

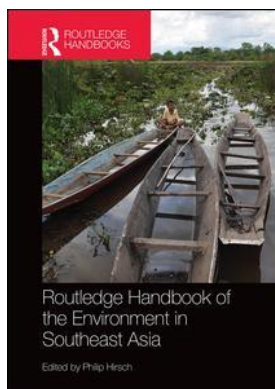
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Philip Hirsch

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Edsel E. Sajor

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PERI-URBANIZATION
AND ENVIRONMENTAL ISSUES
IN MEGA-URBAN REGIONS*Edsel E. Sajor***Introduction**

One clear pattern, and a major component of rapid urbanization unfolding in middle-income developing countries in the Southeast Asian region, is the development of particular mega-urban regions whose larger parts comprise peri-urban landscapes surrounding traditional city cores. Often regarded as transition zones, these areas are today host to environmental problems that are in many ways distinct from those that are typically found in the city centre or in more remote rural hinterlands. Their characteristics and dynamics are distinct in two senses: first, they constitute a set or chain of environmental outcomes directly resulting from, or linked to, transitional changes and the mixing of urban and rural resource uses; second, they structure a large gap and inequality in basic urban environmental liveability between the peri-urban area and the urban region city core.

This chapter characterizes and analyses the nature and dynamics of environmental problems and issues in the peri-urban areas of major mega-urban regions in four middle-income developing countries of Southeast Asia: the Jakarta metropolitan area in Indonesia, the Manila extended metropolitan region in the Philippines, the Bangkok metropolitan region in Thailand and the Ho Chi Minh extended metropolitan area in Vietnam. In studying environmental problems and issues associated with peri-urbanization, this author has focused on wide swathes of land extending from and surrounding the core city of these mega-urban regions:¹ areas which sometimes may extend as far as 150 kilometres from the region's city core. This is not to claim, though, that conditions at the fringe of smaller city centres and towns in developing countries of Southeast Asia are of lesser significance and do not exhibit similarities to the peri-urban environment of these mega-urban regions. The particular geographic focus adopted here is in consideration of the fact that present-day development of these particular mega-urban regions has thus far been most dramatic, rapid and a major highlight of the Southeast Asian region's own urbanization.

The chapter first presents a conceptual review of peri-urbanization and mega-urban regions of Southeast Asia. This is followed by a discussion of environmental problems, impacts and issues, and presentation of selected empirical cases. This section is divided into four topics: (1) land-use change and impacts; (2) water resource use change and impacts; (3) erosion of pre-existing ecological functions; and (4) deprivation in urban environmental liveability in the peri-urban areas.

A section discussing relevant institutional issues and context then follows. The conclusion highlights the most important issues, challenges and prospects related to environment and peri-urbanization in these mega-urban regions.

Peri-urbanization and mega-urban regions of Southeast Asia

Middle-income developing countries in Southeast Asia – notably Indonesia, the Philippines, Thailand and Vietnam – have in recent decades been undergoing massive peri-urbanization. Several scholars have attempted to study this as a distinct experience of urbanization in the region, which is based partly on the merger of the urban and rural sectors. It has been defined as often a piecemeal process of physical, economic and social transformation of rural areas located at the outskirts of established cities, resulting in their becoming more urban in character (Simon, 2008; Webster and Muller, 2004; Sien and Perry, 2003). In these countries, the process closely overlaps with the growth of extended metropolitan regions (EMRs) (McGee, 2003; Kelly and McGee, 2003; Smith, 2001; McGee, 1991; McGee and Greenberg, 1992).

As a process and outcome respectively, peri-urbanization and major mega-urban regions today are a departure from the key features of earlier urbanization in Southeast Asia. During colonial times and the post-war period up to the 1960s, principal cities of the region assumed a largely political role and served as symbols of progress of newly independent countries, and of affluence of the nation's urban elite (Guinness, 2003). Simultaneously, these urban capitals became populated by streams of rural migrants who flocked to the city for jobs in the expanding army and government services, as well as in the new industries cropping up in the core area (Kelly and McGee, 2003). Present-day mega-urban regions also differ from Southeast Asian capital cities of the subsequent period of the 1960s up to the 1980s, which are characterized as being in a state of flux – where new central business districts, together with industrial estates and suburban residential subdivisions, were created, and the older built environment of low-rise housing in ethnically distinct neighbourhoods also became transformed.

The current peri-urbanization in Southeast Asia is not a simple densification of the urban periphery or the progressive outward suburban growth that had generally characterized the growth of cities in the aforementioned earlier periods. Rather, it is a region-scale pattern of urbanization that forms an extended metropolitan zone (Kelly and McGee, 2003, p. 273). This unplanned development, defined by a juxtaposition of the larger city core areas with heavily populated intensive agricultural regions, has generated a mixture of agricultural and non-agricultural resource use activities and a marked heterogeneity of land use, blurring the widely accepted conventional notion of the spatial separation of rural and urban activities. While the peri-urban is a zone of transition, particularly in Southeast Asia, transformation is played out in a widening region of physical space under very weak regulation and guidance systems. As a result, a semi-equilibrium state that is neither totally urban nor still rural continues to dominate the landscape, for decades in many cases (Webster and Muller, 2004). This feature is compatible with the concept of the peri-urban interface as a distinct ecological and socio-economic system under certain institutional arrangements (Allen, 2006, p. 32).

In the past 20 years, urban demographic growth has been highest and concentrated in the fringe areas of the four middle-income developing countries' principal city cores. Extrapolating Jones's (2008) population data and estimates for 1990 and 2000, the core populations of Jakarta, Bangkok, Manila and Ho Chi Minh City had decennial growth rates of 1.5 per cent, 7.9 per cent, 24.9 per cent and 38 per cent respectively. On the other hand, the growth rates of the inner and outer zones (that is, non-core areas) during the same period were higher: Jakarta, 44.6 per cent;

Bangkok, 42.4 per cent; Manila, 46.6 per cent; Ho Chi Minh City, 14.3 per cent. During this period, only Ho Chi Minh City deviated from the pattern. This could be partly explained by Vietnam's historically late linkage to globalization, and also by the late lifting of its population mobility restriction system, which was only officially done in the Doi Moi period starting in the mid-1980s. Updated (2010) data from new sources (Brinkhoff, 2010a; 2010b; NSO Thailand, 2010) show that the general trend of faster growth rate is continuing in Jakarta (core, 0.3 per cent; outer areas, 4.1 per cent), Bangkok (core, 2.6 per cent; outer areas, 5 per cent) and Manila (core, 1.8 per cent; outer areas, 3.0 per cent). The demographic trend of the previous decade in Ho Chi Minh City had also shifted and had been following the pattern of the urban regions of its neighbouring countries. Its annual growth rate during the period 2000–2005 was 1.3 per cent in the inner core, while its newly developed urban districts and peri-urban districts grew at an average of 5.9 per cent (GSO Vietnam, 2009).

A number of scholars have attributed the development of this distinct urban form to the effects of globalizing forces such as foreign direct investment operating in partnership with domestic capital in export-oriented manufacturing and high-end residential, commercial and leisure projects in the context of highly liberalized and supportive national policies (Goldblum and Wong, 2000; Marcotullio, 2003; Kelly and McGee, 2003). Other major drivers of South-east Asian peri-urbanization that have been identified are the availability of relatively inexpensive labour both in situ (that is, in rural areas enveloped by peri-urbanization) and through in-migrants from poorer regions of the country (and from neighbouring countries, in the case of Bangkok), and public policy supporting the dispersal of manufacturing away from the core (often justified in terms of regional development objectives) and the relocation of slum settlements out of the city centre (Webster and Muller, 2004).

Peri-urban development – especially its driving forces and form – has been studied in major mega-urban regions in several countries of Southeast Asia: in the Bangkok metropolitan region in Thailand (Jongkroy, 2009; Hirsch, 2009; Webster and Muller, 2004; Askew, 2003; Parnwell and Wongsuphasawat, 1997), in the metropolitan regions of Hanoi and Ho Chi Minh City in Vietnam (Drakakis-Smith and Kilgour, 2001; Smith, 2001), in the Calabarzon provinces included in the extended metropolitan Manila area in the Philippines (Webster and Muller, 2004; F. P. Kelly, 1999; P. Kelly, 1998) and in the Jakarta extended metropolitan area (Rakodi and Firman, 2009; Firman, 2009; 2000). While there are country particularities in principal driving forces and forms, often influenced by particular histories of urbanization and local geographic specificities, basic characterization of this region-wide peri-urban development and dynamics remains common and valid for each of the four countries.

Environmental problems, impacts, and issues

Environmental problems and issues generated by the intensification and widening of urban–rural linkages have been highlighted and conceptualized by a number of studies that have taken as their points of reference peri-urban development in various parts of the globe (see, for example, Simon, 2008; Douglas, 2006; Hardoy *et al.*, 2001). In understanding the nature of environmental problems in the peri-urban, it is useful to characterize it as a mosaic of ‘natural’ ecosystems, ‘agro-ecosystems’ and ‘urban’ ecosystems that are altered and affected by flows of materials and energy and interactions between the rural and urban sectors and users (Allen, 2006). Intense and constant interactions between these systems and components, and their associated major stakeholder groups, often generate incompatibilities, tensions and conflicts, which are aggravated and remain unresolved under conditions of weak institutional mechanisms to regulate or to negotiate solutions. McGee (2003) argues that in mega-urban

regions, city–hinterland relationships in the domain of the environment and natural resources have become not only more spatially extended but also more intense at the local level. Their severity is never predetermined because local factors are extremely important and predominate in the peri-urban (McGranahan *et al.*, 2004). These are played out especially in the domains of land cover and land use, as well as water resources and their associated ecosystem functions. An equally important domain where changes are played out is in the system of urban environmental services and infrastructures that determine the quality of urban environmental liveability. These services and expectations of environmental liveability are now considered essential also to rural settlements and population that have more recently become ‘urbanized’.

Similar to other places in the world, Southeast Asia’s own peri-urbanization, and the development of mega-urban regions in middle-income countries, have been accompanied by the abovementioned environmental problems and issues. However, the pace and scale of Southeast Asian peri-urbanization, especially the rapid development of extended metropolitan regions in middle-income countries, is notably higher. Thus, the occurrence of conflicts and the drawing of sharper lines of differentiation between the urban core and outer zone seem to be more dramatic and massive than is the case elsewhere.

Taking the notion that the ecology of the peri-urban is a mosaic of ‘natural’, ‘agro’ and ‘urban’ built ecosystems as a starting point, one can thus identify two types of transformations defining ongoing environmental change in the peri-urban of Southeast Asia. The first arises from the physical transformation of pre-existing ‘natural’ and/or ‘agricultural’ ecological systems as these are transformed to be part of the urban landscape or as their resources become shifted to urban uses. Here we see the process of urbanization of nature and agricultural resources as an accompanying component of peri-urbanization. The second is the constitution of new urban environmental basic needs of populations and settlements in the outer zone, as they become increasingly urbanized, and their corollary marginalization due to huge deficits in built environmental infrastructure and the system of provisioning. The latter structures sharp and serious differentiation and environmental liveability between the core city and the outer areas of the extended metropolitan region, resulting in the latter’s deprivation.

The abovementioned issues are empirically illustrated in the following selected examples in the Jakarta, Bangkok, Manila and Ho Chi Minh City extended metropolitan areas.

Changes in land use and impacts

A most visible trend in major extended metropolitan regions in Southeast Asia in the past three decades is the rise of residential and industrial estates and leisure facilities in their outer areas. This outward-bound siting of industries and settlements causes extensive land conversion of prime agricultural lands into urban uses. For instance, in the southern fringe of Jakarta City, land-use data in Bogor–Puncak–Cianjur show that during the period 1994–2001, the area of primary forest, paddy field, garden and estates declined by nearly 8,000 hectares, comprising half of the total area (Firman, 2009). In the early 2000s alone, there were about 25 new town developments in the property sector in the Jakarta metropolitan region, ranging from 500 to 6,000 hectares in size. A similar trend has been occurring in the northern fringe 30 kilometres from Bangkok City, called the Rangsit Field, which comprises ten municipalities (of the total of 13 municipalities of Pathumthani province). The aggregate proportion of agricultural land here diminished from 75 per cent to 61 per cent from 1980 to 2000. By 2002, of its total land area of 1,237 square kilometres, 46 per cent (or 564 square kilometres) had been classified as agricultural land while the other 54 per cent was used for residential, industrial, commercial,

recreational and educational purposes. On average, built-up area density rose from 10 per cent in 1985 to 35 per cent in 2000 (Orapan and Warin, 2000). The number of factory establishments increased 17-fold (from 104 to 1,786) from 1989 to 2000 (PPIO, 2000). The large picture of the expansion of Bangkok's metropolitan region is given in a study (Jongkroy, 2009) based on direct field observations in 2006–2007 and interpretation of satellite images taken in 1988, 1997 and 2007, which found that in the past two decades built-up areas have expanded from Bangkok City to its periphery in all directions.

A similar trend of hectic land conversion for industrial residential estate-building was noted earlier in the southern province of Cavite adjoining the urban core of the metro Manila area (Kelly, 1998; 1999). In Ho Chi Minh City, a clear indicator of land conversion for urban use of erstwhile farming lands is the proportion of project land area to the aggregate total devoted to the spate of residential projects from 1996 to 2006 (Thu, 2010). During this ten-year period, project areas in peripheral districts and sub-districts and adjoining rural areas made up 93.4 per cent (49.5 million square metres) of the total housing project area in Ho Chi Minh City, while the area of housing projects located in the core and inner city comprised only 6.6 per cent (3.5 million square metres) of the total. Moreover, during the period 2006 to 2009, the peripheral areas and adjoining rural district had been the site of 36 housing projects under construction, compared to only 19 housing projects being built in the core areas and inner-city districts.

Rapid land conversion of wide swathes of farmlands in the fringe can reduce agricultural output and change the long-term integrity of local agro-ecological zones (Webster and Muller, 2004; see also Hardoy *et al.*, 2001). For instance, a study of Greater Bandung, another rapidly expanding urban metropolitan region in Indonesia, found land conversion has reduced the productivity of the remaining paddy fields due to, among other things, the loss of investment in irrigation infrastructure from 4.5 to 3.4 tons per hectare (Firman, 2000).

Further, the siting and new concentrations of residential and industrial estates in these converted lands also generate second-order environmental impacts such as traffic congestion, resulting from the construction of toll roads of the ring road system required by these sprawl developments and increased motor travel by residents and workers between the city core and the fringe areas. In Jakarta, for instance, perpetual traffic jams have worsened, especially during the rush hours, in the absence of circulation space (Steinberg, 2007). This includes the worsening of traffic in the city core during weekends, and the reduction of average speed from 38.3 kilometres per hour in 1995 to 34.5 kilometres per hour in 2006 (Firman, 2009). Motor-vehicle congestion and traffic has also been responsible for 70 per cent of air pollution in the Jakarta urban region, with considerable health impacts. A similar trend has been occurring in Pathumthani province, a northern fringe province in the Bangkok metropolitan region earlier mentioned. Today, the traffic flow in its major highway has become slower due to the increase of six-wheeler trucks and the presence of around 3,000 buses a day travelling to and fro to service the manpower and physical goods freighting services for the industrial estates in this fringe area (Maneepong and Webster, 2008).

Land-use change in the peri-urban zone can be closely mixed in a small space, as in the case of the craft villages around Hanoi City, with consequential severe forms of pollution. Here, the mixing of neighbourhood and village land space for residential, farming and industrial uses has resulted in air quality and water source degradation (Hue and Sajor, 2011). In these craft villages, farmers' places of residence have also become sites of craft manufacturing for metal recycling and melting, causing indoor and neighbourhood air and water pollution from fine metal particulates that in turn results in serious and widespread respiratory and carcinogenic poisoning of local residents.

Changes in water resource use and impacts

With the densification of population and the increase in urban production activities in new towns and outer zones, the metropolitan area's urban domestic and industrial water consumption has increased dramatically. This intensifies competition for water allocation in the whole mega-region, whose bulk of traditional users comes mainly from the farming sector. For instance, in the Bangkok metropolitan region, annual water production increased from about 600 million cubic metres in 1981 to 1,700 million cubic metres in 2009 (a 183 per cent increase) (MWA, 2009). The change in water consumption by particular users that has caused this aggregate increase basically reflects the national profile of increases by certain users – that is, domestic and industry users outpacing the rate of increases registered by agriculture from 1990 to 2010.² Growing demand for water from the Bangkok metropolitan region is being met by increasing the share of water coming from the Chao Phraya to be allocated to the urban users in the mega-region and decreasing the share traditionally allotted to agriculture. The competition in water allocation, and the priority given to urban water users in this case, intensifies especially during the dry season, where in some cases water has to be sourced from other connecting river basin systems in adjoining regions (Ongsakul, 2011). Regular water shortages in the context of densification of the population in the metropolitan region has also been noted in the greater Manila region during the dry season, causing the reduction of water allocated for farmers and irrigation in the adjoining province of Bulacan (Brown *et al.*, 2009). Where the major source of water is from bore wells, as in the Jakarta metropolitan area, the increase in demand due to the rapid demographic and economic expansion has led to over-utilization of groundwater due to excessive pumping. This, in turn, results in a decline in the natural levels of water in underground aquifers, allowing the subsequent intrusion of seawater and triggering the degradation of potable water in many areas (Rakodi and Firman, 2009; Steinberg, 2007).

But, on the other hand, conflicts over the quality of water and the functions of pre-existing water bodies have also intensified since, commonly in the peri-urban areas of developing countries, water sources for farming can be damaged by untreated effluents nearby or from upstream industries and municipal wastewater (see, for example, Binns *et al.*, 2003; Huang *et al.*, 2007; Midmore and Jansen, 2003). In Southeast Asian countries in particular, accounts abound of how farmers' crops or fish farming have been damaged by untreated industrial chemical pollutants nearby (for example, O'Rourke, 2002; van den Berg *et al.*, 2003). Seriously degraded irrigation water reduces the availability of appropriate water needed by agriculture (Molle and Berkoff, 2005). As a consequence, this translates into forgone food production and livelihood opportunities for affected farming communities, and also threats to food safety.

An empirical case study shows that the Saigon River, the entire 80-kilometre span of which runs through the Ho Chi Minh City extended metropolitan area, has consistently exceeded allowable maximum concentrations of organic pollutants and domestic and industrial wastes, and has caused damage to downstream shrimp farms located on the fringe of the city. This urban pollution has largely been discharged by firms outside the industrial estates and by households that have used the river as their pollution sinks (Sajor and Thu, 2009; see also O'Rourke, 2004). In addition, the level of pollution of the Saigon River has been causing health problems – such as diarrhoea, skin diseases, respiratory problems, scabies, headache, haemorrhagic fever and dysentery – for settlements near the river downstream of the city core.

In Pathumthani province in the Bangkok metropolitan region, irrigation canals that used to serve farmers' water needs for their crops have now been utilized as discharge points of

effluents by industries, service firms, residential estates near the fruit orchards and remaining paddies in the area. Dirtied canal water has prevented farmers from using it for agriculture (Sajor and Ongsakul, 2007). The situation is aggravated by the weak or absent regulatory system to manage pollution discharges to these water bodies.

Erosion of pre-existing ecological functions

Rapid and massive changes in land cover to make way for industrial and housing estates in the non-core places and rural and natural hinterlands have triggered changes in pre-existing ecological dynamics and functions. These processes have generated various physical stressors, as well as disaster risks and hazards in certain areas of the mega-urban regions. For instance, the dramatic expansion of the metropolitan Cebu region, the second most important mega-urban region in the Philippines during the property development boom in the late 1990s in Southeast Asia, led to the opening up of environmentally protected areas (the city's watershed areas and water spring source) to make way for high-end residential developments in the eastern upland fringe of the city (Sajor, 2003). This expansion is now suspected to have permanently damaged two of the city's three major water sources.

Small town developments in the Bogor-Puncak-Cianjur upland area to accommodate villas for weekend housing for the middle class have eroded the function of the place as a water catchment, and were suspected of causing severe flooding in Jakarta City in 2002 (Firman, 2009). There is also a similar case of damage to a water catchment area in north-west Jakarta (near its international airport) that is seen as a prime cause of flooding (Steinberg, 2007). The recent conversion of 'Nong Ngu Hao' or 'Cobra Swamp', 33 million square metres of wetland and natural canals in low-lying marshes in Samut Prakan province in the Bangkok metropolitan region, into the new Bangkok International Airport has similarly damaged the capacity of the area to drain flood water to the sea – and also its function as a migratory bird sanctuary and for biodiversity – and is widely seen as a factor contributing to an increased risk of such flooding as that which hit the Bangkok peripheral provinces and municipalities in 2011 (Semmee, 2007; RID, 2010). In addition, the first foreign and state partnership that built a new town development in Ho Chi Minh City, Phu My Hung New Town in 1993, in marshland at the fringe of the city (Huong, 2009), damaged its natural floodway function and might have blocked flood water from draining into the nearby Can Gio wetland. This has also heightened the risk of nearby districts' higher inundation depth.

Aside from a dramatic reduction of permeable surface and water catchment areas resulting from expansion of built-over areas in these places, flood occurrences and hazards have also been raised by other consequences of unregulated growth of mega-urban regions. For example, solid waste dumping by many informal settlements along waterways in Jakarta located in the outer zones of the core city not served by the solid waste collection system has narrowed the flow cross-section of waterways and has backwater effects, exacerbating flooding (Caljouw *et al.*, 2005, p. 12). Also in Jakarta, it is well known that over-pumping of groundwater due to the rise of domestic and industrial water demand in the growing metropolitan region has led to ground subsidence in certain areas, heightening flood risks, and has caused subsidence of river dikes and greater inundation depths (Caljouw *et al.*, 2005; Steinberg, 2007).

Changes in natural ecosystems and agro-ecosystems triggered and propelled by peri-urbanization, of course, affect different groups that are socially and spatially differentially located. There are winners and losers in this transformation. Perceptions and calculations of stakes would also vary according to the motivations, values and dominant perspectives of various social groups. Thus, spontaneous and politically organized conflicts around environment, livelihood

and social justice issues have often accompanied peri-urbanization and the development of mega-urban regions in Southeast Asia.

Deprivation in urban environmental service

While peri-urbanization and the growth of the peri-urban interface have increased interdependencies between the urban and rural in terms of spatial complementation and the division of functions, and in terms of population mobility, resource flows and uses, a clear fact is that environmental liveability in terms of built ecological systems and provisioning has been markedly differentiated. The peri-urban interface is said to constitute an ‘uneasy phenomenon usually characterized by the loss of rural values or the deficit of urban attributes’ (Allen, 2010, p. 35). In this dynamics and history, the city core has always been the first location to develop and be provided with urban environmental basic services, such as the water supply system, the solid waste collection and disposal system, the water and sanitation system and the flood management system, while its edge areas – whose rural socio-cultural and production landscapes have already declined and become relatively urbanized – have not yet been adequately provided with these so-called urban amenities. Notwithstanding the many deficits and ineffectivenesses in the coverage and functioning of these systems even within the urban core, the clear fact is that these services are relatively more developed and effective there when compared with those existing in the outer zones and adjoining rural areas. As mega-urban regions expand, the urban environmental liveability between the city core and the outer zones generally becomes even more differentiated and becomes inscribed in the two spaces of the mega-region. Thus, one dimension of rapid and haphazard peri-urban development and expansion is the generation of place-based deprivation in urban environmental services provided to population, households and settlements located at the fringe. This particular deprivation of basic environmental services results from severe deficits and lag in public-sector spending and the development of necessary infrastructures pervasive in the peri-urban. Unlike in areas in the urban core, where these basic services of water supply and sanitation, waste collection and disposal have become a basic entitlement of inhabitants, for those in the peri-urban areas – especially for low-income and poor communities – these remain largely inaccessible. The only frequent exceptions from this condition are micro-locations that operate as private enclaves (for example, industrial estates and gated communities), where these services are developed and operated by the private sector. These private enclaves have proliferated in the peri-urban landscape, but are walled in from the rest of the communities outside, and their self-operated environmental infrastructure and services remain exclusive.

The following selected indicators of environmental liveability in the fringe or outer municipalities and secondary cities on the one hand, and the urban core on the other, of the four mega-urban regions of developing countries of Southeast Asia strongly suggest the place-based deprivations experienced by the former.

Access to safe and reliable water is one field in which clear differentiation of households in the areas in the fringe vis-à-vis those located in the urban core of the mega-region has been underscored. In the urban core area of the metropolitan region of Manila, household connection to piped water is 94 per cent in the eastern part and 86 per cent in the western part (Marin, 2009). On the other hand, the surrounding provinces have the following lower median rates of household water connections: Bulacan, 51 per cent (18 municipalities); Cavite, 52 per cent (12 municipalities); Laguna, 55 per cent (7 municipalities³); and Rizal, 49 per cent (4 municipalities) (LWUA Research Division, 2010). In the Jakarta metropolitan region, 81.4 per cent of the core district of Central Jakarta’s population gets their water from bottled supplies and

piped-in water in dwellings (that is, the more reliable and safe water sources), while in the surrounding eight cities and municipalities surrounding central Jakarta (or Bodetabek) the median average population getting water from the same sources is a low 44.9 per cent (BPS, 2010a; 2010b; 2010c). However, the population's dependence on unsafe pumped water is low in Central Jakarta (6.6 per cent), while this is much higher in the cities and municipalities in Bodetabek (28.9 per cent). In the Ho Chi Minh City extended metropolitan area, while the households in the peri-urban districts have a high percentage of piped water connection based on government figures (98 per cent) (DPI, 2012), there are reports that the problem faced by many households is the substandard quality of potable water (Hiep, 2012) and the lack of sufficient pressure in these areas (Ly, 2010). On the other hand, figures on the very high access rate to safe and improved drinking water in Bangkok City vis-à-vis outlying provinces do not differ significantly, each being about 99 per cent. This tends to confirm that the higher level of economic growth reached by the city region or country, as in Thailand's case, would reduce the importance of water provisioning in the hierarchy of urban environmental problems (Marcotullio, 2003).

Available data on sanitation in the metropolitan Jakarta area and preliminary data in the metropolitan region of Manila also strongly suggest significant differentiation in median rates of access to toilet facilities. The median percentage of population deprived of toilet facilities in the Jakarta metropolitan area shows an increasing gradient as one goes farther from the city core: central Jakarta district, 0.8 per cent; Botabek cities and municipalities, 6.9 per cent; and six other more outer peripheral and secondary cities, 21.4 per cent (BPS, 2010d; 2010e; 2010f). Preliminary data on households without access to sanitary toilet facilities in the metropolitan region of Manila also strongly suggests the same (CBMS Philippines, 2011). A typical urban core area would have only 2.7 per cent of its household population without access to sanitation facilities, while in the northern adjoining province of Bulacan, the median rate of households without access almost doubles to 5.2 per cent (based on 22 municipalities).

While the Bangkok metropolitan region – a mega-urban region in a middle-middle income developing country – has achieved high rates of access to piped water and improved sanitation facilities for both core area and peripheral provinces, differences in certain other basic fields of environmental services are quite remarkable. For instance, the household coverage rate for the solid waste disposal system in the Bangkok metropolitan area (that is, a wider urban core area) stands at a high 99 per cent (BMA, 2011), but available official figures from 22 municipalities (of 93) in five provinces comprising the Bangkok metropolitan region indicate a median coverage rate of only 80 per cent (MONRE, 2011a; 2011b). Furthermore, in terms of wastewater treatment facility capacity, there is a huge difference between the Bangkok metropolitan area and each of the outlying five provinces. The Bangkok metropolitan area has seven water treatment plants that cover 20 of the total 50 districts in the jurisdiction (PCD Thailand, 2011a). On the other hand, the surrounding five provinces have the following: Nonthaburi, 1 (of 19 municipalities); Pathumthani, 1 (of 27 municipalities); Samut Prakan (none); and Samut Pathom, 1 (of 19 municipalities) (PCD Thailand, 2011b).

Change context and institutional issues

The nature, pace and scope of peri-urban development in the extended metropolitan region of the four middle-income developing countries in Southeast Asia have rendered relevant government institutions ineffective and anachronistic, thus unable to address effectively, among others, the environmental problems and issues caused by the transformation. A big part of this problem, of course, is that middle-income governments of these countries are committed to a rapid,

export-led growth paradigm that prioritizes, among others, liberal policies regarding foreign investments and development strategies centred on spurring economic growth. The agenda of environmental sustainability, while recognized in official policy discourse on national development, is in practice and in specific major decisions easily cast aside to facilitate pro-growth projects. The latter's need for cheaper land with good transportation routes, for available labour and for sites that are close to or not too far from the national capital centres and key nodes of global finance and trading networks would often win the day in situations of environment-growth trade-off. The main mega-urban regions of Southeast Asia are the spaces where these development trajectories and priorities, and their engagement with the global, have been played out by state and big private-sector players.

State land-use management and regulation systems, which are critical to avoiding, monitoring and abating environmental impacts being generated by haphazard land conversion from natural and farming use to urban use, are traditionally ineffective and weak in the countries of Thailand, Indonesia and the Philippines.⁴ Major land development decisions and policies have been influenced and manipulated by powerful real estate and other business interest groups, and often pursued despite adverse social and environmental impacts (Yap, 2012; Korff, 2000; Rakodi and Firman, 2009; Firman, 2000). Decisions on land-use change have often occurred outside of planning systems. Land-use plans, on the other hand, in many cases are too inflexible and beyond the enforcement capacity of local authorities (Rakodi and Firman, 2009) or vulnerable to arbitrary and specific changes based on narrow patron-client relationships between local government officials and powerful business groups (Sajor, 2003). Furthermore, particular environment protection tools, such as the environmental impact assessment and, more recently, strategic environment assessment, have been occasionally adopted by government agencies in certain countries in the region only as a response to initiatives and project requirements by multilateral development agencies. Contrary to its purpose of influencing major decisions in area or programme development in a manner that makes environmental sustainability a key consideration, strategic environmental assessment tool application has not achieved its aim to influence the decision outcomes of public authorities due to the lack of a legal mandate and also the practice of tokenistic public participation in the implementation of strategic environment assessment itself (Wirutskulshai *et al.*, 2011).

Institutions of water use, allocation and regulation of pollution in these countries have also been traditionally weak, single-focused and fragmented (Sajor and Ongsakul, 2007; Sajor and Thu, 2009; Rakodi and Firman, 2009). Existing water bureaucracies, which are the traditional irrigation departments or ministries, have not adapted to the rise in importance of non-traditional water users (that is, industries and domestic users). While peri-urban development has been actually coupling multiple land and water uses and impacts at the regional and local scales, land and water administrative bodies have not been apt at tackling these interlinked developments through an integrated land and water management approach.

In the four countries, the growth of urban mega-regions has implicitly been put into consideration in a broader planning framework, including regional development plans. For instance, the extended metropolitan region of Manila has included the four neighbouring provinces (Calabarzon) in a comprehensive planning document. Likewise, the Ho Chi Minh metropolitan region is currently a concept for development planning that ought to encompass Ho Chi Minh City and the other neighbouring provinces. However, the drawing of regional plans is commonly carried out as a one-off documentation project commissioned by the central government. Plans are too broad to have served as a reference point or to have significantly influenced actual land-use direction or major development decisions at various scales. More importantly, there are no enforcement and public authority institutions at the regional level that

are in charge of implementing the whole plan or one key element, such as a land-use plan component at the same scale.

Most land-use plans are based on existing formal political-administrative boundaries for which local authorities at the city, provincial or municipal level are those mandated to formulate (Hudalah *et al.*, 2007). However, functional boundaries of peri-urban areas, especially ecological flows and impacts, often cut across these traditional and rigid boundaries. Only in exceptional terms, such as the protection of environmentally sensitive areas (for example, watersheds), are these formal boundaries allowed to be cut by transboundary regulations or programmes of the government.

Decentralization, whose implementation is more developed in the Philippines and Indonesia, but which has also significantly progressed in Thailand and Vietnam, might have the unintended result of countervailing the development of regional or supra-local planning and establishment of governing institutions that are necessary to effectively manage environmental and socio-spatial processes and impacts of peri-urbanization. Market forces and migration – two of the major driving forces of peri-urbanization – and environmental flows and impacts by their nature transcend local political-administrative boundaries. Thus, decentralization, while creating spaces for enhancing public participation and local democracy, and opportunity structures for more accountability of local officials, can also have un-enabling consequences for effective management of drivers, and environmental impacts and deprivations in peri-urban development. Given certain ways in which decentralization has been actually implemented in the Southeast Asian countries, the process can generate ‘egoism’ among local governments and can make them mindful only of their own turf and local backyards (Firman, 2009; 2010). Inter-local government initiatives and cooperative structures necessary for addressing environmental problems have also become harder to realize (Maneepong and Webster, 2008). Certain practices of decentralization too have raised the risks of, and in some cases have actually led to, elite capture in addressing land-use anomaly and environment pollution cases in localities (Kritsanaphan, 2012; Hadiz, 2004; Sajor, 2003). Moreover, when the task of environmental management is the one particularly decentralized, it can bring to the fore serious issues of local capacity deficits in this new field of expertise (Kritsanaphan and Sajor, 2011). While problems have accompanied decentralization practice in the region, this is, of course, not an argument to re-centralize, but rather underscores an urgent need for some extra-local, higher intermediate levels of government and for local capacity building to be an essential component of current decentralization (Yap, 2012).

Weak management regimes in land, water and environmental liveability and the absence of regional institutions of public governance have further resulted in two notable phenomena in governance and socio-environment landscapes common today in the major peri-urban regions of developing Southeast Asian countries. One has been characterized as the ‘expanding administrative culture of informalization’ as a local-level policy response to large deficits in formal institutions appropriate for the peri-urban (Leaf, 2002; Hudalah *et al.*, 2007). Another is the rise of private (or a mix of public-private partnership) residential or industrial enclaves to secure environmental liveability in small enclosed spaces for certain privileged groups. While informality *per se* is something not necessarily negative and is unavoidable, its excessiveness in a situation of absence of necessary formal and institutionalized regimes of regulation can easily lead to control and advantage by powerful interest groups. Informality also has its limits (Leaf, 2002). For example, due to the lack of an adequate piped water system, groundwater extraction in the peri-urban areas has been relatively widespread and intense, with households and firms not being subject to any formal system of regulation and monitoring by state agencies. This informal self-provisioning is tolerated by the state and provides immediate relief for the water needs

of households and industrial firms. However, as in the case, for example, of the town of Santa Rosa on the southern edge of metro Manila, this informal adaptation has worked, on the one hand, to the advantage of those living in gated communities and industrial estates, who normally utilize powerful pumps and sophisticated technology, and on the other, to the disadvantage of low-income and poor households that depend on small hand-operated pumps for extracting water from the same aquifer stream.

The establishment of privileged enclaves such as gated high-end residential estates in the peri-urban areas has provided, though their homeowners' associations, immediate environmental liveability for certain groups, including the adequate and quality provision of water supply and solid waste collection and disposal in gated housing estates. These have also boosted public-private partnerships in this field. However, the outcome of this privatization of basic services in such enclaves further underscores deprivation and inequality along the dimension of social justice and environmental equity. Adopting an enclave approach raises the question of who is to take care of the environmental liveability of the wider peri-urban area beyond the walls of these small private enclaves.

Conclusion

Negative ecological impacts and urban environmental services and infrastructure deprivations have unfolded and have been unabated in the particular context of peri-urban development of major mega-urban regions of Indonesia, the Philippines, Thailand and Vietnam. These problems are likely to worsen as the peri-urbanization process deepens and widens while these middle-income countries continue to pursue rapid economic growth through the liberalization of foreign capital and investments and the raising of incentives for attracting big domestic businesses and their global partners into these zones. The environmental sustainability agenda and the need for a stronger environmental management regime have been easily de-prioritized, if not sacrificed hugely, in the course of this development trajectory.

The frequent occurrence and seriousness of land and water conflicts, among others, will need explicit and strong legal frameworks and judicial mechanisms that are particularly suited for environmental management and conflict resolution. But, except for certain initiatives, these have not been forthcoming. Distinct environmental consequences of peri-urbanization require innovative approaches and new public administrative structures, as well as robust state, civil society and business partnership arrangements. However, to set out along these paths will certainly require governments at various levels to extricate themselves from a strong tradition of administration and policy development that in Southeast Asian countries remains nested firmly in existing formal politico-administrative boundaries and official remits.

Further, the complexity and multiplicity of drivers and impacts of land, water and ecological changes demands much more research. Dealing with it depends on expediting various forms of vertical and horizontal integration of environmental policy. It also requires overcoming administrative separatism and going beyond narrow departmental mandates of government agencies. Present peri-urbanization might also necessitate a systematic and purposeful development of regional-scale governance institutions and management regimes – especially for integrated environmental concerns, which have been very difficult to get off the ground in the context of local government's own assertion of optimizing power and autonomy in the context of the decentralization movement at present. Moreover, while deliberately linking social policy and anti-poverty programmes and spatial regional planning together has become imperative to effectively address the urban ecological deprivations being generated by peri-urbanization, such an integrated approach is very uncommon.

It would seem therefore that there is no basis on which to expect immediate dramatic changes for the better in the domain of environment and governance in the particular context of the current development of mega-urban regions of Southeast Asia. The likely process of change may be of the nature of muddling through, a long and messy evolution of new policies and institutional adaptation measures as the complexity of peri-urban development and its massive environmental consequences further unfold in the region.

Notes

- 1 While empirical cases and discussions here are focused on the largest mega-urban region of Indonesia, the Philippines, Thailand and Vietnam, some other major mega-urban regions in these countries (for example, the Hanoi metropolitan area in Vietnam, the Cebu metropolitan region in the Philippines, and the Bandung metropolitan area in Indonesia) are also occasionally referred to.
- 2 Figures on water demand and rate of increase by major users in Thailand compiled by the Provincial Water Works (PWA, 2000) and the Food and Agriculture Organization (FAO, 2008) are as follows: Agriculture – 59.78 per cent increase in 1990–2000 and 34.81 per cent increase in 2000–2010; Domestic – 88.29 per cent increase in 1990–2000 and 137.68 per cent increase in 2000–2010; and Industry – 58.33 per cent increase in 1990–2000 and 79.41 increase in 2000–2010.
- 3 Only the seven municipalities that are closest to the urban core of metropolitan Manila have been included in this calculation. Other more remote and largely rural municipalities of the province have been excluded.
- 4 On the other hand, while development planning, including spatial planning, has traditionally been strong in Vietnam, the loosening of certain aspects of centralized planning control due to market reforms has created spaces for household-driven spontaneous initiatives on building and land-use changes at the local level.

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