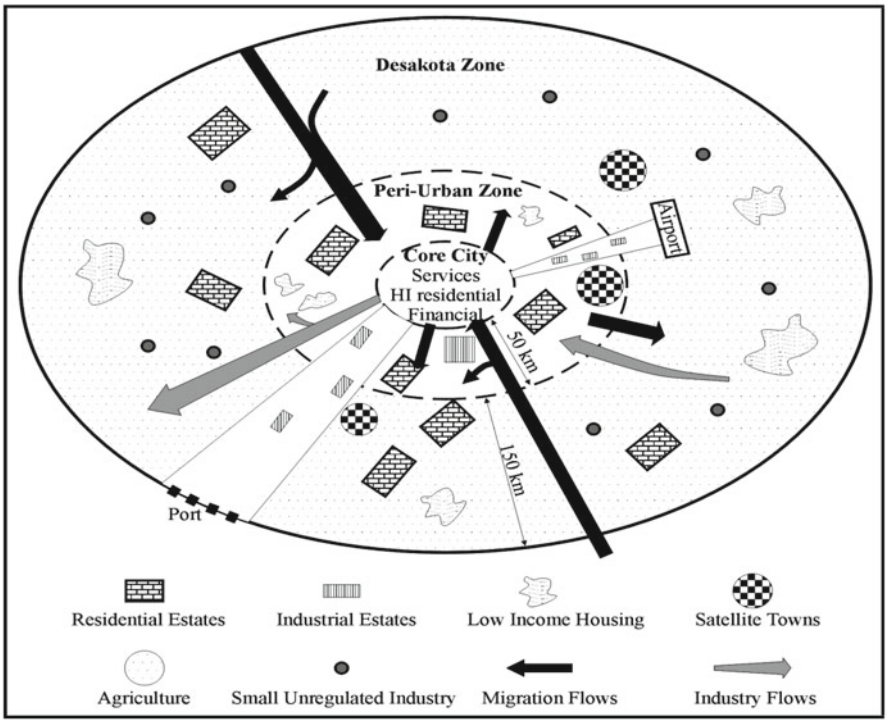

Fig. 30.1 Zonal Model of Southeast Asian Mega-Urban Region C2000

city (Hudallah et al. 2013). The outer zone approximates to an earlier definition of the "desakota" region in Asian mega-urban regions in which urban activity is expanding into rural areas often referred to as the "rural-urban fringe" or "rural-urban interface".

Three points need to be made with respect to this definition. First the idea of "peri-urban" is conceptual. Thus more precise definitions of the peri-urban will have to be worked out in the case of each MUR particularly as the inner zone expands. Secondly implicit in this definition is the idea of the peri-urban as part of the functional space of the MUR. The peri-urban zone plays an important role in the transactional flows of the urban eco-system as well as the information, communication and demographic and economic flows within MURs.

This suggests research on the peri-urban zones of Southeast Asia's mega-urban regions needs constant updating of information that can be fed into policy formation process. For, as we have argued this is an area where the environmental, jurisdictional, social and economic challenges are most marked. It can be further argued that this repositioning of urban policy is made even more urgent because of the vulnerability of many of these mega-urban regions to the effects of global change and fluctuations in the global, energy and food prices.

This emphasis on urban policy needs to be based upon an understanding of the key components of the urban transition in Southeast Asia over the last 50 years.

Firstly most MUR's have expanded outwards very rapidly beyond the limits of the city core but this is also a process that is occurring throughout the urban system at the level of secondary cities. Secondly, the pace of development and features of the peri-urban areas show considerable variation between MURs which reflect the different ecosystems land use practices and urban and national policies of at various scales of government and the level and pace of integration into the global system Thirdly, there are universal driving forces that are leading to the expansion of these peri-urban zones. Perhaps most important is that this expansion has been driven by transport systems that have encouraged the increasing use of auto-centered transport systems including private motor cars and motor bikes. Barter (1999) has shown that while most Southeast Asian countries still have lower vehicle/population ratios than the developed countries their ratios have been increasing rapidly. Most countries have embarked on what may be labelled auto-dependent trajectories which will lead to an increase in the number of motor vehicles over the next 20 years. This development will be further reinforced by the growth of national road systems and ongoing mega-urban based policies of freeway and railway development. What distinguishes these transportation modes from others such as walking is that they require a great deal of space. These transportation activities include "an extensive material infrastructure of roadways, service and repair facilities, storage spaces and an extensive social infrastructure of elaborate bureaucracies" (Freud and Martin 1999). The development strategy of the more rapidly industrialising countries of Southeast Asia is supporting the concept of automobility though the fostering of growth of national automobile industries often in joint ventures with foreign companies.

Another common feature of this expansion has involved these urban "hinterlands" acting as a resource frontier providing, inputs such as water, food, building materials, labour for the urban core and inner ring as well as land to be used for urban activities such as industry, commerce, residential and recreational activities. Atkinson points out that this "functional analysis of cities and their hinterlands focuses attention on resources which is significant as a serious issue in ecological sustainability" (Atkinson 1999).

This urban expansion is also characterised by extensive land conversion that in the Southeast Asian region ranges from state monopoly over the process (Myanmar) to unregulated private sector conversion. In between these two extremes are situations in which the operation of the private sector is regulated and dual land markets operate, as is the case in Vietnam. These land conversion practices lead to rapid changes in land-use from agriculture to non-agricultural activities. They may be described as most intense at the local level where the urban landscapes become increasingly fragmented into a mosaic of different land uses. Particularly in the context of urban expansion where there is an ongoing unregulated growth of urban activity occurring in the rural areas which can take the form of "invisible urbanisation" or "urbanisation by stealth".

This process of urban expansion has also involved an uneven allocation of both government and private capital to different zones in the MURs. The major part of government and private investment has been directed to investments in infrastructure and the built environment that is being constructed to facilitate the growth of industry, residential complexes, new towns, freeways, international airports and container ports. These constructions are designed to integrate the mega-urban region and make it more attractive to global capital. Much of this investment (public and private) is focused on the core cities and inner zones of the mega-urban regions thus causing contradictory processes of greater involvement of the city cores with global transactions and at the same time separating many parts of the urban fringe from this process.

Finally, in the Southeast Asia context this process of expansion varies greatly according to the ecological features, history and political economy of the local region into which the urban expansion is occurring. Broadly we would suggest in the Southeast Asia there are three types of mega-urban regions defined in terms of core hinterland interaction.

Those mega-urban regions in which urban expansion has been primarily into high density rice growing areas characterised by high rural densities such as Bangkok, Manila, Jakarta and Hanoi.

Those mega-urban regions that were expanding into areas where agriculture was more mixed including the production of non-food crops where population densities were much lower. Examples are Kuala Lumpur and Ho Chi- Minh (Mc Gee 1991).

Finally there is the example of the Sijori mega-urban region in which the expansion of the core area has occurred over international boundaries into parts of South Johor (Malaysia) and Batam and Bintang in the Riau Province of Indonesia that ecologically has some similarities to type 2, but has been involved international collaboration.

Thus the creation of peri-urban zones while it is directly associated with processes of urban expansion it is developing in diverse ways and presents a mix of policy challenges that vary from country to country. However the urban fringes still remain places of intense competition for resources and threats to ecosystems. Thus the peri-urban region becomes a significant element of the local-global nexus and the rejigging of regional urban space in which policy interventions are urgently needed (Webster et al. 2003).

30.3 Part Two: The Spatial Analysis of the Mega-Urban Regions of Southeast Asia 1990–2010

It would be incorrect to suggest that the emergence of large urban centres in Southeast Asia is a recent event. Historically Southeast Asia has a long urban history during which large urban settlements emerged from the pre-western period which had different ecological, functional and spatial features. They ranged from low density spread out urban areas such as Angkor in twelfth century Cambodia, to densely populated spatially concentrated cities such as Singapore in the nineteenth century. These large urban centres had extensive trading and cultural interaction with other parts of Asia which increased their populations from the fifteenth century with the large urban centres, such as Malaka, Manila, Batavia, Singapore, Rangoon, Saigon-Cholon and Bangkok that were the urban gateways in the colonial period (McGee 1967; Askew and Logan 1994).

In the post-war period after 1945 the urbanisation patterns began to change radically with the growth of nationalism and the creation of independent states. This period was characterised by the grafting of national administrative functions to most of the primate cities as well as significant structural changes in the temporal shift from agriculture to industry and services.

By 1960 only two countries, Singapore and Brunei, had reached levels of urbanisation similar to that of developed countries and both can be labelled city-states. During this decade the levels of urbanisation in the rest of Southeast Asia remained low as the rural populations continued to grow in size. The economic structures of the cities changed little and the growing influx of rural migrants placed pressures on the existing infrastructure of housing, roads, water and power, many of the migrants moved in to squatter settlements on the fringes or empty spaces of the inner cities and crowded inner tenements. At the same time new housing for the emerging national elites was being built in suburban estates such as Kenny Hill in Kuala Lumpur and Makati City in the Philippines. Residential settlement began to develop in new towns on the outskirts of the cities at this time such as Petaling Jaya in Kuala Lumpur and Kebayoran Baru on the edge of the cities at that time.

This pattern began to change radically in the period between 1960 and 2000 and the levels of urbanisation exhibited sharp variations that reflected different trajectories of urbanisation. There were three main conditions that contributed to these

developments. First the geo-political conditions of Southeast Asia where the intensification of the Cold War established clear lines between the socialist states of the region (Vietnam, Laos,) and the states of Cambodia and Myanmar and the remaining capitalist states; Singapore, Thailand, Malaysia, the Philippines, Indonesia and Brunei.

A second factor was the growth of foreign investment as the developed economies began to accelerate the restructuring of their economies from the 1970s. Singapore, the Philippines, Malaysia, Thailand and Indonesia became important sites for foreign investment in industrial activity either for internal consumption or export. This process led to an acceleration of manufacturing and higher order services focused on the major mega-urban regions which accelerated urban expansion. This process was characterised by the creation of industrial estates, free-export zones, air and container ports and other infrastructure facilities focused on the main mega-urban regions of these countries. Increased income also created consumer demand for housing increasingly in low-density housing estates in the peri-urban regions.

The consequence of these trends was to produce a threefold pattern of urbanisation in Southeast Asia in the late 1980s (Mc Gee and Robinson 1995; Mc Gee 1997). First, Singapore emerged as the regional centre as the Singapore government embarked upon on an ambitious programme to make their country the first post-industrial city in the region. Labor-intensive industry was rapidly restructured and moved offshore to South Johor in Malaysia and Batam Island in the Riau province of Indonesia in a project designed to create a regional growth triangle utilising the economic advantages of the different parts of the triangle such as cheaper labour, capital availability and technology (Macleod and Mc Gee 1996).

Thus by 1990 the processes of urbanisation and economic development were beginning to create the conditions for an accelerated movement of many of the mega-urban regions of Southeast Asia towards increasing global integration particularly reflected in the creation of new "globally-orientated spaces" such as tourist zones, export zones, multiple commercial centres and middle class housing estates. In the cores structural changes occurred as space for the growth of tertiary services such as finance increased which led to urban renewal and high rise building booms. These internal transactional environment of these mega-urban regions began to change and were increasingly linked by road systems responding to the fact that these mega-urban regions were becoming increasing auto-dependent. These developments fuelled a rapid expansion into peri-urban zones throughout the urban hierarchy but particularly in the mega urban regions (Kelly and McGee 2003; Mc Gee 2011).

Many of these processes which have been identified in the preceding paragraph continued and intensified into the 1990s and the first decade of the twenty-first century. A major feature has been the accelerated incorporation of capital flows into the region primarily into equity markets, financial institutions, manufacturing industries and property sectors focused on the mega-urban regions. At a policy level this encouraged effort by national and city governments to market their cities as sites for

international investment. This encouraged a major part of infrastructure investment in the MURs resulting in public investment disproportionately concentrated in these regions. However, one of the more important consequences of this global integration has been the exposure of Southeast Asian countries to the volatility of global financial and commodity markets. The 1997 collapse of equity markets slowed down many of these trends particularly in the property market. Secondly as the financial crisis deepened it opened up long-standing discontent with the existing governments among the poor, the students and even the middle class. In Indonesia it created the conditions that led to the collapse of the Suharto government in 1998 and added further elements of volatility (Mc Gee and Scott 2001). But the first decade of the twenty-first century has seen a rapid economic recovery in the region particularly in the more rapidly developing countries of the Malaysia, Indonesia, Thailand and the Philippines. This has accelerated the pace of urbanisation particularly in the MUR's of Manila, Kuala Lumpur, Bangkok and Jakarta. Some indication of the dimensions of this increase are shown by the fact three of the selected MURs in Southeast Asia were ranked as the 2nd (Jakarta) 6th (Manila) and 19th (Bangkok) of the 30 mega-urban regions in the world over a population of 10,000,000. Kuala Lumpur is ranked as 49th in the list of more than 500 agglomerations over 100,000 population in size. This trend emphasises the importance of Southeast Asia particularly in relation to its proportion of total population within Asia.

These have led to significant changes in the urban form and internal population distribution of the leading Southeast Asian mega-urban regions listed above. In order to establish the importance of MURs in the Southeast Asian context we will focus on the demographic aspects of their growth that involves constructing a longitudinal picture of their demographic growth focused on the four selected MURs of Kuala Lumpur, Manila, Jakarta and Bangkok.

We conclude this discussion of the general features of the growth of mega-urban regions with a summary of the preliminary findings with respect to demographic changes over the last 20 years drawn from data based on data analysis of the 1990, 2000 and 2010 censuses in Jones and Douglass (2008). For Kuala Lumpur see Rostan (2006, 2010, 2011).

This analysis is divided into two parts using population data organised on the basis of (a) spatial zones and (b) the urban system of the mega-urban region.

30.3.1 Zonal Analysis of Population Change in Selected Southeast Asian Mega-Urban Region 1990–2010

The major findings of this zonal analysis are shown in discussion below.

(i) Eleven of the selected MURs increased their populations in the decades between 1990 and 2010. The increase is most marked in the period 2000–2010

when all the selected cities increased the size of their population at rates above 25 % for the decade. Jakarta and Kuala Lumpur had the most rapid increase. The MURs continued to hold their share of their country's population in the two decades between 1990 and 2010 except in the case of Manila.

This reinforces Jones comments on the earlier decade that "contrary to the conclusions reached by some observers who have used the population of the officially designated metropolitan area to conclude that many mega-cities have passed their period of rapid growth and are holding a declining share of national population".

(ii) With respect to density there is a sharp difference between the two high density mega-urban regions of Manila and Jakarta and the lower density mega-urban regions of Bangkok and Kuala Lumpur. Kuala Lumpur has a significantly lower density of population than the other three mega-urban regions.

(iii) The zonal analysis shows that all the four Southeast Asian MURSs have experienced a slowing of population growth in the core areas but still retain a significant proportion of the population of their MUR. In general the rates of increase in the inner zones and the proportion of their population in their MURs have increased as the built-up environment has extended from the core zones. Part of this increase is the consequence of the restructuring of urban cores that has led to out-migration of population and industry to the inner and outer zones. The outer zones have continued to grow at a faster rate with the exception of Jakarta where they have the lowest proportion of population in the four MURs outer zones from outside the MUR. From the point of view of the central arguments of this chapter the most important findings are that the analysis shows the core and inner zones of these MURs while experiencing slower rates of increase have still increased their population size while declining in their population share of the MUR population. Secondly the inner zones have been responsible for absorbing the largest growth of population in Kuala Lumpur unlike the other MUR's. If the core and inner zones are combined then the regions have shown an increased share of the population suggesting that the four Southeast Asian mega-urban regions are exhibiting ongoing "centrality" of the core and inner zones in the mega-urban regions.

(iv) However, in all mega-urban regions and particularly in Jakarta the outer zones are increasing their population and if present trends continue they will attract more population as these mega-urban regions continue to grow. The implications of this analysis suggests the future of mega-urban regions will involve a continuation of the thickening-up of population in core and inner zone areas but that the outer zones will attract a considerable proportion of the increase of population in the MURs over the next decades (Mc Gee 2011).

30.3.2 The Changing Urban System of Jakarta and Kuala Lumpur 2000–2010

This section uses census data analysed on the basis of the administrative units and presents data for the decade 2000–2010 in the MURs of Jakarta and Kuala Lumpur (KL). This analysis enables a probing of the urban system that is emerging at the intra-mega-urban region and presents different spatial ordering of the population data analysed zonally in the preceding section. In the case of the Jakarta MUR the kabupatens that form the hinterland of Jakarta core are separated from their urban centres (regencies/kotas) of Bekasi, Tangerang (North and South) and Bogor in the Jakarta MUR. In the KL MUR there has been a rapid expansion of urban activity in surrounding areas creating areas of mixed rural and urban activity that we have labelled urban clusters. The main urban concentrations represented by the Federal Territories of Kuala Lumpur and Putra Jaya, and other Municipalities and Cities that have the status of Local Administrative Areas have expanded their urban areas boundaries to accommodate almost 90 % of the population of the KLMU.

In both the Jakarta and Kuala Lumpur MURS this administrative difference between Kota and LAA reflects contrasting administrative approaches to the challenges of urban expansion. In the Kuala Lumpur MUR case the challenges of urban expansion are led at the Federal Level with the overall development of the main communication systems, major infrastructure investment, e.g. water systems, the broad environmental policies and social and other investment. The State is responsible for much of the local level service and local level administration through the governance of appointed Councils. Finally at the local level there is a threefold layering of administrative territories. Firstly Local Administrative areas that "usually include consolidation of towns and gazetted administrative areas" (Malaysian Census 2010: 402) that have been taken over by cities and municipalities that have expanded their responsibilities to include parts of the districts in which they have located. In the case of Indonesia the administrative structure is at the local level consisting of special status cities such as Jakarta and Kabupatens which are further divided into kota (urban areas) and non urban areas which are administered by the kabupatens.

The results of this analysis indicate two main trends:-

(i) The core areas of K.L and Jakarta MURs are the central hubs of the MURs increasing their population over the last 20 years although decreasing their proportion of the total MUR population.
(ii) In the case of both the Kuala Lumpur and Jakarta MURs a polycentric urban system is emerging based on the urban clusters centered on secondary cities. In the outer zone of Bogor in the case of the Jakarta MUR and Seremban and Sepang in the KL MUR are the only urban clusters The largest urban clusters are located in the inner ring that makes up a rapidly urbanising inner zone of the wider peri-urban region of Kuala Lumpur and Jakarta MURs stretching along the main north-south and east-west highways. In both MURs these urban

clusters are forming an urban network that is being linked by road and rail connections and developing some functional differentiation particularly between the core and the surrounding LAAs (Firman 2011).

30.4 Part Three: Policy Challenges of the Urban Expansion of Southeast Asian MURs

The implications of this research into the emerging spatial patterns of Southeast Asia MURs indicate that there are many policy challenges that have to be faced.

Firstly new systems of data collection are needed that can measure the impact of changes that are occurring in MURs at different territorial scales within the MURs. These will involve spatial measures of population change as our main approach but it must be recognised that it is only one of many measures that could be used. Other approaches include the analysis of migration, employment. land use, population change flows of people, information, capital and satellite imagery (Sui and Zeng 2001).

Secondly the analysis using the concept of "urban clusters" in the Jakarta and Kuala Lumpur MURs raises questions concerning an approach that only uses zonal analysis defined in relation to the spatial positioning to the core of the mega-urban region. Using the urban cluster approach suggests that there is a formation of an incipient poly-nucleated urban system that exhibits increasing differentiation between these urban clusters in terms of economic activity, commuter patterns and labour force formation. While further research is necessary it suggests that the analysis using urban concentric zones is becoming less suitable for studying the evolving urban form as the population is increasingly living in clusters of urbanising space where these urban nodes are surrounded by a growth of urban activities including industrial and residential estates and smaller scale industry and residential settlement which we have labelled "urban clusters" (Choe and Laquian 2008).

Thirdly these spatial developments suggest that the concept of mega-urban regions as transactional environments that are driving the creation of a network of multiple urban clusters is important to the understanding that is important for formulation of urban policies. These urban clusters spread outwards from the urban core forming secondary urban clusters creating a pattern of highly mixed urban activity that presents its own challenges to urban management, transportation systems, the environment, the provision of physical infrastructure and social services. This means that debates about urban sprawl are sidetracking more research into the new urban systems that are directly influenced by the changing transactional environment.

Fourthly, the implications of these findings are important to policy debates concerning urbanisation in Southeast Asia and particularly for peri-urban regions. Increasingly evidence supports the view that MURs should be regarded as crucial areas for policy formation because of their economic importance and the challenges

they pose to sustainability and liveability. An understanding of these needs is necessary because it is the mega-urban regions and particularly peri-urban regions that will be the focus of most urban-orientated growth absorbing a large portion of all urban increases over the next decades. At the same time there is restructuring in urban cores and inner zones creating a more densely populated and expanded built-up environment which is experiencing increasing prices of land and housing that encourages decentralisation of office services, industry and residential housing. These developments will pose challenges because the increasing integration to the global economy is creating an economic environment in which more investment is directed to the core and inner zones thus creating fiscal imbalances between the core and inner zones and outer peri-urban zones (Mc Gee 2008).

The policy solutions for these latter regions are not easy for many Southeast Asia mega-urban regions that are governed by several layers of national, provincial and local government which is often highly fragmented. Sub-regional variations in the eco-systems, densities and urban morphology thus create great difficulty for policy makers. These developments create a complex managerial environment in which a myriad of decisions at the local level come into conflict with the transformative elements of higher level government, and firm decisions, often resulting in a decisional congestion of management in these outer zones. This is exacerbated by the mixed urban developments that occur as outwards expansion in urban clusters as the MURs expand.

This will involve rethinking the governance and management systems of MURs to reflect the inevitability of the ongoing expansion of these mega-urban regions (Asian Development Bank 2008) and particularly the growth of urban clusters that leads to policy responses that recognise the growing diversity of MURs.

Fifthly, as part of these institutional changes the management of these mega-urban regions need to be directed to ensuring liveability and sustainability. Rapid mega-urban growth poses environmental challenges particularly where national environmental policies that operate at the various levels of government inhibit reducing the environmental impact of rapid urbanisation. Many of the policies that are being adopted at present are too broad to effectively cope with the diversity of urban eco-systems. There are also ongoing tensions between the requirements of development and eco-system protection. One way to respond to these challenges is to build the concept of the "spatiality of eco-systems" into the policy process that will lead to recognition of the importance of peri-urban regions to the sustainability of MURs.

This is particularly significant in the delivery of services such as water provision, public transportation, public and private utilities including sewerage and power, housing and social services including education and health. This is challenging in the less densely populated zones and peri-urban zones of Southeast Asian mega-urban regions that have mixed land-use, much lower incomes and both environmental and health challenges. The cost of installation is extremely expensive. An alternative approach would be to introduce "eco-services" which would be make greater use of the ecological infrastructure of urban agriculture, water systems wetlands and urban forests that are present in the peri-urban zones that can reduce the

costs of engineered large scale service provision. In a broader approach the encouragement of local level community associations to manage the ecological infrastructure could create employment and reduce the costs of services by macro-level engineered solutions (De Groot et al. 2005). This mega-urban visioning does not exclude the possibility of city region, public-private partnerships, and government-civil society coalitions being formed but the privatisation of services such as water has proven very difficult.

There must be a commitment to the preservation of the eco-systems of which these MURs are a part. In this discussion we want to emphasise first that the local features of the eco-system must be taken into account particularly in Southeast Asia where the diversity of mega-urban eco-systems demands locally- derived responses. The policy implications of regarding the MURs as an integral part of national eco-systems does demand acceptance of the idea of extended eco-systems that reach far beyond urban boundaries. This vision of ecosystems sees large urban places functioning as partial ecosystems that are generally supported by biophysical resources from peri-urban regions beyond their administrative boundaries. Generally these mega-urban regions, because they are significant users of energy, material transformation and consumption are more demanding of local and non-local energy systems than non-urban places.

These demands that the mega-urban regions place upon peri-urban often affect the quality of air, the availability of water, the production of local food, waste disposal and other aspects of the ambient environment and are well documented in the Southeast Asian context.

The crucial part of this approach is to recognise not only the importance of protecting eco-systems as part of policy but to build the concept of "spatiality" into the policy process. In 1995 McGee and Robinson had argued that the central imperative for the large mega-urban regions of Southeast Asia was the need to create a response at a regional level that was discussed earlier in this section. But in the decade since this argument was presented the idea that regional planning can provide some rational response to the policy requirements of MURs has become less popular as neo-liberal thinking has developed an agenda of deregulation, privatisation and decentralisation. These neo-liberal ideas have become part of the policy agenda of developing Southeast Asian counties and often made the prerequisite of loans by international agencies. In some cases these agendas clash with the top-down agendas of the states of Southeast Asia and there is a fragmentation of policy responses particularly in the peri-urban areas of the mega-urban regions of Southeast Asia. Thus policy solutions for the mega-urban regions of Southeast Asia will need some way to combine regional vision that is needed to preserve the ecosystems and sub-regional intervention particularly in the peri-urban zones which are contingent on solutions at the local level (Shaharudin et al. 2011).

As various policies are introduced for mega-urban regions it is important to respond to the issues of vulnerability that are being created by global warming (De Sherbinin et al. 2007) and what seems to be increasing volatility in the prices of fossil fuel and food that have major effects on large urban areas. As we have already indicated the mega-urban regions of Southeast Asia have been shaped by the ready

access to fossil fuel as the major source of transportation and are becoming increasingly dependent on imported food. Many are also located on low lying coastal plains that could be vulnerable to projected sea-level rises that is likely to affect the cores cities much more than the urban fringes. The effects of such developments have already begun to be seen in riots that occurred in Jakarta as a result of increasing oil prices but they have the potential to create even greater social discontent and as the competition for scarce resources increases. One policy response being advocated in developed countries is to plan for higher density cores (compact cities) that that penalise the use of the automobile and develop public transport systems. But in the Southeast Asian context many of the mega-urban regions already have high-density cores that are well in excess of western cities (where the idea has developed most traction) so that the possibilities for this type of policy response are limited. Another response might be the capture of "land value" in peri-urban areas as land use is changed from urban to rural (Angel 2011; Angel et al. 2012). This captured capital could then be used to fund the preservation of the local ecosystem and ecosystem services. Other responses could involve efforts to increase the use of alternative energy sources, water conservation and public transportation. Although many planners do not regard it as a viable policy another approach would be to increase the production of food for these mega-urban regions in the peripheral areas. At least in the case of the densely populated rice growing hinterlands of Manila, Jakarta and Bangkok this would be a return to a historical relationship between these cities and their hinterland that has existed for centuries. But it would also involve a sustained investment in the peri-urban regions that at present is in conflict with the priorities of creating internationally competitive urban regions. Obviously these policies will have to be embedded in the local context of each mega-urban region but they should contain the following components:

1. effectiveness in contributing to economic growth;
2. effectiveness in contributing to local and global sustainability;
3. effectiveness in promoting eco-systems approach;
4. effectiveness in contributing to social inclusion, increasing employment and reducing urban poverty; and
5. effectiveness in producing a liveable environment by increasing the provision of services such as health, education, access to housing and, care for the aged.

30.5 Conclusion

In this chapter we have tried to present the major challenges that the current growth of the peri-urban regions Southeast Asia pose for the future sustainability of Southeast Asian societies. We have been concerned to emphasise the challenges that are posed by the recent evolution of the large mega-urban regions, the importance of using a multi-scalar approach to the analysis of the processes that have created them and from the perspective of this chapter the need to spatially deconstruct the

internal spatial features of these regions. The task ahead, then, is to incorporate these ideas into planning for the future so as to ensure that the changing spaces of the mega-urban regions of Southeast Asia are liveable and sustainable. To return to the introductory quote of this paper most solutions to the challenges of mega-urbanisation will have to be based on the policies that place emphasis on the importance of the eco-system (Curtis 2004) as well as adopting a multi scalar approach and "reimagining" the concept of urban expansion.

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