

Moving Towards Embracing Sustainability: Learning from Doing in the Extended Mega Urban Region, Kuala Lumpur

Ke Arah Memupuk Kelestarian: Belajar dari Tindakan di Wilayah Perbandaran Mega Diperluas Kuala Lumpur

AZLIYANA AZHARI, NOR FAIRUZ ABU BAKAR, SITI UMIRA SULAIMAN, NAJIHAH MAT LAZIM, J. J. LAJUNI, ABDUL SAMAD HADI, AHMAD FARIZ MOHAMED, SHAHARUDIN IDRUS & ABDUL HADI HARMAN SHAH

ABSTRACT

The embracing of sustainability and liveability of an extended urban region depends on several underlying factors related to the three pillars of sustainable development. We have identified some of these factors: the soundness of collaboration between stake holders to create functioning institutions; effective governance to ensure feasible implementation and monitoring of plans and policies, the consideration related to the physical environment, creation of favourable social sphere, and balanced economic drivers such as industrial and retail diversity. In ensuring Malaysia's rapid development, the industrial sector was promoted, thus encouraging domestic and foreign investments and diversified industrial activities. Industrial growth is important to boost up the economic growth. However, the growth of industrial areas in cities makes it a very vulnerable environment for people to live in, for their pollution threats. Retailing is the main component that contributes to the liveability of a city centre because this will encourage residents to visit the central business district. However, for traffic congestions there is a need for regional redistribution of marketing such as regional shopping complex. Retail planning is compulsory in order to sustain from either the arrangement or distribution of the shops. Seremban Town Centre showed that the retail outlet has moved to sell "high end" products. Education is one of an essential tool for achieving sustainability. An education for sustainable development is based on an integrated approach to economic, environmental and societal development as well as encompasses a broad range of related issues. Governance in sustainable development institutions can refer to the procedures and processes as a bridge that will link to sustainable development. The process of effective governance in achieving sustainable development requires the proactive involvement of all parties.

Keywords: Embracing sustainability; mega urban region; learning from doing

ABSTRAK

Tiga teras pembangunan mampan merupakan faktor asas dalam merangkul kemampanan dalam kehidupan sebuah kawasan bandar. Kami mengenal pasti beberapa faktor iaitu pengukuhan kerjasama di antara pihak berkepentingan dalam mewujudkan institusi yang berfungsi, urus tadbir yang berkesan untuk memastikan perlaksanaan dan pemantauan polisi serta dasar-dasar dilaksanakan, pertimbangan yang berkaitan dengan persekitaran fizikal, penciptaan bidang sosial yang baik, pemacu ekonomi yang seimbang seperti kepelbagaian industri dan peruncitan. Bagi memastikan pembangunan yang pesat di Malaysia, sektor industri telah diutamakan dengan menggalakkan pelabur domestik dan luar negara melabur dalam pelbagai aktiviti industri. Perkembangan industri penting untuk meningkatkan pertumbuhan ekonomi. Walau bagaimanapun, pertumbuhan kawasan perindustrian di bandar-bandar menjadikan persekitaran yang terdedah untuk orang ramai tinggal mengalami ancaman pencemaran kepada mereka. Peruncitan merupakan komponen utama yang menyumbang kepada daya huni pusat bandar kerana ia akan menggalakkan penduduk untuk pergi ke kawasan tumpuan perniagaan. Walau bagaimana pun, bagi kesesakan lalu lintas, keperluan dalam pengagihan pemasaran perlu dilakukan seperti kompleks membeli belah. Perancangan dalam peruncitan terhadap susunan atau pengedaran kedai-kedai adalah perlu. Pusat Bandar Seremban menunjukkan bahawa kedai runcit telah dipindahkan bagi menjual produk yang lebih mewah. Pendidikan adalah salah satu alat yang penting untuk mencapai kemampanan. Pendidikan untuk pembangunan lestari adalah berdasarkan kepada pendekatan bersepadu dalam pembangunan ekonomi, alam sekitar dan sosial serta merangkumi pelbagai isu-isu lain yang berkaitan. Urus tadbir dalam institusi pembangunan mampan boleh merujuk kepada prosedur dan proses sebagai panduan menghubungkan kepada pembangunan mampan. Proses urus tadbir yang berkesan dalam mencapai pembangunan lestari memerlukan penglibatan proaktif daripada semua pihak.

Kata kunci: Kelestarian; kawasan bandar mega; belajar daripada melakukan

INTRODUCTION

Development is a process of change involving a combination of long term process of structural and societal transformation (Shum and Yap 2007; Harris 2000). This process, although crucial for the improvement of a nation and its population comes with a price towards the environment. In 1987, the World Commission on Environment and Development addressed the conflict between environment and development goals in the Brundtland Report by introducing sustainable development (Harris 2000). Sustainable development is development that meets the needs of present generations without compromising the ability of future generations to meet their needs (WCED 1987). Thus sustainability is crucial in the process of sustainable development. To achieve it, we need to work for it. This is the essence of this paper, embracing sustainability by undertaking programs and subjects to move the process towards sustainability.

Economic development is the process of increment in the absolute size of the capital or annual production provided that the absolute poverty line does not increase and the distribution of the income does not become more unequal (Harris 2000). The most important source of Malaysian economic growth has been the development of a substantial oil and natural gas industry in the 1970s and 1980s. There have also been important developments in manufacturing, particularly in electronics and textiles that provided new jobs in the urban sector. Urban retailing is also one of the main components of economic drivers in the city centre (Balsas 2004). It plays an important role to promote the liveable city centre and contribute to quality of life for human in order to achieve sustainability development. Here, sustainability of the city can be measure through liveability of the city centres.

Agenda 21 is an international document from the Earth Summit providing guidelines of implementing sustainable development globally, nationally and locally (Maisarah et al. 2012). In Agenda 21 of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro 1992 was stated that education including formal education, public awareness and training should be recognized as a process by which human being and societies can reach their fullest potential. Initiatives of applying agenda 21 in Malaysia have been taken by the government and non-profit organizations to expose issues regarding sustainable development and

providing environmental education to the community to increase awareness towards environmental protection (Maisarah et al. 2012).

In this paper, we will be sharing five study cases within Kuala Lumpur Extended Mega Urban Region

METHOD

The methods used in achieving these aims are by looking at five case studies, focusing on the governance, aspects of the physical environment, economic drivers including industrial and retail activities, and education in pursuit to evaluate whether we are moving towards embracing sustainability by reviewing and analyzing collated secondary data and field study to learn the reality of the situation.

The Kuala Lumpur Kuala Lumpur Structure Plan 2020 was examined to obtain figures for the physical environment segment for this study. The economic examples focused in this study are the industrial and retail activity. Secondary data from the statistic of Malaysian Investment Development Authority (MIDA) were collated to study the pattern of industrial growth in the Kuala Lumpur extended mega urban region. In studying the retailing activity of the Kuala Lumpur extended mega urban region, primary and secondary data we used in relating to the four components of the type of business, address, ethnicity and type of holding. All relevant published and unpublished records are considered as primary data collected through the collection of field work. Secondary data was taken from Seremban Municipal Council (MPS) with the help of the officials there. Data collection from the field is used to verify the retail activities other than obtaining information about the type of business, address, ethnicity and type of holdings. Field data on the types of business and the location of the stores were analyzed using Arc View GIS for identifying patterns of distribution.

Data for the aspects education and governance were gathered from various scholars and then analyzed for simple patterns.

RESULTS

This section is to share the justification of creating community spaces and to look at the commitment of Kuala Lumpur City Hall by studying the provision of this subject in the Local Structure Plan 2020. This segment is an introductory study on community

spaces in the mega urban regions across Malaysia. For our paper, we define community spaces as areas specifically designated and design for the city residents' use. These include parks, fields, public gardens, playgrounds, river/water fronts, plazas, community and sport centres and landscaped areas. Community spaces can also be viewed as community facilities and amenities.

A well-developed and enhanced physical environment of a city can be "valued" in term of its environment services contribution, role as economic driver and function in the enhancing of her societal standing as shown in Figure 1.

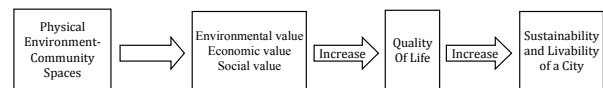


FIGURE 1. The relationship between a well-planned urban physical environment and the sustainability and liveability of a city

Source: adapted from AARP 2005

The explanations of the three physical environment's values are summarized in Table 1. Based on data from figure 1 and its description in table 2, it would seem that it make sense for a city to have a well-developed and considered community spaces.

TABLE 1. The value of a well designed urban physical environment.

Value	Explanation
Environmental Value	<p>***Biodiversity presence-green spaces, albeit small can provide ecosystem services and sustain biodiversity.</p> <p>***Regulates urban temperature thus reducing heat island.</p> <p>***Improve air quality because plants exchange CO₂ with O₂</p> <p>***Increase water retention in the soil and reduce flood due to decrease surface water movement speed.</p> <p>***Reduce pollutant.</p> <p>***Landscape-improve visual appearance.</p>
Economic Value	<p>*Business Attraction and Retention-High-quality green space has a significant impact on the economic life of urban centers because the presence of good parks, squares, and gardens can becomes a vital economic lever to first attract and then retain new businesses.</p> <p>*Tourism- In most cases, public parks and green space in, or immediately around, the town contribute to its attractiveness as a tourist destination.</p> <p>+ Industry/Employment Value- people directly employed within the public parks and green space industry; many others are employed in associated industries such as manufacturers of park-based equipment and products.</p>
Social Value	<p>***open spaces provide communities with a place to gather, thus fostering better relationships amongst them.</p> <p>***Well designed spaces instill some pride to residents in relation to the area where they live.</p> <p>***Create opportunities for communities to form volunteering groups, and Community Led Management, such as the Friends of Bukit Gasing group in Petaling Jaya.</p> <p>*** Parks and other community spaces help empower local people to take more control of their environment and give them an opportunity to become more active in their communities.</p> <p>****Public Health and Well Being-Public facilities provide places to exercise.</p> <p>+ Places for local residents to have horticultural therapy.</p> <p>***Places where relationship building process for families through picnicking, walks and gatherings.</p> <p>***Culture and Sport- Parks and open spaces enable individuals to revive their creativeness.</p> <p>+They are the heart and soul of cities; often retelling our heritage and injecting life into the built environment.</p> <p>+Many parks and green spaces have an element of historic association such as the name, a monument or commemorative features, with most telling the stories of the local community thus fostering residents' sense of belonging.</p>

Sources: *AARP 2005; **Handy 2002; ***Lajuni, 2012; +GreenLINK, 2001) **** (Pereira et al. 2011; ***** van Dillen et al. 2011

Kuala Lumpur, the largest city within the Lingi-Bernam extended urban region is endowed with good physical factors such as climate, natural resources such as rivers and established urban parks such as Titiwangsa Lake. Kuala Lumpur have taken

great consideration to ensure that the infrastructure, physical environment, city management and cultural, social and community facilities meet the highest expectations of the majority of its residents, workers, visitors and investors.

Table 2 list the number of Kuala Lumpur's community spaces as well as their area in hectare. Based on the number of available facility in relation to the total area of the city 243 km² (94 sq mi) and her population of 1.6 million as of 2012, it is clear that the existing number of unit does not meet the requirement of KL's population. However, DBKL recognizes the importance of community spaces

and has committed to increase the number of these spaces (Kuala Lumpur Structure Plan 2020 2012). The biggest commitment put forward by DBKL is increasing the number of local play area from 531 to 610, an increase of 79 units. Generally, though an area is designated as a play area, local communities tend to make this space as a multipurpose area by say, using it as a "kenduri" venue.

TABLE 2. Summary of existing and committed public open spaces in Kuala Lumpur

Types of Community Space	Existing		Committed	
	Unit	Hectare	Unit	Hectare
City Park	3	103.52	1	170.98
District Park	8	441.08	5	145.17
Neighbourhood Park	2	33.02	21	227.71
Local Park	35	65.82	18	36.91
Local Play Area	531	153.15	79	29.25
Sports Complex	22	167.62	10	27.16
Golf Course, Polo Field, And Forest Reserve	14	579.61	00	00

Source: Kuala Lumpur Structure Plan 2020 2012

An added current issue faced by KL related to its community spaces availability is the uneven distribution where not all the residents have equal access to these facilities. The city management acknowledges this problem and includes their commitment to solve the distribution concern in their KLSP2020. Creating a sufficient amount of community spaces should be one of the highest priorities of local authorities in order to create better sustainability and liveability of their cities and towns. In addition, these spaces should be evenly distributed among the communities and easily accessible in order for these spaces to realize their values as summarized in table 1. Based on the available data in the Kuala Lumpur Structure Plan, DBKL is on its way to embrace sustainability in term of providing more and better-distributed community spaces.

The second case study focuses on industrial activities as an economic driver which in turn is used to determine the economic and social pillar of sustainable development. The process of urbanization caused a great increment in the total number of industry since 1980 until 2010 as shown in Figure 3 below.

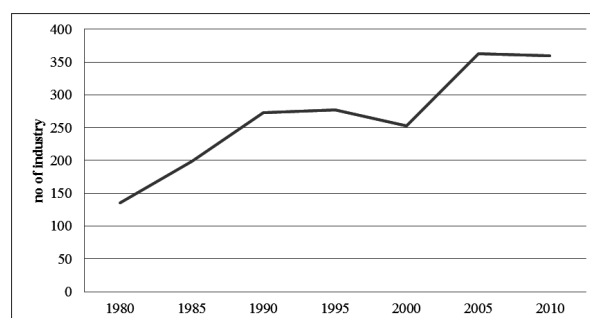


FIGURE 3. Total number of industries in the Kuala Lumpur extended mega urban region

Source: Malaysian Investment Development Authority (MIDA) 2012

In the past 30 years, the total number of industries in the Kuala Lumpur extended mega urban region has expanded from 130 industries in 1980 to 365 in 2010. In 2010, the total number of industries comprises 40% of the total number of industry in Malaysia showing that most of the economic driving activities of the country are carried out in the Kuala Lumpur extended mega urban region (source: Malaysian Investment Development Authority (MIDA) 2012). The growth of industrial activities in the city ensures the economic vibrancy of the city to remain at a sustainable level by providing job opportunities to the urban dwellers as well as generating income for the country and as the population.

The third case study is urban retailing, which is the main component in the city centre (Balsas 2004) and plays an important role to promote the liveable city centre and contribute to quality of life for human in order to achieve sustainability development. The sustainability of a city can be measure through liveability of the city centres. Good retailing will be able to maintain the business from generation to generation without disrupting the environment though wasting, pollution and so on.

Nowadays, Malaysia shows that we had implemented the culture of sustainability through the planning of the retailing. Retailing in Malaysia has undergo a continuous changes over decades depend on the demand of costumer (Lim et al. 2003), its showed via the changes of the latest trends in retailing product and the distribution of the retail shops. Changes in selling the product become an indicator for us and directly shows that we have already reach at the embracing stage for practice the culture of sustainability.

Through the existing of giant shopping malls, its shows that the retail system changes a lot into a modern shopping malls with complete facilities, entertainment and leisure activities. From the kinetic study, about 81% of Malaysian citizens choose weekend leisure destinations as shopping malls. In this paper, only the small-scale retailers were examined. The study area is at Seremban City Centre (SCC). Modernization of the shopping malls affects the flow of trading at traditional shops in SCC. The traditional shops in SCC also adapt to the new environment for compete with the urban retailing development (Abdul Samad Hadi et al. 2012).

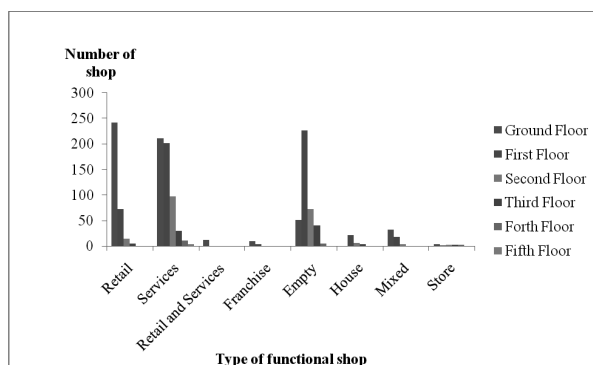


FIGURE 4. The total amount for each type of functional shop in different level of shop

Preliminary result shows that the total number of the shops at SCC is 1411, representing all shops on every floor. SCC has a building facade as unequal in terms of incremental due to modifications done by the shop owner (Seremban District Local Plan 2010). Here, the results shows that only six shop that exist in the upper level of the fifth floor. The shops in SCC divided into eight categories: retail, services, retail and services, franchise, empty, house, mixed-use and store. The figure X in the results show that retail is a major activities in SCC, which consist 43% from the total shops in ground floor follows by services 38%. While there is no housing exist in ground floor, 51 of the shops were vacant because the owners have moved to the more modern shopping malls near by.

Figure 4 shows that mostly shops in SCC function as a retail, services and vacant shop. There is lot of vacant shops covering the area because the owner prefer to invest for more livable place such as shopping complex due to existing new large scale deparment stores in Seremban such as Aeon in Seremban 2 and Tesco outlet. Here, the graph explained retail and services is highly demanding from the visitors. From the patterns that show functional diversity of shops selling goods that more specific showing that visitors who attend have the ability to have items that has been modernized explained they mostly have a stable income and shows one of the features for quality of life and contributing to livability of the city itself (Abdul Samad Hadi et al. 2012). It's clear that with the function of shops is an indicator overtly seen to understand the concept of a liveable life.

The fourth case is education. The better way to sustainability is through educational. School is the crucial platform to make human being conscious and knowledgeable about the environment and environmental problems. School communities, students, teachers, administrators and support staff encourage the practice and embrace environmental friendly practice in their way of life whether at school, home, in the community, outdoor and society. Based on the school system, education will develop the students through required knowledge and the proper attitudes towards environmental health practices as well as to provide opportunities for carrying out these practices (Figure 5).

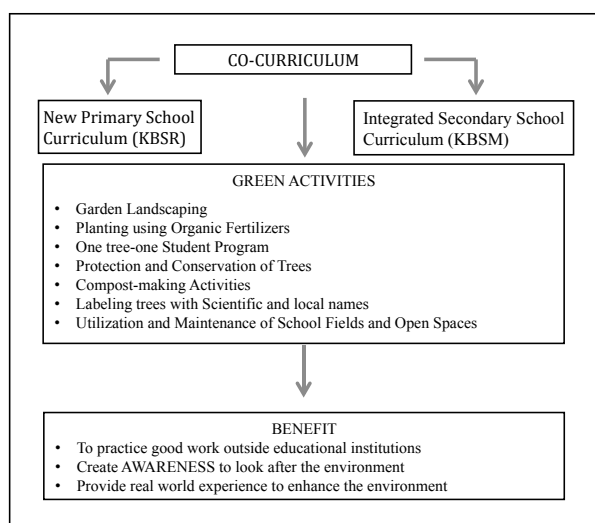


FIGURE 5. Education system’s contribution to environment sustainability

Source: Handbook on Establishment, Implementation and Assessment of Sekolah Lestari - Environment Award

In Malaysia, the New Primary School Curriculum (KBSR) and the Integrated Secondary School Curriculum (KBSM) emphasize environmental education across the curriculum. The elements of ‘about, through and for the environment’ and environmental values are assimilated within the teaching and learning methods in all school subjects. Through education, it contribute towards awareness among of the students about environment and the problems associated with make it them play their role effectively (Figure 5).

Figure 5 shows that co-curricular activities are an integral part of the curriculum. The co-curricular activities more provide educational activities to the students, and help in broadening their experiences. Co-curricular activities are defined here as the activities that enhance and enrich the normal curriculum during the normal class school hours. All co-curricular activities are organized with specific purposes that vary according to the nature and form of such activities. All these activities are designed to point student toward contributing to sustainability.

The last case is about governing all the activities in moving towards embracing sustainability. Without governance, sustainability may not be realized. Governance is a medium to achieve sustainable development; Figure 1 shows the framework and shows the connection between governance and sustainable development. It shows that the stakeholders such as government organizations, institutions; communities, non-

governmental organizations (NGOs), industry and others work together and mutually dependent on each other to get a good balance toward sustainable development. It also shows that, smart partnerships between the stakeholders are the basis for closer integration of the various parties who have an interest in focusing on sustainable development pattern. The stakeholders shared responsibility for planning, managing, implementing and monitoring sustainable development based on the goals, objectives and aspirations are clearly for the benefit and well-being (JPBD 2005) (Figure 6).

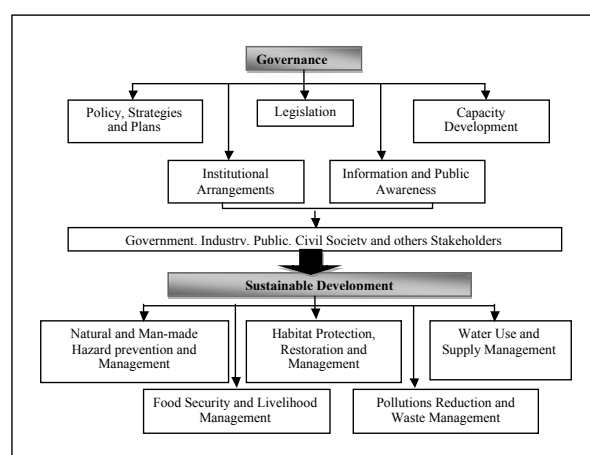


FIGURE 6. Governance toward sustainable development framework

Source modified: Jamaluddin Md Jahi 2002; Jamaluddin Md Jahi 2010 and Jacob et al. 2009

In parts of the mega urban areas, the interaction and connection between the stakeholders must be strong to ensure feasible implementation and monitoring of plan and policies toward sustainable development. Against, sustainability of a place needs a strong economy, good management and a stable political situation in order to achieve sustainable development. With this strong governance structure, such as allowing the government, industry, institutions and non-governmental organizations (NGOs) to listen difference views, suggestions and constructive criticism from each others can give a good impact for future action (Shaharudin Idrus & Abdul Hadi Harman Shah 2009; Jacob et al. 2009). The process of work towards sustainable development should be done in pure and transparent. In conclusion, strong governance which is proactive involvement of stakeholders is really important in achieving sustainable development.

CONCLUSION

Based on the discussion of the five study cases as examples of the activities related to sustainable development, we confident that the various levels of Malaysian society practice activities that are geared to pursue and follow process that lead to a more sustainable development, than they did in the past. In addition, the five cases also shows that Malaysians are embracing sustainability and hopefully this trend will continue.

REFERENCES

- AARP. 2005. *Livable Communities: An Evaluation Guide*. AARP Public Policy Institute, 601 E Street NW: Washington DC, 20049.
- Abdul Samad Hadi, Shaharudin Idrus, Abdul Hadi Harman Shah, Mohd Raffi Othman & Ahmad Fariz Mohamed. 2012. *Prosiding Seminar Antarabangsa Ke-5 Ekologi Habitat Manusia dan Perubahan Lingkungan di Alam Melayu*. Ur Press Pekanbaru, Indonesia.
- Balsas, C. J. L. 2004. Measuring the livability of an urban centre: An exploratory study of key performance indicators. *Planning, Practice & Research* 19 (1): 101-110.
- GreenLINK. 2012. Blue Sky Green Space Understanding the Contribution Parks and Green Spaces can make to Improving People's Lives. <http://www.green-space.org.uk/> access on 13 March 2012.
- Hadi, AS, Ibrahim, H., Jacob, J., WCED. 1987. *World Commission on Environmental and Development: Our Common Future*. Oxford University Press.
- Handy, S.L., Boarnet, M.G., Ewing, R., Killingsworth, R.E. 2002. How the built environment affects physical activity views from urban planning. *American Journal of Preventive Medicine* 23(2S).
- Harris, J. M. 2000. Basic principles of sustainable development. Working paper 00-04 Global development and environment institute, Tuff University: Medford, USA.
- Jacob, J., Hadi, A. S., Idrus, S., Idris, N., Iswan, E. 2009. For Sustainable governance in India: Some Consideration for a Conceptual Framework.
- Jabatan Perancang Bandar dan Desa (JPBD). 2005. Apakah Pembangunan Mampan? <http://www.townplan.gov.my/risalah/016.pdf>. Access on: 18 November 2011.
- Jamaluddin Md Jahi. 2002. =Issues and challenges in environmental management in Malaysia. *Malaysian Journal of Environmental Management* 3(9): 143-163.
- _____. 2010. *Pengurusan Alam Sekitar di Malaysia: Dari Stockholm ke Rio de Janeiro dan Seterusnya*. Bangi: UKM Press. Kuala Lumpur Structure Plan 2020
- Kuala Lumpur Structure Plan 2020. 2012. Kuala Lumpur Structural Plan. <http://www.dbkl.gov.my/pskl2020/english/>. Accessed on: 10 October 2012.
- Lajuni, J. J. 2012. Physical Environment Criteria. Presented at the Sustainable City-Environment Award Workshop, 13 - 15 March 2012, Promenade Hotel, Kota Kinabalu, SABAH
- Lim, Y. M., Nurwati Badarulzaman, & A. GhafarAhmad. 2003. Retail Activity in Malaysia: From Shophouse to Hypermarket. Paper presented at the Pacific Rim Real Estate Society 9th Annual Conference, 20-22 January 2003, University of Queensland and Queensland University of Technology, Brisbane, Australia.
- Malaysian Investment Development Authority (MIDA). 2012. Malaysian Investment Development Authority. <http://www.mida.gov.my/home/>. Accessed on: 23 November 2012.
- Maisarah, M., Zulhabri, I., Ruqayah, H. and Nasyairi, M. N. 2012. Malaysia under the purview of the united nations and Agenda 21. *World Academy of Science, Engineering and Technology* 72:1504-1508.
- Patrick Tan Hock Chuan, Shaharudin Idrus, Rosli Osman, Ahmad Fariz Mohamed, Mazlin Mokhtar & Abdul Samad Hadi. 2007. *Handbook on Establishment, Implementation and Assessment of Sekolah Lestari - Environment Award*, Department of Environment (DOE) & Institute for Environment and Development (LESTARI), Bangi.
- Pereira, J.J., Tan, P., Ahmad Fariz Mohamed, Shaharudin Idrus, Abdul Samad Hadi, Choong, M. C., Lajuni, J.J 2011. *Handbook on the Establishment, Implementation and Assessment of Bandar Lestari-Environment Award*. Institute for Environment and Development (LESTARI) and Department of Environment (DOE).
- Seremban Local District Pelan. 2015. Sebuah Daerah Metropolitan Menjelang Tahun 2015. 2010. Town and Country Planning Department, Negeri Sembilan.
- Shaharudin Idrus, Abdul Samad Hadi, Abdul Hadi Harman Shah & Siti Umira Sulaiman. 2013. Kemunculan Kuala Lumpur Sebagai Wilayah Perbandaran Mega Diperluas: Menongkah Dayahuni dan Kelestarian. Persidangan Kebangsaan Geografi & Alam Sekitar Kali Ke-4, Anjuran Jabatan Geografi dan Alam Sekitar, Fakulti Sains Kemanusiaan, Universiti Pendidikan Sultan Idris.
- Shaharudin Idrus and Abdul Hadi Harman Shah. 2009. *Governance for Sustainability View from the Asia Pacific*. Bangi: Institute Environmental Development (LESTARI).
- Shum, Y. L., Yap, T. S. 2007. Role of government and its agencies in promoting industrialization. In *Malaysian Economic Development: Issues and Debates*, edited by Har, W. M., 1-16. Malaysia: Harwaimun.com.
- United Nation Development Programme (UNDP). 1997. Governance for sustainable human development A UNDP policy document. <http://mirror.undp.org/magnet/policy>. Accessed on: 16 November 2011.
- Van Dillen, S.M.E., de Vries S., Groenewegen P.P., Spreeuwenberg, P. 2011. Greenspace in urban neighbourhoods and residents' health: Adding quality to quantity. *J Epidemiol Community Health* (2011). doi:10.1136/jech.2009.104695.
- World Commission on Environmental and Development (WCED) .1987. *Our Common Future*. Oxford: Oxford University Press.

Azliyana Azhari
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: azliyana.azhari@gmail.com

Nor Fairuz Abu Bakar
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: norfairuz@yahoo.com

Siti Umira Sulaiman
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: sitiumirasulaiman@gmail.com

Najihah Mat Lazim
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: eman_jiey@yahoo.com

J. J. Lajuni
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: jlajuni@yahoo.com

Abdul Samad Hadi
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: asamad@ukm.edu.my

Ahmad Fariz Mohamed
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: fariz@ukm.edu.my

Shaharudin Idrus
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
E-Mail: dinn6358@gmail.com

Abdul Hadi Harman Shah
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia

Received: 12 July 2015
Accepted: 19 February 2016