ASSESSING MANGROVE CONSERVATION EFFORTS IN ISKANDAR MALAYSIA

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Abstract

Despite the importance of mangrove ecosystems, they are being destroyed more quickly than all other types of forests around the world. The causes of mangrove destruction vary, but are most closely associated with human population growth and the dynamics of urbanization. Urban development has been identified as one of the key threats to mangrove survival in many emerging coastal cities in developing countries. This paper explores mangrove conservation efforts in Iskandar Malaysia, the fastest growing economic region in southern Peninsular Malaysia. Specifically, I assess the extent to which existing urban planning efforts are helping to conserve mangrove in a developing coastal zone. I conclude that the top-down planning efforts of the federal and state government are undervaluing the extent to which mangroves provide important ecosystem services. I recommend a more comprehensive planning approach that emphasizes 1) greater public participation at the local level, 2) more substantial involvement of the regional planning and development authority, 3) more extensive protection of existing mangrove forest reserves and 4) stricter enforcement of environmental impact assessment requirements.

Overall, this paper contributes to the empirical literature on urbanization and nature conservation in developing countries. In the case of Iskandar Malaysia, the existing urban planning system—which favors economic development—has become a double-edged sword vis a vis nature conservation: a common problem in many emerging economic regions in developing world. Nevertheless, strategic and methodological mechanisms can be applied to offset many of the negative impacts of the urban planning system.

Introduction

Mangroves are shrubs or small trees that grow in salt water or brackish water along coastlines. Mangrove forests provide a wide range of ecosystem services provided by mangroves. These include coastal protection, shoreline stabilization, climate regulation, water quality maintenance, nursery sites for fishes and invertebrates,

fisheries, timber and plant products, spiritual and cultural values, and tourism.

The rate of mangrove destruction globally due to human interventions is alarming. Mangrove deforestation is occurring at the highest of any forest type (WWF 2015). In 2002, mangrove coverage was estimated at 14 to 24 million hectares, covering approximately 181,000km^2 of tropical and subtropical coastline. This represented a loss of almost one-third of all mangrove forests compared to 50 years earlier. The total shrunk to 137,760km^2 by 2011 (Giri et al 2011). Despite representing only 0.7 percent of tropical forest area, annual carbon emission generated by mangrove deforestation totaled 0.01-0.12 Pg, or about 10 percent, of the emissions from global deforestation (Mcleod et al 2011). In 2010, 11 out of the 70 mangrove species (16 percent) assessed were placed on the International Union of Conservation Network's Red List (Conservation International 2010). This depletion is closely correlated with human population growth and development (McIntyre et al. 2001; Riley et al. 2003; McGranahan et al 2006; McDonald et al. 2008). Indeed, urban development has been identified as the largest single threat to the survival of mangroves.

More than half of the world's population lives within 60 km of the sea, and three-quarters of all the largest cities are located on the coast (UNEP 2005). In these areas, many mangrove forests have been replaced by urban waterfronts. While mangrove depletion is occurring in both rural and urban areas, the threats to mangrove forests in urbanized areas are more complicated. Competing interests in the face of increasing land scarcity put multiple pressures on mangrove forests. First, decision makers are under pressure to use every square inch of urban land to maximize economic returns. Cities, which drive the economic prosperity of a country, feel these pressures acutely. Second, urban planning in most metropolitan areas has tended to emphasize managing the built-environment, leaving natural resource management to fend for itself.

Using Iskandar Malaysia as a case study, this paper examines the impacts of urbanization on mangrove conservation. Specifically, we ask, how can urban development planning promote mangrove conservation? More important, can mangrove conservation be pursued without undercutting a city's economic development objectives? Through a detailed contextual analysis of urban planning in Iskandar Malaysia, we can learn a great deal about the interplay of regional economic growth and mangrove conservation.

Iskandar Malaysia at a glance

Iskandar Malaysia is an economic development region located in southern Johor. It was established by an Act of Parliament: the IRDA Act 2007 (Act 664) (MLIT 2011). It is modeled after the Pearl River Delta Economic Zone of China, and seeks to capitalize on synergies with Singapore in the same way that Shenzhen, China seeks to take

advantage of synergies with Hong Kong (see Figure 1). There are indications that the strategy is working. In terms of economic performance, Iskandar Malaysia is the most dynamic and competitive economy on the Malaysia peninsula, due primarily to its geographical proximity to Singapore.

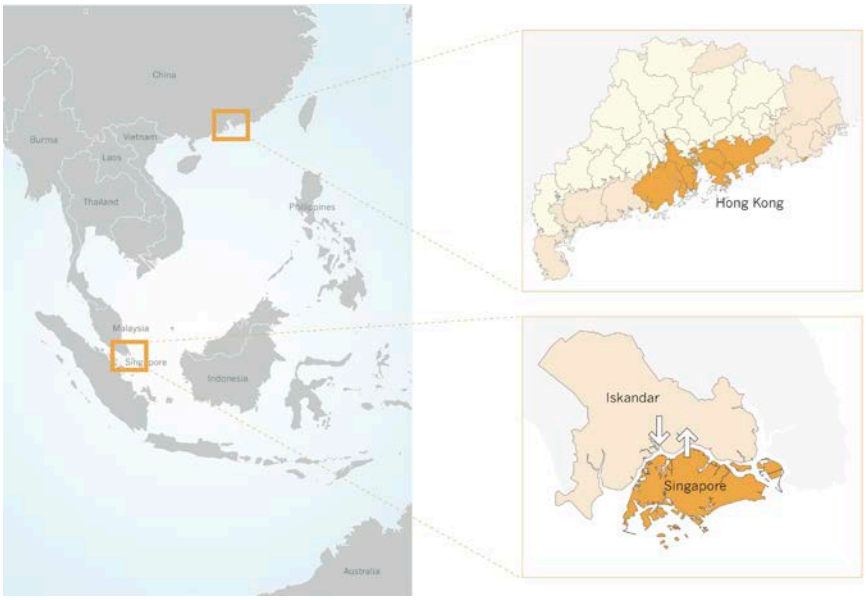

Figure 1. Iskandar Malaysia and Pearl River Delta

The Iskandar region covers an area of 2,217 km^2—three times the size of Singapore—and is administered by the Iskandar Regional Development Authority (IRDA). Geographically, the region stretches from Pasir Gudang to the east to Johor Bahru, Senai, Kulai and Pontian to the west, and involves five local planning authorities (IRDA 2014). The new administrative center of Johor state, Nusajaya, is located within the Iskandar region.

IRDA has established the goal of developing Iskandar Malaysia into “a strong and sustainable metropolis of international standing” (IRDA 2014). Realistically, this vision can only be realized through a significant population increase, and associated economic growth. For that reason, Iskandar Malaysia is anticipated to have a population of 3 million by 2025. As of 2013, the population was 1.8 million, rising from 1.3 million in 2009. In terms of the workforce, the projection is for 1.46 million by 2025, up from 0.62 million in 2005. Employment is also expected to increase from 610,000 in 2006 to 1.43 million in 2025. Furthermore, GDP per capita in the region is expected to rise to $31,000 in 2015, up from $14,790 in 2005. This represents an annual growth rate of around 6 percent (IRDA 2014).

These projections of population growth and the associated economic investments are the main impetus for intensive and extensive property development in Iskandar Malaysia over the past

decade, and—presumably—in years to come. This ambitious vision is gradually transforming the region from semi- or under-developed landscapes into fully built environments. It is this transformation process that has emerged as the major threat to the survival of the intact mangroves, which was estimated at 13,449 ha in 2005 (or 12.5 percent of the remaining mangroves in Peninsular Malaysia), of which all three of the Ramsar sites[i] of Johor (i.e. Sungai Pulai Forest Reserve, Pulau Kukup National Park and Tanjung Piai National Park), are located (see Figure 2).

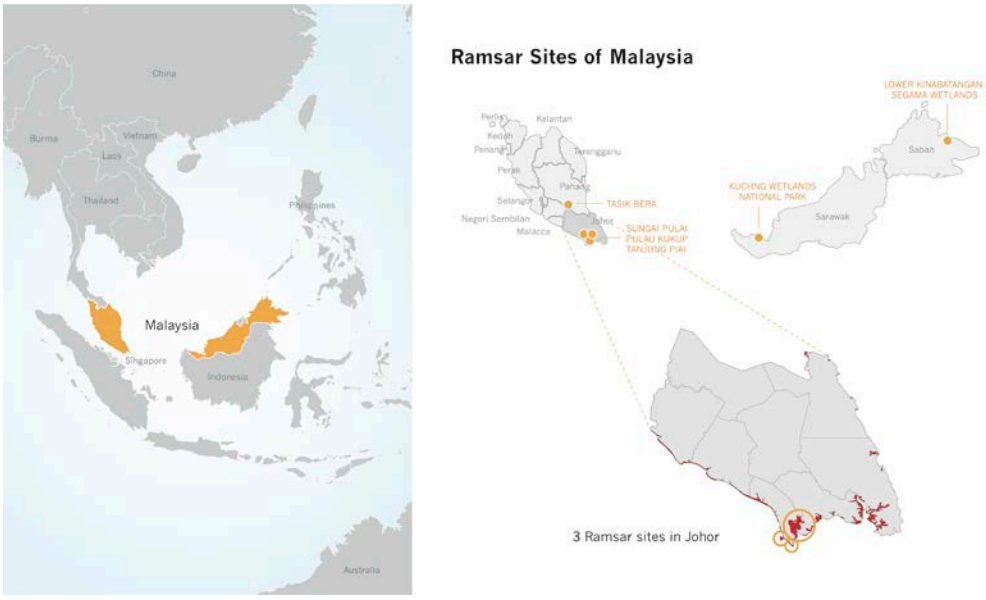

Figure 2. Ramsar sites in Malaysia

More important, these mangroves are home to many coastal communities. These include the Seletar people, who once practiced a nomadic lifestyle but who have settled down along the southern cost of Johor. Their population is now estimated at some 1,250 people (JHEOA 2008 in Paul et al 2014).

Methodology

This research was conducted in conjunction with the MIT-UTM Malaysian Sustainable Cities Program from September 2014 until January 2015 at the Universiti Teknologi Malaysia, Johor Bahru; and from February through May 2015 at Massachusetts Institute of Technology, Cambridge, United States of America.

Data collection involved both primary and secondary sources. The selection of method and data source was based on the concept of triangulation. Our aim was to gather different perspective about the influence of urban planning on mangrove conservation, and to verify and validate the data collected from each stakeholder. In addition, a

total of 24 semi-structured interviews with staff of technical departments, private sector, representatives of local communities, non-governmental organizations (NGOs), academics/research institutions as well as tourists were completed. Secondary sources included annual reports, published statistics, and newspaper stories. These were collected from agency offices and online websites. (see Table 1). Four field assistants assisted with data collection.

No.	Nature of stakeholders	Stakeholders	Methods	
			Primary data	Secondary data
1.	Public	• Iskandar Regional Development Authority (IRDA)	Yes	Yes
		• Johor Forestry Department	No	Yes
		• Johor National Parks Corporation	No	Yes
		• State Department of Town and Country Planning (JPBD)	No	Yes
		• Jabatan Kemajuan Orang Asli (JAKOA)	No	Yes
		• Perak Forestry Department	Yes	Yes
2.	Private sectors	• Real estate developments (Country Garden@Danga Bay, Country Garden@Forest City)	Yes	Yes
		• Malaysia Institute of Planners	Yes	Yes
		• Johor City and Nature Tour Guide Association	Yes	No
		• Tourists to Kampung Sungai Melayu	Yes	Yes
3.	Local communities	• Kampung Simpang Arang	Yes	No
		• Kampung Pok, Gelang Patah	Yes	No
		• Kampung Melayu	Yes	Yes
		• Kampung Pendas Laut	Yes	No
		• Kelab Alami Tanjung Kupang	Yes	No
4.	NGOs	• Wetlands International	Yes	Yes
		• Malaysian Nature Society Johor Branch	Yes	Yes
		• WWF Kuala Lumpur	Yes	No
5.	Civil society	• Citizens of Johor Bahru	Yes	No
6.	Educational institutions	• Forestry Research Institute Malaysia (FRIM)	Yes	Yes
		• Universiti Teknologi Malaysia	Yes	No
		• Universiti Teknologi Mara Malaysia	Yes	No
		• Universiti Malaya	Yes	No
		• Singapore University of Technology and Design	Yes	Yes

Table 1. List of data sources

Content analysis was employed as the key analysis technique, supported by the statistical analysis on the questionnaire samples.

Literature review

Mangroves and their ecosystem services

Mangroves are the only forests found at the confluence of land and sea in the subtropics and tropics (where the sea surface temperature never falls below 16°C). In 2010, the total mangrove area globally was estimated at approximately 15,236 million ha (Spalding et al 2010). Asia contains 34 to 42 percent of that total, thereby supporting the largest mangrove areas (Giri et al 2011). One third of the world's total mangrove forests (or a total area of about 5.1 million ha) is located in Southeast Asia. The largest coverage is found in Indonesia, with Malaysia ranked sixth. Three quarters of the world mangroves are found in just 15 countries (see Tables 2 and 3).

Region	Area (ha)	Global total (%)
East and South Africa	791,700	5.2
Middle East	62,400	0.4
South Asia	1,034,400	6.8
Southeast Asia	5,104,900	33.5
East Asia	21,500	0.1
Australasia	1,017,100	6.7
Pacific Ocean	571,700	3.8
North and Central America	2,240,200	14.7
South America	2,388,200	15.7
West and Central Africa	2,004,000	13.2
Total	**15,236,100**	**100**

Table 2. World mangrove forest distribution[ii]

	Country	Area (ha)	Global total (%)
	Indonesia	3,189,400	20.9
	Brazil	1,300,000	8.5
	Australia	991,000	6.5
	Mexico	770,100	5.0
	Nigeria	735,600	4.8
	Malaysia	709,700	4.7
	Myanmar	502,900	3.3
	Bangladesh	495,100	3.2

	Cuba	494,400	3.2
	India	432,600	2.8
	Papua New Guinea	426,500	2.8
	Colombia	407,900	2.7

Table 3. The countries with the largest mangrove areas in the world[iii]

As of 2010, mangrove forests are estimated to provide at least US$1.6 billion worth of value, which is on a par with some national GDPs. The recognition of the extent to which mangroves fulfill important ecosystem functions has been on the rise in the recent years (Duke 2007; Haines-young and Potschin 2011; Barbier 2011; Horowitz, Finlason and Weinstein 2012). These functions are not only significant at the local level—such as for fisheries and conserving cultural values—but as part of the climate change calculation at the global level.

Coastal protection through reducing the risk associated with storms is one of the most important roles that mangrove forests play, especially for coastal cities such as Iskandar Malaysia. Mangroves represent low-cost natural "tools" that can reduce disaster risk that is related to climate change, such as rising sea levels and more intense and frequent storms. Their unique root structures reduce the velocity of currents, absorbing and reducing the impacts of strong winds, floods, and tidal waves that accompany tropical storms. Meanwhile, mangroves accumulate soils and sediments. By trapping sediments in above-ground root structures, mangroves keep the sediments and other solids from washing offshore, thus stabilizing the shorelines and mitigating coastal erosion.

At the macro level, mangroves play an important role in regulating climate through their "carbon store and sink" function. In fact, mangrove forests are among the most carbon-rich in the tropics, containing an average of around 1,000Mg carbon per ha. This far exceeds carbon stocks measured in both tropical savannas and tropical dry forests, and can even exceed those of the rainforest (see Figure 3).

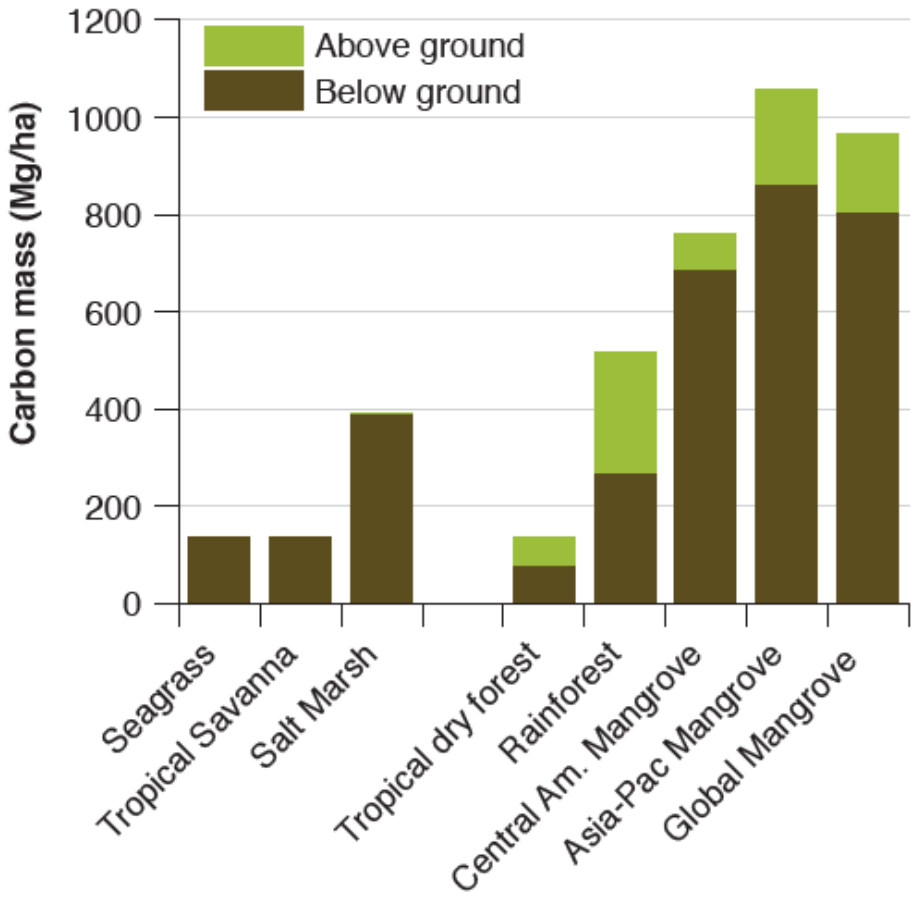

Figure 3. Carbon stocks (MG/ha) of selected tropical upland and coastal ecosystems (1 Mg is equal to 1 metric ton)[iv]

This function significantly supports global efforts to reduce carbon emission, as announced by both the developed and developing countries in the 2014 United Nations Climate Change Conference. In particular, Malaysia has committed to further reduce its carbon emissions to 40 percent of current levels by 2020. Protecting its mangroves at the local level would significantly help in meeting this ambitious goal.

Mangroves maintain surrounding water quality through the filtering of riverine and tidal sediments, contaminants, and nutrients (Snedekar and Brown 1981). They are also an effective agent in bio filtration and waste processing. Pollutants originating from urban, agricultural, and industrial sources are delivered through land run-off, river inputs, discharges, and dumping. Through their unique physical structure, mangrove trees trap sediments and reduce water turbidity. This ecosystem service is particularly important in areas where run-off nutrient load or untreated sewage are combined with slow coastal tides or currents—as well as in areas of coastal aquaculture—where the intermittent nutrient outflow can be mitigated by mangroves. While mangroves cannot combat water pollution singlehandedly, they can

make a positive contribution. Conversely, their degradation and loss can exacerbate the decline of water quality.

For many local people, mangroves are important as the breeding sites and nursery grounds for a broad mix of marine and terrestrial species, including birds, fishes, shellfishes, reptiles, and mammals (Jusoff and Haji Dahlan 2008). In fact, mangroves support the local economy activities and are an important livelihood for those living by the coasts. A large number of commercially important fish species, e.g. snappers, depend on mangroves during all or part of their lives for mangrove offering food, shelter and refuge functions. It has been estimated that 30 percent of the fish caught in South East Asia are supported in some way by mangrove forests. For some species—for example, highly mangrove-dependent prawn—that figure approaches 100 percent for (Roennbaeck 1999).

Photo 1. Aquaculture activities supported by mangroves at Matang Mangrove Forest Reserve

Mangroves provide woods for construction, fuel, charcoal, and furniture. Local and indigenous communities in many parts of the world (e.g. Pulai River of Johor, Caete river estuary of Brazil) depend on mangroves as a source of wood for cooking and heating, as well as for building houses and huts. Honey, fruits, and medicine (with antifungal and antibacterial properties) are examples of non-timber mangrove-derived products (UNEP 2014). These timber and non-timber products have great economic value, and are vital for local peoples. The Rhizophora species of mangroves has long been a valuable source of commercial wood production in Asia, including Malaysia. But such

harvesting requires proper management aiming for long-term sustainability, as in the case of the Matang Mangrove Forest Reserve, which has been well-managed for harvesting for more than a century (Goessens et al 2014).

Photo 2. Timber harvesting at Sungai Pulai Ramsar Site

Many indigenous communities have long been associated with mangroves. In Australia, the Torres Straits Islanders managed the mangroves for more than 40,000 years (MangroveWatch Australia 2013). The Seletar people—also known as the Sea Gypsies in the Straits of Johor, who have settled down at the southern coast of Johor in the 1960s—have since then depended on the mangroves as their home and for their livelihood, including fishing and medicinal properties. Finally, spiritual and cultural values that indigenous communities associate with mangroves are one of the most significant intangible values of mangroves.

Photo 3. Sungai Pulai mangrove as the playground for the Seletar children

Photo 4. The Seletar indigenous people depend on the mangrove for their livelihood

Tourism and recreational uses of mangroves are a quite recent development, and appear to be a potential ecosystem service to be explored further. Traditionally, mangroves have been perceived to be smelly and muddy, and a breeding ground for mosquitoes. With the rise of awareness as a result of environmental education, these

negative perceptions have been gradually replaced with appreciation for the wide range of ecosystems supported by the mangroves. Bird and wildlife watching, fishing, board-walking, and snorkeling have become increasingly popular activities for eco-tourists and visitors—for example, in China's Dongchaigang nature reserve, the Cairns of Australia, and Laguna de Resting in Venezuela (UNEP 2014). For developing countries, and especially for those dependent on tourism as a major income generator, developing responsible forms of tourism in mangroves would make an economic contribution, and would enable those countries to offer a wider range of tourism products in the market. All of this, of course, would help provide the economic incentive for mangrove conservation in the long term.

Photo 5. River cruise as a form of tourism activities in mangroves, Kampung Sungai Melayu

In recognition of the ecological, economic, cultural, and scientific significance of mangroves, an international treaty was signed in 1971 and came into force in 1975.[v] The more recent launch of the International Union of Conservation Network (IUCN)'s "Mangroves for the Future" (MFF) initiative in 2006 also confirms the significance of mangroves (IUCN 2012).

Urbanization, the economics of mangroves, and urban planning

While the range of ecosystem services mangrove provides has been identified and the recognition of that key role is on the rise, mangroves nevertheless have been constantly experiencing depletion worldwide. This trend is closely associated with urbanization, a global phenomenon that is particularly significant in the developing countries such as Malaysia.

Urbanization refers to the concentration of human populations in discrete areas, such as cities, which leads to the transformation of land. It is a global phenomenon that is intensifying and increasingly significant. Due to its scale and speed, urbanization poses both opportunities and risks (Park et al. 2003, Kraas 2007, OCHA/IRIN and UN-HABITAT 2007, Ehlers 2009, Annez and Linn 2010).

Through the concentration of people, infrastructure, innovation, and industry, cities (and particularly capital cities) generate economic growth and offer the kinds of paid employment opportunities that contribute to poverty reduction. In developed countries, cities generate more than 80 percent of national economic output, while in developing countries, that contribution of national GDP is estimated at 40 percent (UN-HABITAT 2008).

Urban growth, however, is not without its challenges. Urbanization brings congestion and pollution, along with social segregation. It escalates environmental and social risks. Specifically, rapid urbanization is putting pressure on the valuable natural areas in peri-urban areas, in many cases causing them to be turned into urbanized zones. [vi] Numerous studies have found that the decrease in mangrove area has been due mainly to the conversion of land to agriculture, urban development, shrimp ponds, and deforestation (Bolger et al. 1997; Bolund and Hunhammar 1999; Luck et al. 2001; McIntyre et al. 2001; Riley et al. 2003; Food and Agriculture Organization 2005; McGranahan et al 2006; McDonald et al. 2008).

One reason why the survival of mangroves is threatened is bad economic reasoning. Because the ecosystem services provided by mangrove forests are not estimated based on total economic value (TEV)—a calculation that would that would cover both their *use value* (direct use value, indirect use value and option value) and their *non-use value* (existence value) (Barbier 2000). In particular, the indirect values of mangrove—such as storm protection, sediment trapping, and nursery—are all too rarely taken into consideration. Failing to do so had led to the misrepresentation of the economic costs dealing with mangrove conversion, which are often assumed to be insignificant in urban development decisions (Barbier 2000).

The absence of appropriate economic valuation for the ecosystem services mangrove provide tends to grow out of a country's urban planning system. This is because urban planning generally focuses on the *physical* planning of an area, through policy formulation; and the *legal* framework of that area, in relation to development decision-making. In general, the planning system operates at several hierarchical levels, such as macro and micro levels, or national-regional-state-local level in the case of Malaysia. Urbanization has resulted in increasingly complex development scenarios involving built and natural environments, and the linkages of the two. It also causes the expansion of urban areas, which exceed the scope of micro

planning and therefore require a more comprehensive planning approach at the regional level (Masson-Vincent 2008).

Urban planning in Malaysia and the related legislation

Planning Law

The Malaysian urban planning system is complex, largely due to the hierarchical setup of multi-tiered institutions at the federal, regional, state, and local levels. This system is closely modeled after the British system that was introduced in Malaysia in the early 19th century during the British colonial era. Originally, the planning law (Act 172) defined only a three-tiered land development authority in Malaysia, of which all were at the state level. These are the State Authority, the State Planning Committee, and the Local Planning Authorities (Laws of Malaysia 2006; Mohd Sukuran and Ho 2008). In 2001, an amendment to the original planning law (Act 1129) was passed to include federal involvement through the National Physical Council and the Regional Committee.

This hierarchical planning system influences mangrove conservation in two ways: first in terms of the institution-planning authorities who are the decision makers; and second in terms of the development plans that provide guidance to the physical development of any specific area.

In terms of planning authorities, at the federal level, there are the Department of Town and Country Planning and the National Physical Council. The federal government gets involved through the National Physical Council, which prepares the National Physical Plan (NPP), thereby providing the overall framework to achieve integrated and sustainable land-use planning in the country. The NPP serves as the guide for the preparation of state and local development plans.

Meanwhile, the Department of Town and Country Planning prepares guidelines for development planning. In order to integrate the state-level guidelines with policies formulated at national level, and also to achieve more balanced development in urban and rural areas, regional economic zones with respective authority have been established. In Peninsular Malaysia, there are three regional economic zones: Iskandar Malaysia, the Northern Corridor Economic Region, and the East Coast Economic Region. These regional authorities are responsible for the preparation of master plans to provide direction, policies, and strategies in relation to the development in the regions and to coordinate between government entities to promote trade, investment, tourism etc. Unlike the structure plans and local plans, this master plan is not a “development plan” as defined and prescribed in planning law, and thus does not have any statutory weight. In other words, the state and local governments do not have to adhere to the guidelines laid out in the master plan.

At the state level, the State Authority is the highest authority responsible for the general policies concerning development planning and land uses, and these policies must be complied with through translation into detailed planning control mechanisms at the local level. The second-tier planning authority is the State Planning Committee (SPC), which advises the state government on all development planning matters, including monitoring the progress of the development plan's implementation. SPC is also the approving authority for development plans—that is, °State Structure Plans" and "Local Plans." However, the SPC does not directly get involved in the planning control process. Instead, planning-related proposals are submitted to the local planning authority for approval.

Local governments are the lowest tier in the planning system. This means that local governments are the local planning authority directly responsible for regulating, planning, and developing the use of land and buildings through planning control. They are also responsible for the preparation of local plans(Section 5 of Act 172) [vii]. They are solely subordinate to their respective state governments, which in effect makes the state governments the ultimate authority for urban planning.

Land Law

Land Law in Malaysia is an important variable in mangrove management for two reasons, both of which relate to the state government being the ultimate authority over any land-related matters—and thereby making the necessary tradeoffs between ecosystems services and development.

First, the land law clearly states that the immerse powers of land matters (both legislative and executive functions) are vested in the state government through the State Land Administration (Awang 2008). As land is prescribed in the State List under the Federal Constitution, the state's power to determine the land use category is ultimate, and its decisions supersede any land-use decisions made at the local level. Unlike the local planning authority, the State Authority is not compelled by law to consult any person, policy document, or plan when considering applications for a conversion of a given parcel of land from one use to another.

Second, there is also no provision either to compel the State Land Administrator to take the approved Structure Plan (which was approved by the state in the first place) into account when considering applications for conversation under the land law, or to force the SPC to honor the Structure Plan in any of its dealings. Although the categorization of land use is supposedly meant to promote proper land use planning, in fact the land law does not provide any mechanism for which planning is a prerequisite or basis for decision-making.

Environmental legislation

For the most part, the federal and state governments share responsibility for environment-related matters. The Environmental Quality Act 1974, however, grants the federal Department of Environment a comprehensive jurisdiction over environmental administration related to any land-development activity (Memon 2000). The department is also responsible for formulating environmental rules and regulations and enforcing legislation. In relation to urban planning, an environmental impact assessment (EIA) system was introduced in 1985 as a means of preventing environmental destruction in the context of large-scale development projects.

Unlike the environmental realm, all land and water resources—such as agriculture, mining, forestry, and fisheries—are exclusively in the jurisdiction of the state governments.

These two overlapping spheres of influence mean that, without proper coordination, conflicts may arise between the federal and state authorities in the consideration of resource-conservation issues.

Findings: Issues and challenges of mangrove conservation

There is a wide range of issues and challenges related to mangrove conservation in Iskandar Malaysia. Those specific to urban planning are centered on (1) the respective jurisdictions of federal and state governments, along with regional authority, as described below (2) the practice of environmental impact assessment, (3) top-down and sectoral approaches in urban planning, and (4) the perceived values of mangroves.

Jurisdictional issues between federal and state governments, and the introduction of regional authority

The Federal Constitution lays out federal and state jurisdiction when it comes to land development and resource conservation. As noted, land resource is solely a state matter. Although urban planning is defined as a joint responsibility of the federal and state governments, the state government is the final decision maker concerning land. Although the federal government may lay out a broad land-use planning concept through the National Physical Plan, the actual land development decisions are made exclusively by local authorities, who—again—are answerable to their state governments. One example is the introduction of Total Planning Doctrine by the federal government in the mid-1990s through the Department of Town and Country Planning, the Ministry of Housing, and local governments. The doctrine adopts a holistic approach to urban planning by integrating physical and social planning with moral and spiritual values, which focus on the relationships between the Creator and Man, Man and Man, and Man and His Environment, having Man as the focus of development (see

Figure 4). There is little evidence that this doctrine, however inspirational and well-written, has been translated into practical policies at the local level.

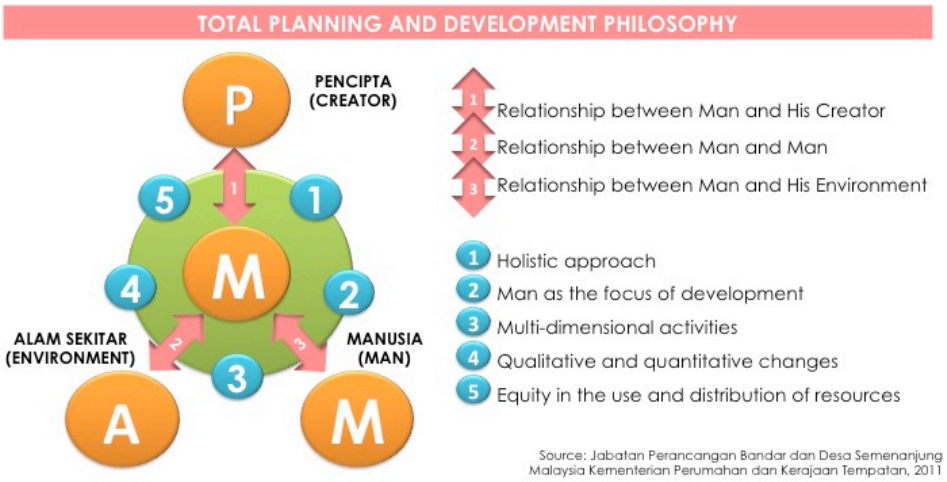

Figure 4. Total planning doctrine

While according to the federal constitution the environment is a shared federal/state domain, forests are considered a natural resource, and are therefore exclusively administered by the state governments. Therefore, even though the state governments may share the similar enthusiasm with the federal government for achieving the broad-brush national vision, they have the final say when it comes to the urban planning that either makes this vision real or blocks it. Further complicating the relevant calculations is the fact that there are no departments within state governments that deal with environmental issues. Again, the Federal Department of Environment handles environmental controls and all related administrative matters, greatly complicating the coordination issues in areas of overlap.

As noted, the federal Department of Environment has limited influence on planning applications. Although the department is responsible for evaluation in terms of environmental impact—and may impose requirements after the environmental impact assessment is completed—it merely serves as a technical advisor on environmental related matters.

In the same vein, the federal government has very limited power when it comes to proposed land developments, acting only in an advisory capacity. Similarly, regional authorities only facilitate the approval process in the context of the regional development plan. Unlike other economic development regions at the national level—all of which cover at least three states—the Iskandar Malaysia plan covers only part of Johor state, which consequently limits the power exercised by IRDA. Instead of the usual federal-regional-state-local hierarchical arrangement, therefore, Iskandar Malaysia constitutes an unusual federal-state-regional-local hierarchy.

The diverse resources found in the mangrove forests have also intensified the issues in managing and in conserving those forests. Multiple agencies at both the state and federal levels have attempted to manage those resources. In the case of Johor state and Iskandar Malaysia, for example, there are two main government agencies involved in managing the mangrove forests: the Johor Forestry Department, because the mangroves have been designated a forest reserve; and the Johor National Parks Corporation, because the mangrove forests have been designated as a national park. Apart from these agencies, the Departments of Fisheries, Environment, Town and Country Planning, Tourism Malaysia, Wildlife, Irrigation and Drainage, Agriculture, and Orang Asli Development—as well as the Land and District Office, IRDA, and local authorities—are also involved in managing the different resources within the mangroves. These agencies report to different ministries at different levels, including the Ministries of Natural Resources and Environment, Agriculture and Agro-based Industry, Urban Wellbeing, Housing and Local Governments, Tourism and Culture, and Rural and Regional Development, as well as the State Economic Planning Unit and the state government. It is easy to imagine how this profusion of ministries and other government entities could overlap and even contradict each other in the prescriptive and enforcement realms.

The public sector in most developing countries favors economic growth, and—by extension—large development projects. This greatly influences decision-making in the context of natural conservation, especially when a choice has to be made between the provision of ecosystem services and economic development. In the case of Iskandar Malaysia, fostering economic development is IRDA's ultimate goal. Interviews with IRDA officials confirm that IRDA is taking all necessary steps to attract investment into Iskandar Malaysia, and thereby to achieve its economic target. Despite the well-defined conservation objectives in the regional master plan, IRDA sees its role as helping to get development proposals approved at the state and local levels, rather than evaluating the environmental feasibility of the project. Interviews with three real estate developers and two independent planning consultants confirm that IRDA's role is essentially that of facilitation.

One last point deserves discussion. The conventional national-state-local approach in urban planning grew out of a dichotomous model of the urban and rural planning respectively. Unfortunately, it is a model that ignored the linkage *between* the two, and was unprepared for the increasingly blurred boundary between urban and rural areas. The urban areas are managed by the Municipal Councils, while nature conservation is a rural matter—managed by the District Councils or District Offices for distinctive sets of development agendas, emphases, and issues. The location of the mangroves in Iskandar Malaysia—once considered a rural landscape—has now become part of the urban

space as the urbanization extends. The forests are, in a very real way, lost in a shifting jurisdictional limbo.***

Environmental impact assessment in practice

The environmental impact assessment (EIA) process has been criticized for its weakness on several counts.

First, EIA takes place in a political context. It is almost inevitable that when development proposals are evaluated, economic, social, or political factors tend to outweigh environmental factors, especially in developing countries where economic development is the priority. Given that reality, EIA has been perceived negatively as an anti-development tool (Memon 2000). Interviews with local environmental NGOs suggested that EIAs in Malaysia are merely seen as a stumbling stone in obtaining a speedy approval.

There are also concerns over the lack of ecological soundness in many environmental impact statements (Hezri and Hasan 2006). An oft-cited case is the controversial Forest City development, in which reclamation work started before any EIA was completed (AECEN 2014).[viii] Criticism arose again when the EIA—notably thin on detail—was later submitted and approved by the Department of Environment (Low 2015). During the public dialogue session between the Forest City developer and the local communities, local environmental NGOs pointed out that there some of the EIA's findings were inaccurate, and critical aspects of the assessment were missing entirely. These included, for example, the project's impacts on sea grasses, mitigation measures, and the chain effect of these losses on the presence of dugong (a marine mammal) in these coastal areas. In addition, the statement made in the EIA claiming the project had the support of two-thirds of the local communities was denied completely by the local villagers, many of whom were not even aware that a supposedly comprehensive survey of the population had been conducted.

The entire EIA process also raises issues about the relatively power of the various stakeholders in the process. The developer, affected parties, the general public, and the regulators at various levels of government all have different access to the decision-makers, and therefore, have different degrees of influence on the outcome of the impact assessment. Because the EIA is prepared and submitted by a consultant appointed by the developer, it stands to reason that the resulting report will be developer-oriented, and that potential environmental impacts will be minimized.

In addition, there is ongoing debate about the stages in the EIA process to which the general public should have access. In the case of the Forest City project, for example, the local communities in the Tanjung Kupang Sub-District were invited to get involved in a dialogue (organized by the developer) only after the earthwork had been carried out on the proposed site, and when the developer had been requested

to conduct a detailed EIA following a state-to-state complaint filed by the Singapore government to the Putrajaya administrators.

Monitoring, too, is an issue. Because monitoring is not a mandatory step in EIA procedures, developers and government officials have little incentive to monitor impacts to allow for better projects—and better assessments—in the future. In fact, responsibility for environmental monitoring rests mainly with the Department of Environment, which again has only limited jurisdiction.

Finally, because many EIAS are prepared for one-off projects, they naturally lack a broader perspective. For instance, the EIA report of Forest City project didn't need to (and didn't) take into account the potential impacts of the project on the neighboring port of Tanjung Pelepas. ***

Top-down and sectoral approaches in urban planning

As a result of Malaysia's three-tiered planning system, contemporary urban planning follows a top-down approach that directly influences the degree of public participation. Local participation, as prescribed in the Town and Country Planning Act, 1976, is limited to inspection during the statutory publicity phase of a draft development plan. Statutory publicity is also granted in planning applications, but is limited to the neighboring landowners and only in the absence of a local plan. Clearly, this low level of public participation limits the public's ability to influence projects in which it may have an interest.

In addition, the existing approach to urban planning is also sectorally driven—that is, across a range a specialized economic sectors. While this approach results in detailed analysis—generally a good thing—the lack of integration across sectors quickly becomes an issue. At times, it results in conflicts during the implementation phase.

Value perceptions about mangroves

The existing urban planning approach, summarized above, has many faults. Among them is the inability of that process to appreciate and reflect the full values of mangroves. At present, that assessment of value is restricted to purely tangible and physical uses, with no consideration given to the mangroves' intrinsic and indirect-use values.

This, too, is part of a bigger picture. Despite increasing public awareness about the importance of the mangrove forests is on the rise, the full range of ecosystem services provided by the mangrove still has not been fully explored. Even seemingly non-tangible values are linked closely to direct economic benefits, which results in distorted market signals. For instance, property developers and investment teams too often exploit mangroves as the value-added to their housing projects, thereby generating extra profits. Take, for example, the marketing message that appeared on the website of Iskandar Investment Berhad

in general, and of the East Ledang development in specific (Iskandar Investment Berhad 2012).

Iskandar Investment Berhad advertises:

> *Nusajaya Residences combine the best of urban living and the refreshing, de-stressing power of nature. Complemented by modern amenities and infrastructure that put safety and security foremost, they are set amidst oases of green, in the form of landscaped parks, gardens, and the tropical mangroves of coastal Joho.*

while East Ledang promotes:

> *East Ledang is UEM Land's most prestigious offering with contemporary and spacious luxury resort homes nestled within seven parks featuring 31 esoteric, intimate and lush gardens. The lake, forest, wetland and canal themes here are melded together with tropical landscaping celebrating nature and where "space" means much than mere dimensions, both in the residences and in the overall 275-acre secured, guarded, patrolled and monitored community here. The gardens of East Ledang—this is indeed how living spaces should be.*

Far more often, though, mangroves are perceived as wastelands with little intrinsic values. Consequently, the forests tend to be the first to be cleared when the demand for land rises. One example is the mixed-use waterfront development at Danga Bay Country Garden, which has transformed local mangrove forests into man-made beaches to match the profile of luxury five-star living. The closer a mangrove forest is to an urbanized area, the greater the risk that is will be cleared and turned into waterfront.[ix]

Policy-relevant recommendations

As noted, the federal constitution divides the authority over land and land-related matters between the federal government and the state governments. This has allowed for a diversity of legal and policy approaches—but has also led to conflicts. It is therefore important to mitigate these conflicts through various strategic and methodological mechanisms.

Toward that end, the following recommendations are made in order to provide strategic solutions to mangrove conservation in Iskandar Malaysia. These include: (1) enhancing the holistic approach in urban planning and its subsequent implementations at the local level, (2) underscoring the values of mangroves, both in terms of their intrinsic worth and the ecosystem services they provide, (3) designating the Pulai River Ramsar site as a protected area, and (4)

enhancing public participation as a pluralism strategy and inclusive approach.

Revitalizing the holistic approach in urban planning

Malaysia's "Total Planning Doctrine," which takes a holistic approach to urban planning by integrating physical and social planning with moral and spiritual values, must be implemented in urban planning projects in Iskandar Malaysia. For that to happen, the Town and Country Planning Department must play a more proactive role, and must ensure that the state government of Johor and the local authorities actually *implement* the doctrine.

At the same time, the Department should communicate this doctrine with the various religious groups and environmental NGOs to raise greater awareness in the civil society, which in turn would send a clear message to the decision-makers and thereby influence the urban planning process. The methodological mechanism—that is, enforcement of the EIA requirements—must also be fully embraced.

Similarly, moving towards an ecosystem approach would help overcome the limitations of the current sectoral approach to planning. Strengthening regional planning would also help, since planning at that level (1) provides crucial technical assistance to local governments, (2) maintains a forum for exploring and resolving intergovernmental issues, (3) develops regional plans to guide and to coordinate local planning, and (4) establishes two-way conduits between local governments and other agencies. IRDA, too, needs to play a more proactive role in promoting a holistic approach in urban planning, rather than merely facilitating and optimizing economic development.

Appreciating mangrove as an ecosystem service through ecotourism

Trees are cut down because they are worth more felled than they are worth standing (Butler 2008). With this maxim in mind, the full values of mangroves must also be explored and instilled in the urban planning. Specifically, the potential of mangrove forests as an unparalleled natural resource for ecotourism development in Iskandar Malaysia must be fully explored. The existing small-scale ecotourism projects at Kampung Sungai Melayu and the Kong Kong fishing village are promising examples of this kind of initiative. The far larger Pulai River Ramsar site—with an area of 9,126 ha (Mohd Hasmadi et al 2011)—and its surroundings within the Tanjung Kupang sub-district have a far bigger potential to be developed into an ecotourism destination.

A large and intact Ramsar site will serve as an eco-tourism highlight not only of Johor and Malaysia, but also of global eco-tourism—or more specifically, mangrove tourism—writ large. Such a powerful niche market would not only complement the conservation

commitment by the state government of Johor, but also to showcase the unique and innovative model of Iskandar Malaysia as a city with a balanced environment, both built and natural.

This is not merely a vision, but a reality. Malaysia is currently ranked one of the top ten global tourism destinations in terms of tourist arrival, and tourism in Malaysia significantly contributes to national economic growth, with a total international receipts recorded at US$21bn in 2013 (World Bank 2015). Exploring mangrove tourism potential in Iskandar Malaysia will build on that momentum, and will create mutually advantageous links between Iskandar Malaysia and the larger tourism industry. Toward that end, the Ministry of Tourism and Culture should take the necessary steps to launch a mangrove tourism initiative, underscoring that mangroves are valuable not only valuable for their intrinsic worth and their role in providing ecosystem services, but also for contributing directly to the economic growth of the region.

A well-planned and -managed ecotourism initiative would not only help to economically justify the mangrove's survival. It would also support local livelihoods, enhance local participation, and increase the public awareness about mangroves though environmental education. Therefore, mangrove tourism must be carefully planned, not only in terms of its physical development, but also in terms of human management. On the former count, nature-friendly infrastructure and public amenities must be provided at an appropriate scale, with minimum damage to the forests. As for human management, both the service providers and the visitors must be involved. Capacity building within local tourism operations (such as hygienic levels, food handling, and even cultural differences) must be carried out prior to the actual implementation. At the same time, linkages must be established between local businesses and tourism networks at the state level in order to create complementary, rather than competitive, relationships. In this case, the involvement of the Johor Tourist Guide Association, for instance, will be essential.

Designating the Pulai River Ramsar site as a protected area

In view of its significance and relatively pristine state, the conservation of Pulai River Ramsar Site must be designated as a protected area.

That said, due to the complexity of the existing utilization of resources within the forests—which involves economic harvesting and the livelihood of indigenous and local peoples—co-management seems like a viable and appropriate approach, ensuring both a biosphere reserve and the recognition of the existing local reliance on the mangroves. Toward that complex end, there is an urgent for the Department of Forestry to prepare a management plan specifically for mangrove forests. At the moment, the mangrove forest management

strategies are included in the state forest management plan, which is not sufficiently specific or tailored to the unique resource of the mangroves.

Enhance public participation as a pluralism strategy and inclusive approach

At present, a federal-regional-state-local planning hierarchy is in place, but with only relatively modest local input. Increasing local participation as a means of decentralization is crucial. Community participation helps to ensure responsive and accountable public decision-making (Sharma 2012). It is important to note that governance is not merely about the relationship between political and administrative institutions, but also the relationship among government, private institutions, and civil society.

To build consensus behind the Total Planning Doctrine, public participation in urban planning and nature conservation must be further enhanced. In many developing countries, the environmental and people-oriented NGOs use environmental education to foster socio-political and economic change. These environmental education programs are presented not only by local schools, but also by NGOs, businesses, and local government offices (Nomura et al 2004). In the case of Iskandar Malaysia, IRDA must work with schools, universities, and NGOs to foster appreciation of the mangroves across the broader society.

Concluding remarks

Clearly, leaders must seek out and reinforce the facilitating mechanisms in the existing urban planning process. Specifically, the Total Planning Doctrine introduced in the 1990s needs to be translated into detailed and operation-able measures, to be implemented tangibly in the context of urban development planning.

Development planning at the local level is enjoying a greater degree of decentralization—a trend that represents progress. As noted, decentralized planning tends to be more accountable, and tends to be built upon a better understanding of local needs and priorities. And yet, still more local participation is needed. Environmental education will help enhance public awareness about the ecosystem services provided by the mangroves, thereby broadening the base of support for those forests.

Meanwhile, mangrove tourism must be developed with an approach that is both ecologically sound and economically viable. So far, the modest ecotourism that has been initiated in Iskandar Malaysia— involving the local villages—is a laudable effort on the part of the regional authority, which so far has not been imitated by the stewards of other mangrove forests worldwide. One way or another, however, this effort needs to gain traction and spread far more widely.

In light of the global sustainable-development movement and Iskandar Malaysia's goal to be a sustainable metropolis, it seems inevitable that effective and mutually complementary interactions must be established between the built and natural environment. The narrow urban-centric and conventional economic-dominant approach must not be allowed to define would the total values of mangroves—because those forests provide far more than the benefits that are taken into account in development decisions. Meanwhile, despite of the rigidness and the built-in constraints of federalism, a promising concept of regional planning is now in place, which could help reintegrate and to bridge the gaps between the federal and state governments —in the long term, validating the very premises of Malaysian federalism.

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Notes

[i] Ramsar sites are the wetlands areas of international important for conserving bio-diversity, designated under the Ramsar Convention (Ramsar Convention Secretariat 2014).
[ii] Source: modified from Spalding et al (2010), Hamdan et al (2012)
[iii] Source: modified from: Spalding et al (2010), Hamdan et al 2012
[iv] Source: adopted from UNEP 2014: 56
[v] This treaty was the Ramsar Convention for the conservation and sustainable utilization of the mangrove forests.
[vi] A peri-urban area is a transition or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid human-induced modifications (Douglas 2006). Some examples of peri–urban areas are protected areas, forested hills, agricultural lands, and wetlands.

[vii] According to Section 12 of Act 172, a Local Plan is a document prepared by each Local Planning Authority, consisting of a map accompanied by a written statement showing in detail the local authorities' development proposals and proposed use of land within the area of the local plan.
[viii] The comprehensive development plan of Iskandar Malaysia requires that all project proposals in environmentally sensitive areas prepare EIA— a requirement was not adhered to by the developer in the initial stages of the Forest City project.
[ix] In Iskandar Malaysia, the Pulai River Ramsar site—located just at the fringe of the core development nodes in Iskandar Malaysia—is now under intense development pressure.