



Revisiting Malaysia's Population-Development Nexus

THE PAST IN ITS FUTURE

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Population Change and Its Impact on the Environment in Malaysia

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Introduction

Human influence on the earth's ecological footprint was negligible for thousands of years until population numbers started to increase dramatically (Dietz *et al.* 2007). For instance, prior to the Industrial Revolution, the forests of many European countries were cleared mainly for subsistence, with little effect on functioning of the ecosystem. By the late 17th century, the fall in mortality and higher birth rates had catalysed the spread of settled agriculture resulting in a rapid decline in Europe's forest cover. The population growth also triggered migration within Europe. When some natural resources fell into short supply, European powers started to explore other parts of the "New World" (Grove 1995). These explorations later resulted in migration not just for subsistence, but also for settlement, agriculture and industry.

In contrast to Europe, parts of Asia have been densely populated for a longer period. In the year 1700, population estimates for the South Asian region were upwards of 146 million people (Goldewijck 2005). However, over the 18th century, the population increased modestly to only 176 million in 1800 (out of 1 billion world population), and then population growth accelerated to reach about 325 million in 1900, 486 million in 1950 and 1,357 million in 2000 (Goldewijck 2005; Goldewijck *et al.* 2010).

Between 1960 and 2012, the global human population more than doubled, from three billion to over seven billion, while the size of the world economy increased by sevenfold (Crist and Cafaro 2012). By 2050 that number is projected to expand to 9 billion people, despite the fall in fertility. More babies, children, and adults have survived because of improved nutrition, vaccination, and better hygiene. The explosion of humanity has decimated many animal and plant populations, impacting biodiversity, and causing the deterioration of many ecosystems services. Leading scientists coined the term “Age of the Anthropocene”, whereby the human species has become a powerful geological force in its own right (Crutzen 2002; Steffen *et al.* 2007).

This chapter seeks to contribute to a better understanding of the ways population processes interact with environmental change in the context of Malaysia.

The first section sets the scene by outlining the conceptual aspects of population–environment nexus. The section that follows analyses population change and urbanisation in Peninsular Malaysia by focusing on the case of an emerging mega-urban region of Bernam-Linggi. Next, the chapter suggests seven ways how urbanisation and population change have impacted Malaysia's development. This is followed by a discussion on the interplay of population–environment issues in Malaysia beyond the common Malthusian perspective. The chapter concludes with a set of five recommendations to address the population growth and its future impacts.

The Nexus of Population and Environment

Conceptually, the growth figures above assume a direct, causal and deterministic relationship between population and the environment. This view is known as Malthusian, whereby population growth is perceived to cause environment depletion because more people exert higher pressure on the environment through their consumption activities. If left unchecked, unsustainable patterns of consumption and production will lead to ecological catastrophe (Malthus 1798; de Sherbinin *et al.* 2007). According to this view, population growth in developing countries is regarded as a major cause for ecological degradation and natural resource depletion. The policy prescription is to urgently reduce population growth through fertility reduction in the South through population policies (Matthews 1989).

There are at least two alternative views to the mono-causal Malthusian idea—the *multiplicative* approach and the *mediating* perspective. In the multiplicative approach population is central, but

linked to economic activities and technological factors associated with sustainable development. The most common formulation is the identity $I = P \cdot A \cdot T$. In this scheme, environmental impacts (I) are the product of population (P), affluence (A), and technology (T). IPAT models of "sustainable development" focus on reducing population pressure on the environment through improved technologies (Ehrlich and Holdren 1971).

The mediating perspective argues that factors such as policy context, institutions, market, science and culture link population factors with environmental outcomes. Also influential are local-or region-specific dynamics and the view that population–environment relationships do not happen in a vacuum. These mediating factors deny the existence of a direct, causal relation between population and environment (de Sherbinin *et al.* 2007).

As opposed to the Malthusian view of exponential population growth outstripping food production capabilities, the Boserupian hypothesis holds that agricultural production increases with population growth owing to the intensification of production (greater labour and capital inputs) (Boserup 1965). High fertility in traditional societies is seen as beneficial to older generations, owing to the net flow of wealth from children to parents (Caldwell 1982). Also, high fertility is seen as a traditional adaptation to peak labour demands during the short cropping season. While Malthus viewed technology as being exogenous to the population–resource condition, Boserup viewed it as endogenous.

Much attention was paid internationally to the world's "population explosion" in the 1960s and 1970s.¹ Proponents argue that because individuals simply could not act in the best interests of society, governments must intervene to appropriately manage the commons beset by rapid population growth. Many social scientists rejected such a Malthusian view because of its underlying biological or ecological underpinnings (de Sherbinin *et al.* 2007). Implicit is the assumption that humans are similar to other species that are unable to grow beyond their local "carrying capacity". This view neglects the fact that cultural adaptation, technological developments, trade, and institutional arrangements have enabled human populations to grow beyond their local subsistence base.

In 1994, the United Nations International Conference on Population and Development (ICPD) in Cairo, removed the population subject from the global policy discourse. This, by extension had also silenced the population–environment nexus for four reasons (Campbell 2007). First, population growth has always been a sensitive subject in many countries. It involves religion, reproduction, and severe

inequities across the world. The Catholic Church, for instance, considers contraception a sin, while abortion is legal in some Muslim countries such as Tunisia and Turkey (Collins 1995).

Second, many social activists became upset by India and China's population stabilisation policy, calling it "coercion" (Stycos, 1991). Some 197 countries joined the ICPD consensus, agreeing that they had a collective duty to respect and promote the right of their respective populations to decide their own reproductive outcomes, to improve their health and wellbeing, and to distribute such wellbeing more equitably among the world's many inhabitants.

Third, drawing attention to any connection between population growth and environmental destruction was deemed taboo, as it was seen as disadvantageous to women's ability to decide on how many children to have (Campbell 2007). The language of family planning and birth control in population programs was overtaken by a more comprehensive notion of reproductive health which was based on individual rights and empowerment of women (Chapman 1999). This broader approach includes not only family planning, but maternal and infant health, prevention of gender-based violence, and the prevention and treatment of sexually transmitted infections. Going beyond the achievement of demographic objectives, and parting with the numbers-driven neo-Malthusian policies and programs, the post-ICPD discourse embraced an individualistic tradition, where freedom, autonomy, capacity and desire were given more policy emphasis.

Fourth, the population–environment nexus invites tension between North and South over the justice issue. For instance, does a rich Northern country, which emits a hugely disproportionate amount of greenhouse gases, have a right to suggest that Southern countries reduce their rates of population growth to compensate for consumptive lifestyles of the Northern population?

Because of the complexity of population interactions as well as political issues, population issues were not considered in formulation of the Kyoto Protocol and have also been largely excluded from the Intergovernmental Panel on Climate Change (IPCC) assessment reports. Some scientists and activists see the current attention to the issue of climate change as an opening in which to make the case that global warming cannot be alleviated or reversed without slowing population growth (Pielke and Sarewitz 2005; Petroni 2009). They believe that linking population growth and climate change will help governments to see the urgency of the matter, and will place family planning back into the political realm as a matter of national and environmental security. They see evidence that population growth, both in industrialised and

developing countries, as a contributing factor, especially so when consumption is considered the primary driver of environmental degradation and climate change.

The Spatiality of Population Change—the Malaysian Case

Urbanisation has been one of the most prominent trends of the 20th and 21st century. By 2050, the United Nations project that two in every three persons, or 69% of world population will live in cities in Asia and Sub-Saharan Africa (United Nations 2010). The benefits of urbanisation for economic growth are well known. As a dynamic process, it brings better infrastructure and economic opportunities to meet the needs of an increased urban population.

This phenomenon is present in Malaysia despite the fact that it is not beset by high overall population densities. An important feature of Malaysia's history is its rapid urbanisation, increasing from 26.8% in 1970 to 70.9% in 2010 (Abdul Rahman and Prema 2014). The future seems more challenging since small towns and cities are growing outwards of their individual boundaries to merge into each other and form huge conurbation of urban centres or mega-urban regions. Natural ecosystems are increasingly replaced by urban regions with negative impacts such as environmental pollution derived by intensive material flows, dramatic changes in land use, loss of biodiversity, habitat fragmentation and a decline in ecosystem services.

Urbanisation and Industrialisation

The population of Malaysia multiplied in the order of 11 times over the past 110 years. Most nations in Southeast Asia recorded only around a 7-fold increase. According to the Department of Statistics, Malaysia's population will reach 38.5 million people by 2040. Driven by industrialisation since the 1980s, three quarters of the population now live in urban areas, and most are concentrated in a few cities.

A primary driver of Malaysian urbanisation is industrialisation which impacted Malaysian urbanisation in two ways. First, it was the founding of manufacturing areas in new neighbourhoods of existing cities or municipalities and new towns with a strong industrial base. Second, it was massive rural to urban labour flows taking the form of daily circulation from rural *kampungs* or more permanent rural to city migration mainly to seize job opportunities in these industrial centres especially to fill up vacancies in the labour intensive industries (Nagata 1974). As the urban population agglomeration took shape other

supporting social infrastructures, facilities and amenities grew; from shelters to educational facilities—from primary schools to colleges and universities, health provisions, personal and family security, intra and inter-city mobility, recreational needs and so on (Brook-field *et al.* 1991).

Following two decades of socio-economic and infrastructural development after Independence, Peninsular Malaysia began to witness the rise of relatively huge urban conurbations (Aiken and Leigh 1975). Initially, these urban conurbations were the Klang Valley urban conurbation stretching from Kuala Lumpur, the national capital, to Port Klang covering about 50 kilometres from the main range to the coast (Saw 1972). The second conurbation was the line of urban areas from Georgetown city, Seberang Perai industrial town across to Kulim industrial area, while the third urban conurbation then was in the Johor Baru Pasir Gudang urbanisation space. Over the years there were other much smaller urban conurbations centring on the state capitals.

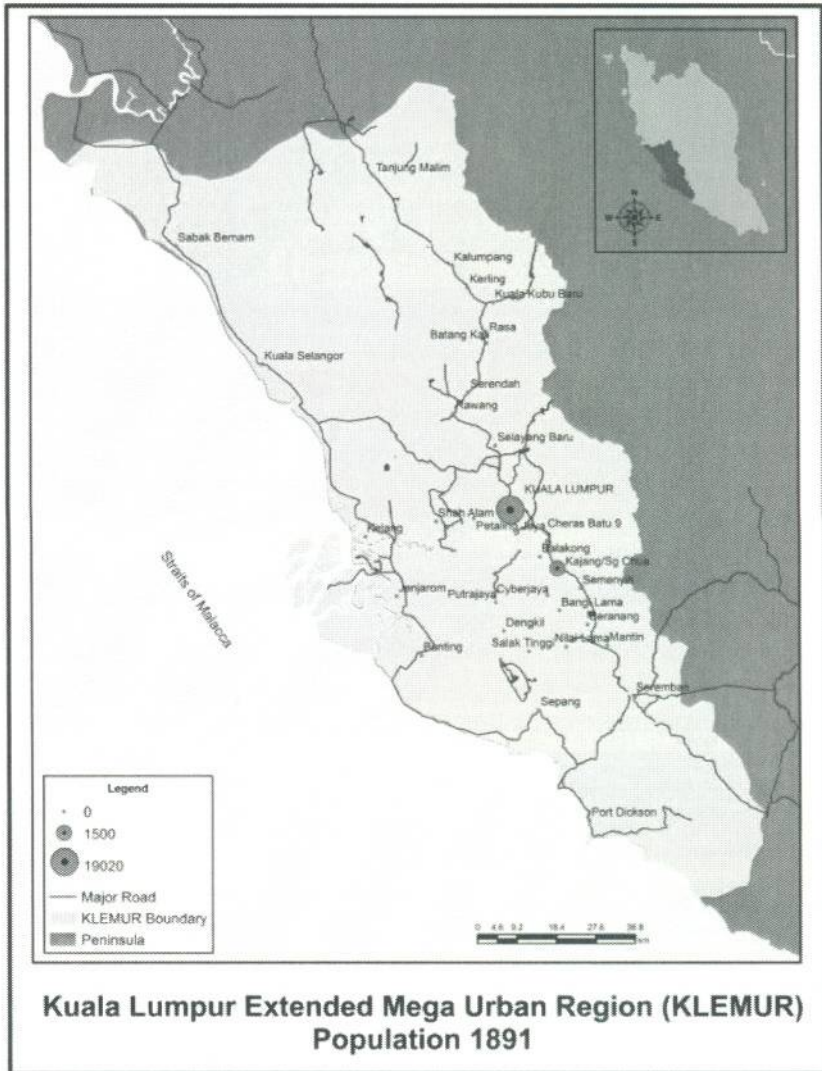
All these urban regions were relatively small in population size by regional standards, offering a pale comparison to the mega urban regions seen in Southeast Asia such as Jakarta in Indonesia, and Bangkok in Thailand, let alone those in China. These mega urban regions record a total population of over 20 million people, and are characterised by not only economic prosperity for some but also overcrowding, urban poverty, and pollution. The largest Malaysian urban region, the Klang Valley today has about six million people.

The Kuala Lumpur Extended Mega Urban Region (KLEMUR)

Most modern urban centres in the Kuala Lumpur Extended Mega Urban Region basins were founded during the British colonial intervention in Perak state – where the Bernam basin is, in Selangor in which at least three major basins are to be found, and the Linggi basin in Negeri Sembilan around the 1874 to 1900 period. An insight into the size and distribution of urban centres during the period, is afforded by the size distribution of urban centres in 1891. Except for Kuala Lumpur, the rest of the urban centres were small and somewhat isolated from each other except for the connecting main trunk road linking each other (Figure 11.1).

Perhaps the generalisation that urban centres were mainly peopled by Chinese migrants as shopkeepers and providers of other basic services could very well have started from this early urban population landscape in the 1930s. The local people remained in their *kampungs* and were peripheral to the urban life then. Over the years, these urban centres

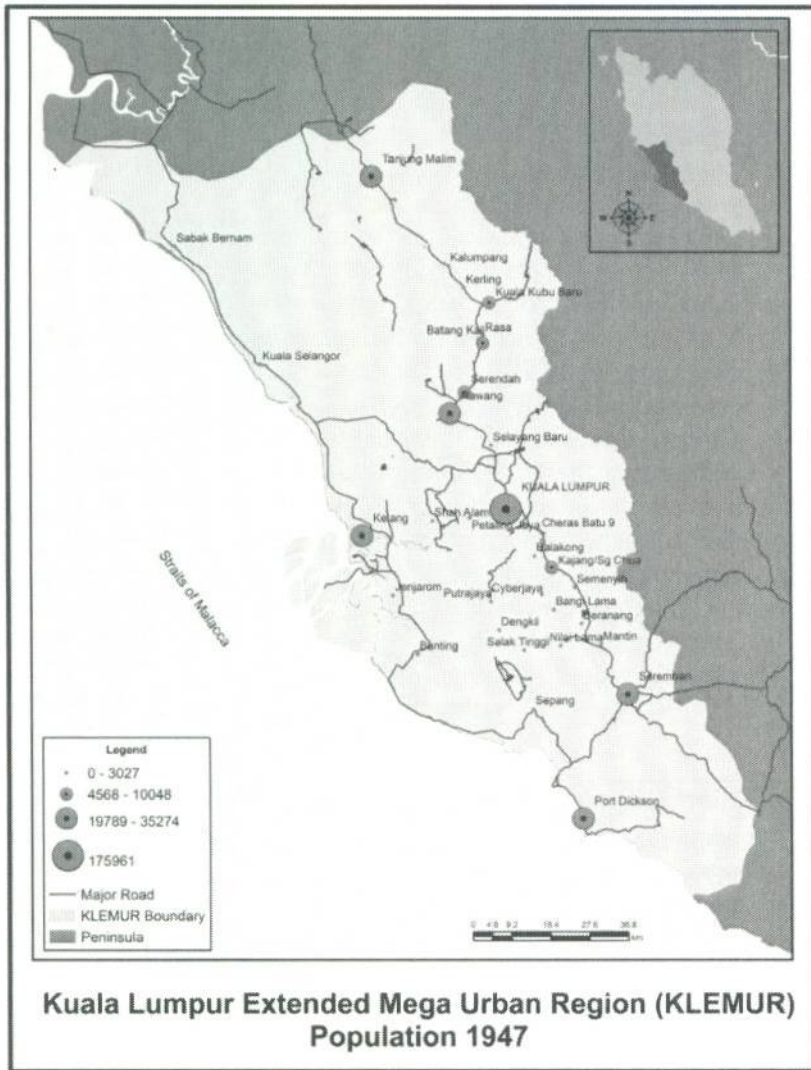
Figure 11.1: Population in Bernam-Linggi Basin, 1891



Source: Geographic Information System (GIS) Analysis; Population and Housing Census.

grew in size through population increase, mainly by migration and high fertility level prevailing at that time. Being the capital of Selangor state, Kuala Lumpur grew substantially compared to the other urban centres. Commercial and services functions grew with population increases. The urban growth patterns continued to change slowly as shown in the census after the war in 1947 (Figure 11.2). War destruction and much

Figure 11.2: Population in Bernam-Linggi Basin, 1947



Source: Geographic Information System (GIS) Analysis; Population and Housing Census.

uncertainty during World War II (1939-1945) contributed to the slow growth of these urban centres.

By the Census in 1947, the area covering Kuala Lumpur and south to the Seremban-Port Dickson area had begun to form a clear urban belt, centring on the main north-south trunk road. These urban centres and towns dotted the largely agricultural rural areas. Rubber estates

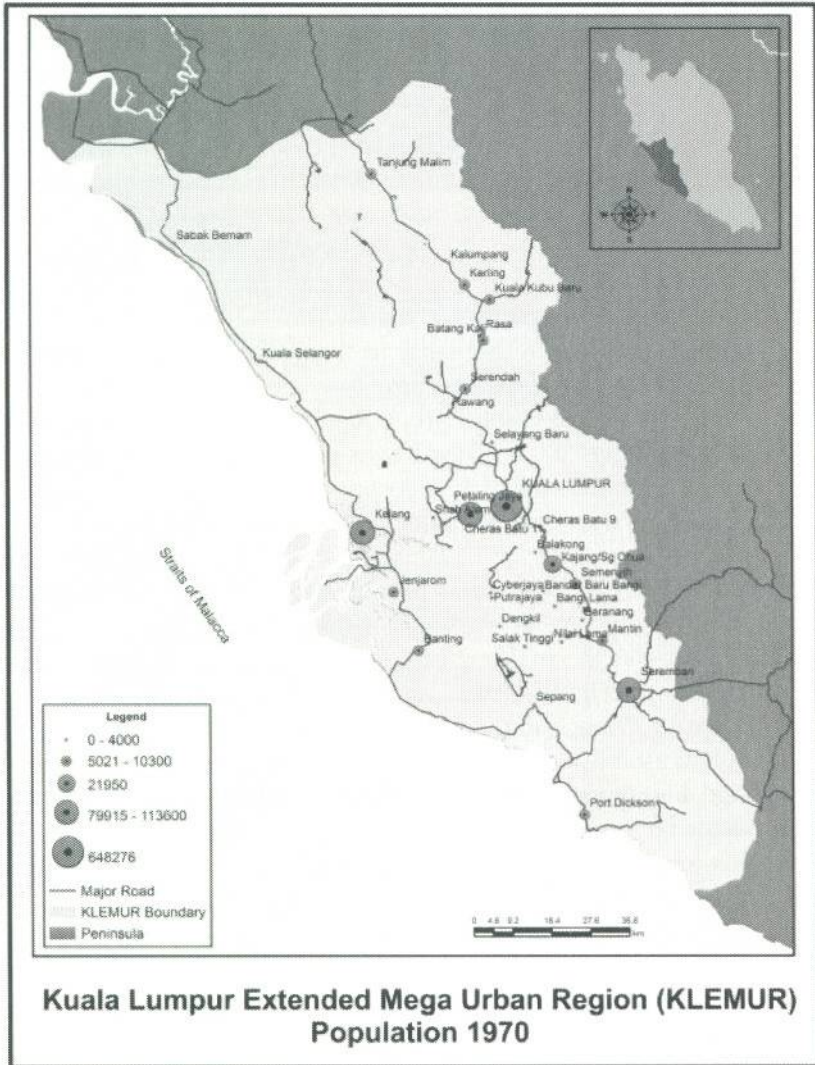
along the north-south stretch were the epitome of modern commercial agriculture existing next to traditional villages. Each urban centre seemed to be isolated from the other and there was a noticeable break separating one urban centre from the other.

On the eve of Independence, the emerging urban belt bordering Kuala Lumpur and Seremban had become more marked. Kuala Lumpur developed further. A small urban conurbation was developing linking the capital to the Petaling Jaya new town – founded in 1953 (McGee and McTaggart 1967). Overall, the framework for a huge urban belt was in place (Figure 11.3).

In the post-Independence years, the existing urban centres continued to grow, most markedly in the Klang Valley centering on Kuala Lumpur and Petaling Jaya new town. The urban centres in the Kuala Lumpur Extended Mega Urban Region continued to experience rapid growth (Figure 11.3). New towns in the Klang Valley too grew rapidly due to labour migration in response to job opportunities in the manufacturing industries in Petaling Jaya and newer towns right up to the old Klang town west of Petaling Jaya. The urbanised frontier was moving west to Klang town and beyond to Port Klang. By the 1970s, Kuala Lumpur and Petaling Jaya began to dominate the urban landscape; a primacy was in the making for the Kuala Lumpur Extended Mega urban landscape (Figure 11.4).

By the 1990s, economic stability and an excellent transportation network had established Malaysia as one of the preferred destinations for foreign investments. The availability of relatively better educated, skilled labour in large numbers brought labour intensive manufacturing industries into the country. The established cities, municipalities and towns with the basic infrastructures were chosen to host the industries. In addition, specifically-created industrial neighbourhoods and new towns were planned and developed. Throughout the 1980s, starting from Kuala Lumpur to Port Klang on the coast and Seremban to the south, industrial neighbourhoods emerged to replace the agricultural landscape. In the meantime, the manufacturing industrial frontier was also moving north from Kuala Lumpur to the Bernam basin where the national car industry, Proton, has a commanding area in the urban landscape. At the small town of Serendah, another automotive assembly plant has been producing another well-known local car. In almost 40 years, the Bernam-Linggi river basin had merged into a huge urbanised area replacing the widespread agricultural landscape earlier (Figure 11.5). It is now expanding in size to meet the growing needs for more settlements, roads and other infrastructures.

Figure 11.3: Population in Bernam-Linggi Basin, 1970

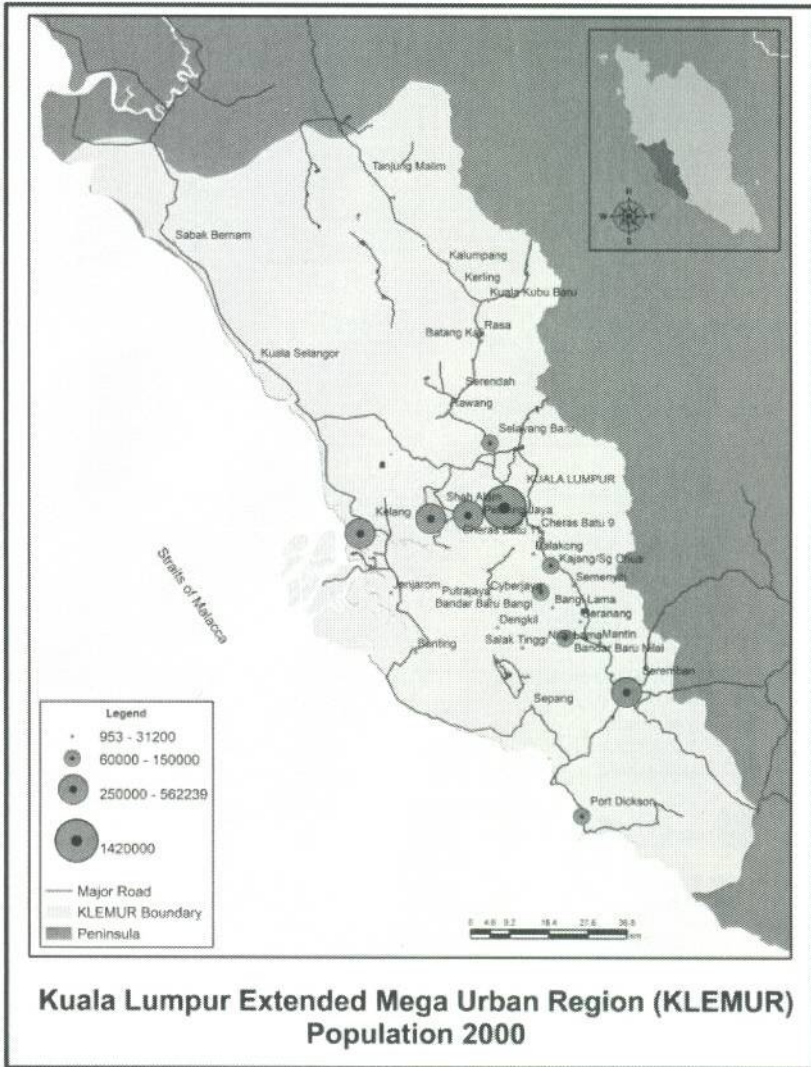


Source: Geographic Information System (GIS) Analysis; Population and Housing Census.

Environmental Impacts of Population Change

Consumption is clearly the primary driver of environmental degradation, while population growth, both in industrialised or developing countries, is a contributing factor. Malaysia's per capita consumption of resources

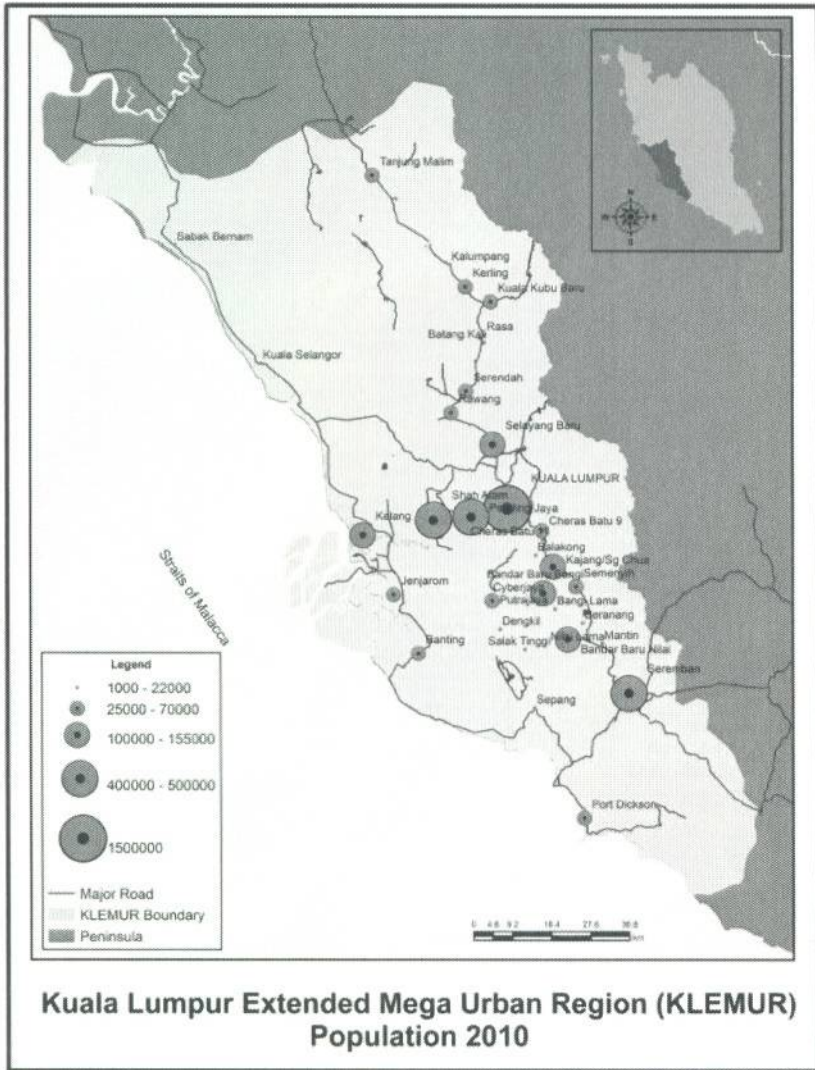
Figure 11.4: Population in Bernam-Linggi Basin, 2000



Source: Geographic Information System (GIS) Analysis; Population and Housing Census.

such as water and energy are on a steady climb concomitant with the country's economic progress. The country's earlier economic rise was made possible by its rich natural resources such as tin, petroleum and timber together with agricultural commodities like rubber and palm oil

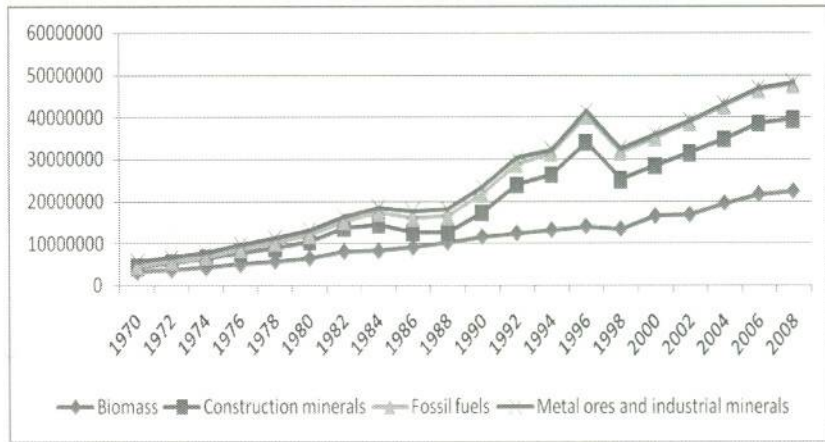
Figure 11.5: Population in Bernam-Linggi Basin, 2010



Source: Geographic Information System (GIS) Analysis; Population and Housing Census.

(Aiken *et al.* 1982; Vincent and Ali, 1997). Figure 11.6 illustrates the country's material flow from 1970 to 2008, indicating that consumption and production patterns of natural resources and minerals have been increasing steadily throughout the years.

As an outcome, the state-of-the environment is altered from a pristine natural environment, to a modified human landscape in

Figure 11.6: Material Flow Malaysia, 1970-2008

Source: Commonwealth Scientific and Industrial Research Organisation (CSIRO) and United Nations Environment Programme (UNEP) databases, 2010.

just a century. The provision of environmental goods and services by the natural ecosystems is compromised as a consequence of rapid development. Indicators of unsustainability include escalating per capita CO₂ emission from 1.3 metric tons per capita to 7.7 in 2010 (World Bank 2013), water supply disruptions, unchecked forest conversion to agricultural and urban landscapes, poor river water quality, inefficient waste management and declining food security.

Greenhouse Gases (GHGs) Emissions

On the 2010 Climate Change Performance Index, which rates the emission levels, emission trends and climate policies of the world's 57 largest carbon dioxide emitters, Malaysia appeared in the bottom-ranked group of countries alongside countries like Canada, Australia, the USA and Saudi Arabia. The energy sector alone accounted for 66% of total emissions in 2000, with transportation and manufacturing sectors as the second and third largest emitter. The total GHG emissions are projected to increase from 223.1 MtCO₂ equivalent in 2000 to 375.4 MtCO₂ equivalent in 2020 (Ministry of Natural Resources and Environment, 2011). Malaysia's increasing per capita energy use will result in over consumption that will end its energy-exporting status. Malaysia's total final energy demand is expected to almost double from 47 million tons of oil equivalent (Mtoe) in 2010 to almost 93 Mtoe in 2030 (Asia

Pacific Energy Research Centre 2009). The total primary energy supply is projected to more than double from 66 Mtoe in 2005 to 130 Mtoe in 2030, and fossil fuel is expected to constitute more than 90% of the total primary supply. In 2001 the government introduced the Five-Fuel Policy to encourage the utilisation of renewable energy (RE) resources for power generation. To fast-track the implementation of the Five-Fuel Policy, the Small Renewable Energy Power Program (SREP) was introduced in the same year. This program allowed utilisation of all types of RE sources, including biomass, biogas, municipal solid waste, solar, mini hydro and wind. However, the low take-up rate of RE development under the SREP led to the formulation of the Renewable Energy Act 2010. The Renewable Energy Act 2010 provides for the establishment and implementation of a Feed-in-Tariff (FiT) system to catalyse the generation of renewable energy.

Water Resources

The perceived abundance in Malaysia's water resources had resulted in inefficiency in water usage. A survey jointly undertaken by the Federation of Malaysian Consumers Associations (FOMCA) and the Energy, Green Technology and Water Ministry found that Malaysians use an average of 226 litres of water a day, compared with 155 litres and 90 litres in neighbouring countries Singapore and Thailand respectively. This was much more than the 200 litres per capita per day recommended by the United Nations. It was estimated that only 80 litres of water a day is required, pointing to a possible saving of up to 136 litres per person (Salleh *et al.* 2010). Water supply disruptions have become more frequent in recent years. Despite abundant water resources, various parts of Malaysia have experienced shortages in water supply due to increased demands and changing weather patterns as well as technological issues such as leakages. The water crisis in Selangor from March to May 2014 has caused multi-million ringgit losses to over thirty companies in the state (Zachariah 2014). A report by the National Water Services Commission projected that demand for water will outstrip supply in the most densely populated regions in Malaysia (Selangor, Kuala Lumpur and Putrajaya) unless actions is taken (National Water Services Commission 2012).

Minerals

There are indications that resource scarcity globally has led to renewed importance of natural resources to Malaysia's economy (Hezri and Alizan

2015). For instance, while mining is often seen as a sunset industry, and the importance of mining to the overall economy of Malaysia has declined, the extraction of some minerals has seen a resurgence recently. Iron ore for example, has seen an increase of 934% in production from 1990 to 2010, including a rapid 275% rise from 949,605 tonnes in 2005 to 3,557,813 tonnes in 2010 (Department of Statistics 2011). Iron ore is bringing huge returns to state governments. In 2011 the Pahang government received royalties amounting to RM5.5 million in just four months, while the Kedah government received RM10 million in a year (Hezri 2013). Extractive industries are known to be environmentally damaging if stringent law enforcement is not put in place.

Pollution

Urbanisation and industrialisation pressures continue to threaten the environmental quality in Malaysia. In 2011, the Department of Environment reported that 39 rivers were polluted, 3,177 open burning cases were lodged, and about 12 illegal disposals of scheduled wastes were still practiced by unscrupulous offenders (Department of Environment 2012). Within the Kuala Lumpur Extended Mega urban region, air pollution is on the increase in recent years. The air pollution level in the congested and traffic heavy municipality of Petaling Jaya records a high concentration of particulate matter (PM10) pollutant from industries and NO₂ gas from motor vehicles (Azmi *et al.* 2010). Fast-developing towns such as Kajang and Nilai are found to have high concentrations of air pollutants originating mainly from exhaust systems of motor vehicles (Latif *et al.* 2011). This is hardly surprising as the country's road transport vehicles have increased from 6.8 million in 1995 to 18 million in 2008 (Ong *et al.* 2011). Both urban air pollution and river pollution will cause long-and short-term impacts on human health and wellbeing.

Biodiversity

Ensuring the survival of biodiversity in protected areas (e.g. national parks) alone is insufficient for conservation, especially under the condition of incessant habitat loss due to pressures from expansion in human settlements and agriculture. Although Malaysia embraces biodiversity conservation, protected areas serve only as surrogate indicators for biodiversity conservation. A study by Reza and colleagues (2013) revealed that a number of protected areas in Peninsular Malaysia are unsuitable for large mammals with big home range. Some mobile

species such as elephants often move outside of protected areas, resulting in conflicts with humans. In this regard, these protected areas do not function effectively as tools for conservation. Worse, the most biologically-diverse areas, the lowland dipterocarp, have been excised for development long ago, whereas most protected areas are located at higher elevation with lesser constituent species to begin with. Policy reversal on protection status also threatens the efforts of biodiversity conservation. Since the 1960s, backed by powerful vested interests, a number of key wildlife protected areas have been rescinded to give way to agricultural land use in Peninsular Malaysia (Abdullah *et al.* 2014).

Municipal Solid Waste

The increase in Malaysia's population has resulted in a tremendous amount of municipal solid wastes being generated. In Peninsular Malaysia, the daily generation of waste escalated from 13,000 tonnes in 1996 to 19,100 tonnes in 2006, an increase of 91% in just one decade (Agamuthu *et al.* 2009). A survey on waste management issues showed that 59% of respondents were moderately aware with some basic knowledge and were mildly concerned with solid waste issues (Hassan *et al.* 2000). This may come as a surprise to some because as much as 50% of public complaints lodged to the government are on waste and cleanliness issues. Dumping of waste in open fields and rivers by industries and households is still common today. A study of waste disposal behaviour in the low-income areas in Kuala Lumpur disclosed that 31.9% of waste were disposed by open burning, while 6.5% were thrown into the river system (Murad and Siwar 2007). This situation is different from that in developed countries where the goal of sanitation and the objective of collection and disposal, even though not infallible, are generally considered as a thing of the past.

Food Security

The land use for agriculture in Malaysia is geared to producing commodities for export rather than to fulfil the food requirements of the nation. With an annual growth of 5.9%, areas under oil palm in Malaysia increased from 641,791 hectares in 1975 to 5.0 million hectares in 2011 (Malaysian Palm Oil Board 2013). By 2012, oil palm plantations occupy 15.4% or 5.08 million hectares of Malaysia's land mass. In comparison, areas under paddy cultivation comprise only a meagre 672,000 hectares located in eight granaries (Fahmi *et al.* 2013). As a result, although Malaysia is self-sufficient in palm oil and other

commodities, the level of self-sufficiency for sugar, rice, and vegetables as well as beef, mutton and dairy products is very low (Rahman 1998). The Food Price Crisis in 2007/08 has exposed Malaysia's vulnerability as a net rice importer when major producers such as Thailand and Vietnam decided to curtail their exports to ensure domestic food security (Tey and Radam 2011). There is a need for Malaysia to boost domestic rice production by expanding the paddy areas to ensure greater self-sufficiency level.

The Interplay of the Population–Environment Nexus

A glance at Malaysia's population statistics (e.g. population size, growth, density, age and sex composition, migration, urbanisation, vital rates) will not sound off any alarm bells for demographers or policymakers. Malaysia is not a population hotspot of the scale and magnitude of Indonesia and the Philippines. However, rapid urbanisation came with a new set of sustainable development problems. Malaysia's urban population is faced with emerging problems as discussed in the preceding section and the list of challenges is growing. The government has been trying to manage environmental challenges with numerous policies since the 1970s (Hezri and Hasan 2006; Sani 1993). Table 11.1 lists a suite of environmental and natural resources policies and how they relate to population issues.

Despite the constellation of policies and programs on the environment by the government, in reality it is extremely hard to bridge the gap between stated policy goals and practical strategies to achieve those goals. An evaluation of Malaysia's record in implementing the United Nations' Agenda 21 on recommendations for the environment–agreed in Rio de Janeiro in 1992–was prepared by a consortium of Malaysian NGOs for the 2002 World Summit on Sustainable Development. It concluded that:

In essence, the words are in the right place but in truth the actions are not. The commitment and focus to implement sustainable development practices is not forthcoming.

(Malaysian NGO Forum for Rio+10 2003)

The main difficulty in enforcing these policies is overcoming the distinctly resilient patterns of production and consumption associated with conventional paths of economic development. Obstacles in moving toward sustainable development are many, but four are worthy of mention (Hezri 2014; Hezri and Dovers 2012). First, natural resources

Table 11.1: Environment and Natural Policies and Links to Population Issues

| <i>National Policy</i> | <i>Implications for Environment–Population Nexus</i> |
|---|--|
| National Policy on Biological Diversity, 1998 | The policy recognises the role of local communities in the conservation, management, and the utilisation of biological diversity as well as their rightful share of benefits. |
| National Environmental Policy, 2002 | Its goal is a clean, healthy, safe and productive environment for the current and future generations involving active participation of all sectors of society through conservation and sustainable consumption and production. |
| National Urbanisation Policy, 2006 | The policy links the high rate of population increase to the need for the development of new areas for housing, social amenities, commercial and other urban land uses. It also stated that the lack of clear urban limits has led to the creation of urban sprawl encroaching upon environmentally sensitive areas and major agricultural areas. |
| National Green Technology Policy, 2009 | One of its four objectives is to ensure sustainable development and conserve the environment for future generations. The policy emphasises uptake of green technology by the Malaysian society. |
| National Water Resources Policy, 2012 | One of the guiding tenets is “Water for People”, providing for universal access to safe, adequate and affordable water supply, hygiene and sanitation. |
| National Physical Plan 2, 2013 | The plan aims to rationalise and consolidate the national spatial planning framework: to promote more balanced regional development by enhancing spatial and environmental quality, diversity and safety for a high quality of life and liveability. It also aims to facilitate efficient integrated inter-state connectivity and public common users’ space provision for social interaction and sustainable communities. |

in Malaysia are under priced through subsidies including water, fuel, and paddy seed, to name a few obvious examples. Rather than reduce its consumption of resources to a sustainable level, Malaysia continues to consume more resources than many of its peers. Second, Malaysia

continues to be bedevilled by the problem of disconnect between federal policies and state jurisdiction. Environmental policy is mainly a federal jurisdiction, but land encompassing agriculture, forestry, mining and water is a state jurisdiction. The power of the states over land has constrained national policymaking. Third is the general apathy among the public about the environment and sustainability. Malaysians generally lack understanding of the underlying causes of environmental problems resulting in wastage of resources and polluting behaviour. The fourth obstacle has to do with the performance of the delivery system of the public service. Although the economy and the environment are interdependent, planning has been formulated in silos, leading to fragmentation of regulation and implementation.

In future, more natural ecosystems will be replaced by cities to accommodate the growing urban population and industries. Hence there will be more pressure on the environment with consequences on the wellbeing of the Malaysian population. At the national and subnational levels, attention should be paid to the nuance of interplay between population dynamics and emerging environmental challenges. As a future policy and research agenda, we should ask how specific population changes (in density, composition, or numbers) relate to certain changes in the environment (such as deforestation, climate change, or ambient concentrations of air and water pollutants)? In other words, we need to unpack and disaggregate population dynamics (e.g. in density, composition, numbers, sex/age structure, and life histories) in empirical studies to prepare for appropriate policy responses. In what follows, we outline three areas for further enquiry.

Encroachment into Environmentally-sensitive Areas

Population growth in the rural areas in the 1960s and 1970s as a result of land resettlement has contributed to significant deforestation (Nagata, 1974). The area of arable land increased fivefold between 1900 and 1950 as forested land gave way to agriculture and rubber plantations. Later on, the Federal Land Development Authority was the dominant agent of change, converting more than 100,000 hectares of forested land annually from the mid-1950s until 1965 (Goh 1982). In 1966, 9 million hectares of Peninsular Malaysia's total land area of 13.3 million hectares was under forest cover (Ooi 1976). By 1977 this had declined to 7.2 million hectares (Rowley 1977). More recently, the Millennium Development Goal indicators showed that the proportion of land area covered by forest has dropped from 68.2% in 1990 to 62.4% in 2010

(Hezri 2013; EPU and UNCT 2010). Thus, Malaysia has not achieved the MDG target of reducing the rate of loss of forest cover.

The agricultural frontier had then advanced in areas that are environmentally sensitive. The ecological effects of land clearing included high sediment loads in rivers from soil erosion and the pollution of river systems with effluent discharged from rubber and palm oil mills. Another impact of human migration was the increasing conflicts between wildlife and rural population as the natural habitat for these animals has been encroached for agriculture. During the period 1998 to 2005 the average number of reported human–elephant conflicts is 731 incidents per year, with crop damage accounting for 72% of the cases (Poh and Othman 2008). Removing or trans-locating a “problematic” elephant usually cost around RM40,000. Agriculture and human settlement have pushed the boundary of natural areas in Malaysia to only four large islands of forests which are fragmented and disconnected. The Central Forest Spine is a government initiative to protect the backbone of Peninsular Malaysia from development encroachment that will further threaten wildlife and human populations.

Displacement of Forest-dwelling Peoples

Logging and infrastructure projects such as hydropower development have also affected the wellbeing of forest-dwelling communities. There are many instances where land alienation and other forms of socio-economic marginalisation have undermined the population and identity of Malaysia's indigenous tribes. The plight of the Penan in the 1980s due to unscrupulous logging practices in the state of Sarawak has attracted worldwide attention (Brosius 1997). Subsequent to that, the resettlement of indigenous tribes in Kampung Asap to accommodate the construction of the Bakun hydropower dam has also caused a lot of grief. Gone with their sense of place was the sense of identity loss when they are forced to leave behind their traditional agricultural practices. There is also evidence that the indigenous peoples do not play a significant part in the timber industry or palm oil. For the industries, cheaper labour from neighbouring Kalimantan makes better business sense than employing the locals.

In Peninsular Malaysia, the return to resource extraction is causing great strife among the affected communities. Environmental degradation has persisted amidst increasing land scarcity. This in turn has resulted in resentment brewing among the public (Hezri and Alizan 2015). Unprecedented environmental protests have occurred, such as

against the siting of an iron ore processing plant in a biodiversity hotspot in Perak, forest clearance for agriculture in Cameron Highlands (Lai 2013) and the mining of iron ore around Lake Chini, the only UNESCO Man and Biosphere Reserve in Malaysia (Hezri and Chan 2012).

High-density Urban Living

The Malay Peninsula, Sabah and Sarawak were only sparsely populated before the colonial intervention. The flood plains of Thailand and Myanmar or the fertile volcanic soils of Java in contrast have developed a substantial population density for thousands of years.²

The population density for Malaysia in 2010 stood at 86 persons per square kilometre. But the density varies widely from 6,891 persons per square kilometre in the Kuala Lumpur Federal Territory, 205 persons in Kedah, and to 20 persons in Sarawak. Other high density states include Penang (1,490 persons) and Putrajaya Federal Territory (1,478 persons). Selangor despite being the most populous state records only a density of 674 persons per square kilometre. Although not as dense as other capitals, Kuala Lumpur has experienced strong growth since the last century. From a mere 900,000 population in 1950, the number of its residents more than doubled by the 1980s. With more economic opportunities in these three decades, the population in 2010 had tripled from its 1980 level to 6 million. By 2030, it is estimated that Greater Kuala Lumpur will be home to 10 million people (PEMANDU 2010).

In many dense cities, the social life of a population is disintegrated and replaced by maladies such as increased anxiety, mental disorder, family breakups, crime, and violence.³ Some signs suggest that the Klang Valley city dwellers are yet to develop sufficient adaptation capacities to live in a high-density environment. One example of the pathology of high-density living is the public nuisance of double-parking in the city and its suburbs. Another indicator is the increasing trend of road rage or aggressive behaviour on the roads.

A balanced approach involves complementing physical or “hardware” improvements with the cultivation of collective ethics or “heartware”. High urban density is tolerable only if civility and regulations mediate social relations in the city. Managing common resources such as streets, parks and rivers requires an approach that maximises the gain for all and not individually. The city council, on its part, must modernise its regulations to permit social order in dense parts of Malaysian cities.

Concluding Remarks

There exists an uneasy relationship between population and sustainable development. On the one hand, population growth is always used as a proxy measure for social sustainability because data on population is readily available in contrast to other human variables such as values, culture and institutions. On the other hand, population policy prescriptions such as birth control are seen as antithesis to the rights-based approach to sustainable development. But in a finite world, there are limits to growth which demand a serious rethinking of population issues. As Malaysia eagerly joins the global economy, it cannot continue to overcrowd and over-consume following the trajectories of the rich societies in the North.

The preceding discussion points to areas of action that are within the reach of government authority to influence through instruments of public policy. It also brings home the fact that the absence of population pressure akin to China and India for instance does not automatically eliminate the importance of population policies that are sensitive to the needs of sustainable development. For instance, even if population growth is not the issue, where people choose to live will influence the environment and the level of exposure to risk. Moving forward, the following actions may soften the impact of population growth on the environment in Malaysia:

1. Establish a holistic land use policy which is based on river-basins rather than state administrative boundaries to ensure water, energy and food security for all;
2. Strengthen the pricing mechanism for water and electricity supply to control unnecessary wastage by consumers;
3. Synergise urban development especially for new housing and industrial estates with the carrying capacity of respective water catchments to avoid future water shortages;
4. Empower the federal government to enforce environment-related legislations at the state and local levels especially in protecting environmentally-sensitive areas from illegal or legal-but-lethal encroachments; and
5. Develop policy intelligence on the nexus between migrant workers dynamics and environmental change to understand the effects of their migration on Malaysia's human-environment systems, be they on socio-economic stratification, urban livability, gender dynamics, and cultural factors.

The convergence of population growth and global warming is likely to create immense challenges for Malaysia in the medium to long term.

At the time of writing (December 2014), a significant part of the East coast of Peninsular Malaysia is submerged under water in arguably one of the worst episodes of flooding in the country. In the age of climate change the causes of flood disasters are no longer solely an act of God but also a result of man-made hazard due to uncontrolled land use. Without the political will to the above-mentioned actions, Malaysia's quest for sustainable development remains in serious jeopardy.

Notes

- ¹ US President Nixon, in his 18 July 1969 speech, announced the establishment of the Rockefeller Commission on Population Growth. The US State Secretary Henry Kissinger signed the National Security Study Memorandum (NSSM 200) in April 1974, calling for the United States to provide world leadership for population growth control (Collins, 1995).
- ² In 2012, Southeast Asia's megacities of Jakarta and Manila, both clocked a whopping population of 26 million and 22 million respectively.
- ³ By far the world's densest urban areas are on the Indian subcontinent. Dhaka's density is 44,400 people per square kilometre.

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