

The Potential of Lake in Generating the Urban Community Development. Case Study: Putrajaya Lake, Federal of Putrajaya

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Abstract

Lake is not only the recreational area for people but also promote physical and economic development. Lake in urban environments is an important sources to remote and protects our natural environments. Lake also gives benefit to create positive social, culture and physical development in urban community. In Canada, the Ontario Lake is an *axial development* of their commercial, residential, tourism and also as recreational areas. However, in Malaysia lake development is still diffident and less comprehensive as a community centre in socio- culture environment. Therefore, the purpose of this study is to interconnect the design implementation and the potential of Putrajaya Lake with the Putrajaya community and the land use (commercial, residential, recreational and administration) areas. The research methodology is based on site inventory, site analysis and also using primary and secondary data. The findings were used in helping Putrajaya Lake expand its *sense of ownership* among their community as well as in constructing Putrajaya Lake as an enormous destination of water recreation. Furthermore, Putrajaya Lake is known to have an acceptable urban setting condition with higher quality water level to cater its multi-functional uses such as for boating, fishing, recreational and water sport. This will help Putrajaya to achieve its inspiration of "*City in a Garden*".

Keywords: Lake, Urban, Community, Development, Axial, Sense of Lively

1.0 Introduction

Lake is known to be utilized in various aspects of development, planning, land use and local design. It provides more benefit for various parties and many sectors in the economic, socio-cultural and physical development. Lake should be maintained as water a source that provides as eco-tourism, watershed and recreation area to urban community. It's also as a main heart for landscape development to public or civil society in creating a healthy and multipurpose space. According to Povilaitis and Querner (2008), a lake is vital for protecting biological diversity and ecosystems. Also it provides a major contribution to the economy of the situated area. This study is to embrace the inspiration of Putrajaya Lake as a '*sense of ownership*' to all local people and create sustainable development between the lakes and space interconnection in design implementation. It is also to make Putrajaya as a '*A City in A Garden*'. The main objectives of this study are (i) to identify the lake potential in socio-economic development and (ii) to analyze the design approach at Lake Corridor and surroundings. The lake formation and planning is important in generating the urban community development. The techniques and philosophy of lake development should be balanced and sustainable between the nature environment and integration of human activities. This will create a balance and effective relationship between local ecology and land use. The creation of man-made lake at Putrajaya marks a new chapter in the development history of modern Malaysia.

2. Literature Review

2.1. Lakes

2.1.1. Definition of Lake

Lake as stated by oxford dictionary can be defined as a large area of water surrounded by land. It is also defined as a relatively large body of slowly moving or standing water that occupies an inland basin of appreciable size by Robert K. Lane in Encyclopedia Britannica. Thomas (2010), lake defined as any body of water, other than ocean, that is for reasonable size, impound water, and has little or horizontal movement of water. However, there is not precise definition for lake. Water in lake mostly comes from river, rain, melting ice, snow, or groundwater. Lake can be an open or closed lake. Open lake is where the water flow in and leave the lake by river or other outlets while closed lake is where the water leave only by evaporation. Lake can be in terms of fresh or salted water and

be a habitat for fish, plant and other organisms. Lake also is a large source of freshwater. It also provide cultural, economic and recreational significant to the people in the world.

2.1.2. Type of Lake in Putrajaya

Lakes in Putrajaya mostly are an artificial lake and it is constructed to provide recreational and educational activities for people. For instance, is Putrajaya Wetland Park; it was divided into two compounds that are Wetland Putrajaya Park and Lake Recreational Park. Wetland Putrajaya Park is the first constructed freshwater wetland that attracts a migratory birds, have attractive marshland, and emergent vegetation to provide biodiversity of wildlife. Meanwhile, for Lake Recreational Park it serves as water recreational sport area. Besides that, there is also a manmade lake designed at the centre of Putrajaya to provide a recreational area for fishing, water sport and water transport. Furthermore, it also acts as a cooling effect to the city and generates economic value when it gains its popularity as a tourist attraction.

2.2. The Potential and Impact of Lake to Generate Urban Community

A lake is a relatively large body of slowly moving or standing water that occupies an inland basin of appreciable size (Rafferty, 2011). A lake might be isolated, with no observable direct water input and occasionally no direct output (Asyraf, 2013). A lake ecosystem is a community of interacting animals, plants and microorganisms and the physical and chemical environment in which they live. Natural resources such as flora and fauna that exist in lake may become sources of food, aesthetical value and environment sustainability for the community and its surrounding. Lakes are among the most dynamic environments, a means to uphold the cyclical relations within the ecosystem and thus maintain the ecological services such as clean water and air, biodiversity hotspot and supporting life of the people in the areas and also a melting pot for nature tourism for the country (Nyaupane & Paudel, 2011).

In addition, it also contributes to ecotourism sector for community and country. This ecotourism benefits not only protects the environment, but also helping changing the local communities incalculating positive manner (Chaynee, 2005). However, it also helps in sustaining the temperature of surrounding that provides convenient place for meeting. Ecotourism encourages responsible travel to natural areas that maintains the integrity of ecosystem and provides profitable incomes for the local communities (Asyraf, 2013). Wenchi Krater Lake is a good potential for such tourist activities such as hiking, boating/ canoeing, horse riding, forest exploring, spa bathing, medical tourism trekking, adventure, and other leisure activities (Ketema, 2014). Furthermore, it provides multitudes uses for human settlement and habitation including drinking and public water supply, commercial, and recreational fisheries (Asyraf, 2013).

In most big scale lakes area of Malaysia such as Kenyir Lakes, Bakun Lakes, and Chini Lakes plays an important generator for hydroelectric. It is reported that lakes in Malaysia supply about 3600 MW that is around 6% of the power demand (Asyraf, 2013). This may also help to contribute towards the country's economy or development. The lake also provides a visual benefit where it gives picturesque scenery landscape, culture and nature with its ability of ecosystem in accepting managed level of visitors, historical monastery built in the 15th Century and cultural landscape being shaped (Ketema, 2014).

3.0 Site Study

Putrajaya Lake is the man-made lake and located at the centre of Putrajaya City. The 400 hectares Putrajaya Lake was created by inundating the valleys of Sungai Chuau and Sungai Bisa. The construction was started in 1998 and fully completed in 2002. The lake is designated as a natural cooling system as well as for water activity, recreation and fishing. The lake is at the southern part of the wetland. About 40% is remaining from the direct discharge from bordering promenade and 60% water flow of lake is from the Putrajaya Wetland. The total volume of the whole lake water is about 23.5 million cubic meters and the water depth is in the range of 3 to 14 meters. The lake and its foreshores also form Putrajaya's most popular resource for informal recreation as a waterfront city.



Figure 3: The location and view of Putrajaya Lake (Putrajaya Waterfront). Source: <http://www.ppj.gov.my>

4.0 Methodology

In this study the potential of lake in generating the urban community are discussed in two different facets. Firstly, is to study the interconnection of lake on the physical and socio-economic development in the community. Secondly, to review the design approached by Putrajaya Cooperation and Putrajaya Holding in providing the activities on Putrajaya Lake. As a method, the inventory, analysis and data collection on site study were used (*Refer Figure.4*). Additional data such as land use and cultural development included. Meanwhile, the adaptation and reviewed of landscape ecology in coastal lake were referred to the lake function and the water quality.

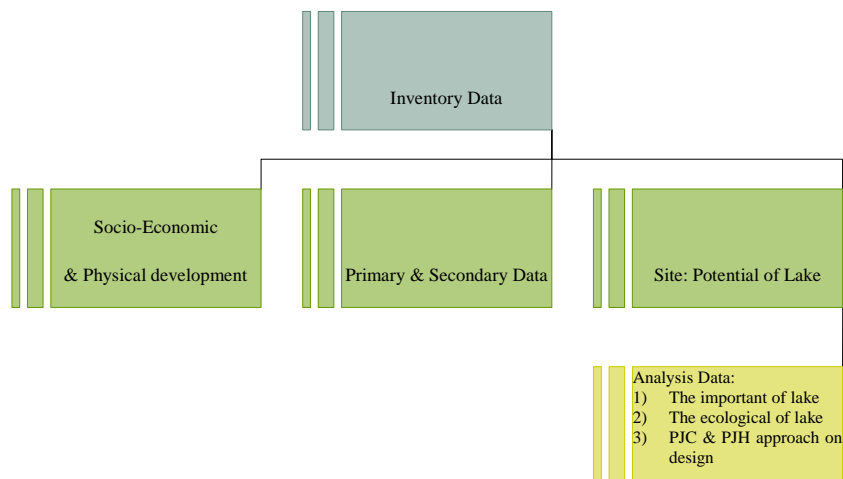


Figure 4: Flow chart for Research Design. Source: Author, 2015.

5.0 Data Analysis and Findings

The research analysis shows that Putrajaya Lake contribute more on physical and ecological aspect in the design development. That contribution has led to the establishment of effective and possessive community in Putrajaya. In this study, the analysis and findings were divided into three (3) category which are the design approach (Philosophy of Design), physical and land use and socio-culture. The research shows, Putrajaya Lake is capable to improve the quality of life and community growth. It is influenced throughout the proper planning, design and implementation of Putrajaya via Putrajaya Cooperation (PJC) and Putrajaya Holding (PJH).

5.1. Design Approach (Philosophy of Design) of Putrajaya Lake

The planning and design evolution of Putrajaya Lake is based on four (4) main levels which are: (a) the zoning of land use was divided into hierarchy and interests of place, (b) division of facilities, infrastructure and circulation in physical requirements, (c) fractions zone for green area or *green lung* and recreations area, and lastly (d) the construction of water sources for lakes and wetlands. (*Refer Figure: 5.1*)

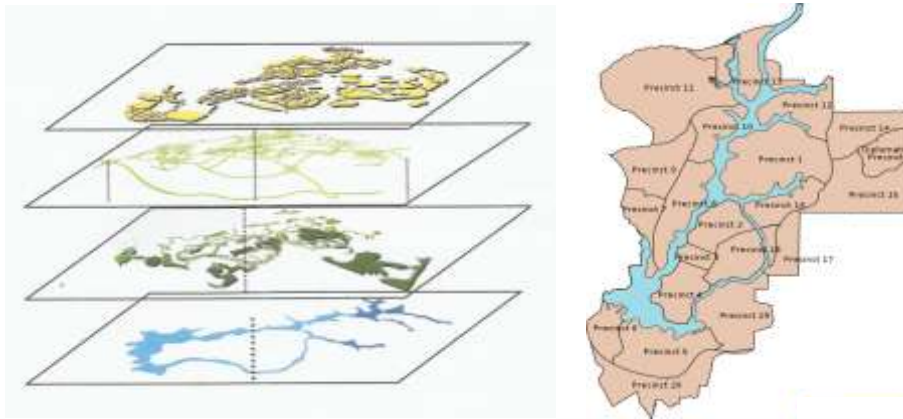


Figure 5.1: The planning and design evolution of Putrajaya Lake based on the theme of City in the Garden.
Source: Putrajaya Cooperation, 2001.

In the construction of Water Lake, the Putrajaya Cooperation (PJC) and Putrajaya Holding (PJH) were provided golden opportunities for communities. Lake covered an area of 400 hectares, creating 38 kilometers of shoreline (Putrajaya Cooperation, 2006). The study found that PJC and PJH were embarked on innovative planning and recreation space to create of community bonding, sense of lively and values of life in multi cultural of Putrajaya community. The lake recreation available with the water sport activities including canoeing, sailing, boating and also cruising for Putrajaya community and tourists.

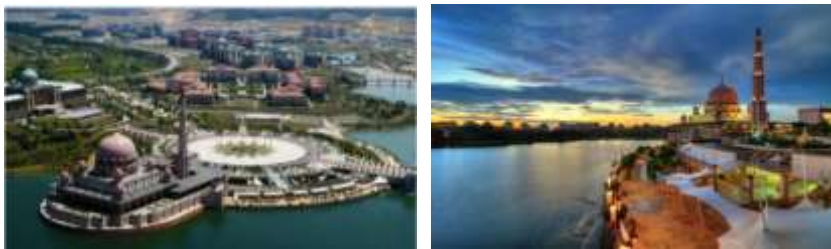


Figure 5.2: Putrajaya Lake as centre-hub (green lung) for Putrajaya development.
Source: <http://www.malaysiacentral.com/information-directory/federal-territory-of-putrajaya> (2013)

The data analysis shows that Putrajaya Lake philosophy was balanced with their physical and ecological. The planning concept was sustainable in their environmentally, economically and socially designs. The study found that by almost 40% of its total city area of Putrajaya specifically for water elements, green and open space. In the design approach, PJC and PJH were encouraged to have of good interconnections between the lake and corridors, lake with the infrastructures and the lake with space and surroundings. In the interconnections of lake with the corridor, the lakeside promenade was identified as good linkages. Its magnificent attractions and sheer beauty of lakeshore by provider of jogging and cycling track, bird watching, observations decks, bush walking and also for relaxing area. The lake was designed to cater for multi-functional uses including recreation, fishing, water sports, water transportation and provided opportunities for educational and research activities. It's also creates a multipurpose space for social interactions with the local community and tourists. Analysis also shows that design approach that was used by PJC and PJH was intended to merge the lake with the vibrant ecosystem and futuristic architecture styles.



Figure 5.3: The interconnection design of pathway with the lake corridor at Putrajaya.

5.2. Physical and Land Use

Based on the physical and land use planning of Putrajaya, more than a third of the total area (37.6%) is reserved for open space including of Putrajaya Lake (Putrajaya Cooperation, 2003), refer Table 5.2. The physical land use of lake is line with the garden city concept as a lake in the green lung and center area. It was important to introduce nature into city. The study shows that lake as a main attraction in land use planning. Which are the ranges of Government land use included areas designated for Government offices and official residence are facing to the front lake and nearest with the lakeshore. Results shows that, Putrajaya Lake is promoting the city with identity and character are parallel with the concept of ‘A City in A Garden’ within a man-made water body. The physical planning of lake area also offered efficient accessibility to facilities, services and place to work. Besides, close to nature and urban ecology. Inclusive, the main land use features at Putrajaya are created by 38km man-made lake and large partition of the city area is designated as green open space and water bodies.

Table 5.1: Land use components at Putrajaya. Source: Putrajaya Holding, 2010.

Land Use	Area (ha)	Percentage
Government	235	4.6
Residents	711	14.4
Commercial	139	2.8
Mixed-use	41	0.8
Special Use	138	2.6
Service Industry	11	0.2
Public Amenity	344	7.0
Open Space & water bodies	1,930	39.2
Infrastructure & Utility	483	9.8
Road	908	18.4
Total	4,951	100

5.3. Socio-culture (Community)

In Putrajaya, Residential land use constituted the second largest land use category with 25.5% of the total area, covering a total of 2,888.8 acres which is capable of supplying about 67,000 dwelling units (Putrajaya Cooperation, 2006). Putrajaya Lake is given a deluxe life-style for the community. The idea of community lake-side living becomes true with the good and beauty of panoramic. Based on the data analysis, of all the Putrajaya residential developments, only Perdana Lakeview West and Perdana Lakeview East were front to the Putrajaya Lake. Its making the communities more exclusive addressed in Putrajaya.

The panoramic view of lake was given phenomenal of natural beauty and aspires the elite groups to live. The study found that, lake is potential to provide more oases of tranquility for residents and merge the vibrant ecosystem. The Perdana Lakeview community also using the lake as a space for their community events, including fishing competitions, outdoor boating and water sports competitions. Putrajaya Lake had contributed towards leading a healthy and quality urban life for residents with integrated neighborhood and community atmosphere. Besides, promote of dynamic, lively and community that is close to nature.



Figure 5.4: A deluxe lifestyle at Perdana Lakeview West, Putrajaya and the International Hot Air Balloon Fiesta in March 2013.

Source: <http://www.malaysiaicentral.com/information-directory/federal-territory-of-putrajaya> (2013)

6.0 Conclusions and Recommendations

Putrajaya is known for its uniqueness in terms of its philosophy development and design. This philosophy is guided by the fundamental trinity of human relationships between man and his creator, between man and his fellow man, and between man and his environment. Putrajaya Lake constitutes the largest consolidation of open space within the city. Essentially, the development and design of Putrajaya Lake is based on the theme of garden city that is in harmony with its natural environment yet unique and spirit of place to their community. It is also improves the Putrajaya environment and quality of life, as well as wonderful place to live in, work and play. The landscape also integrated into the surroundings. Residents can look forward to enjoy easy access to the extensive Putrajaya Lake.

Furthermore, the lake also offers a tremendous opportunity to create a world class sustainable natural environment. The lake corridor provides the waterfront city with nearly all the precincts enjoying the direct access (interconnection) and frontage to the Putrajaya Lake. This opens up new opportunities for waterfront usage and Putrajaya Lake to be developed for tourist and leisure activity. Major features and opportunities of a waterfront city are the 38 km of Waterfront Promenade and the existence of green corridors, parks, and wildlife at the door step of urban dwellers. Currently, Putrajaya Lake provides a water taxis and cruise boats to ferry residents and tourist between city destinations. The sheer beauty of Putrajaya lakeshore also make its ideals for jogging, cycling, bush-walking, bird-watching, kite flying and relaxing area.

Overall, the planning concept to detailed designs of Putrajaya Lake, are designed to create a rich and beautiful setting in which the city and its community can play their parts in using the service. It is also have a good integration between the lake and the green and infrastructures. In the future, the lake can also be used for harvesting rain water and developed water sports that gradually promoting its attractive venue for national and international water sports event.

The contributions of this study were given more aspiration to community in providing higher quality of living environment. Besides, the lake as a 'benchmark' in creates the sustainable development and emphasis the planning and design process at Malaysia. It also can be a great place or center for congregation consists of public square, public facilities, meeting places and also shops. This study also gives more guidance to development of Ecotourism Lake in Malaysia by providing the ecotourism activities such as children and young promenade, management of ecotourism area, proper disposal and reduction of wastes and also as a hosting –serving –cultural and coastal establishment.

7.0 References

- A.P. (2015). Lakes retrieved 17/07/2015, from <http://www.basicbiology.net/environment/freshwater/lakes/>
(2006) Oxford Wordpower Dictionary, Great Clarendon Street.:Oxford University Press Publication.
- Asyraf, M. K.M. (2013). Rivers, Lakes, and Swamps: Sustainable Approach towards Ecotourism, Proceedings of the 3rd Regional Conference on Tourism Research, 29-31 Oct, 2013, Langkawi, Malaysia.
- Cech, Thomas V. (2010). Principles of Water Resources: History, Development, Management, and Policy. U.S.: John Wiley & Sons Publications.
- Chaynee, (2005). Benefits of Ecotourism for local communities. http://www.mier.org.my/newsarticles/pdf/chaynee17_10_2005.pdf (7 August 2012)
- H.Pertti, Z.Giuliano. (2000). Hydrological and Limn logical Aspects of Lake Monitoring. John Wiley & SonsPublications.
- Jayeshe. (2012). Brief Essay on the Formation of Lakes retrieved 17/04/2015 from <http://www.preservearticles.com/2011110116434/brief-essay-on-the-formation-of-lakes.html>
- Ketema T. D. (2014). Development of community based ecotourism in Wenchi Crater Lake, Ethiopia: Challenges and prospects, J. of Hospitality and Management Tourism, Vol. 6(4), pp. 39-46.
- L.Robert K. (2015). Lake: Physical feature. <http://global.britannica.com/science/lake/Water-level-fluctuations>
- Nyaupane, G. P., &Poudel, S. (2011). Linkages among biodiversity, livelihood, and tourism. Annals of Tourism Research, 38(4), 1344-1366.
- National Geographic Lake. (2015). <http://education.nationalgeographic.com/encyclopedia/lake/>
- Perbadanan Putrajaya. (2015). The Putrajaya Lake & Wetland. http://www.putrajaya.gov.my/tourist/attractions/lakes_wetlands/the_putrajaya_lake_wetland
- Putrajaya Intelligent Garden City. (2009). Tourism Malaysia, Ministry of Tourism.
- Perbadanan Putrajaya and Putrajaya Holding (1999) Putrajaya Wetlands, Petaling Jaya.
- Perbadanan Putrajaya (2003) Putrajaya , D'Synergy Sdn Bhd.
- Putrajaya Corporation (undated) Putrajaya Booklet on Putrajaya attraction and Getting there.
- Rafferty, J. P., (2011). The Living Earth Conservation and Ecology, Britannica Educational Publishing.