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Ex-landfill Redevelopment and Adequacy of Open Space Provision: An Integrated Approach in Malaysia Urban Development

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Abstract
This paper presents a review of the needs of ex-landfill redevelopment and the adequacy of open space provision in the context of sustainable urban development planning in Malaysia as seen from the perspective of the National Urban Policy. With a specific focus on the Action Plan DPN6 and DPN9, ex-landfill redevelopment needs and provision of open space are detailed to identify their potential and constraints in the development of sustainable cities. As a result, this paper found a link between the needs of urban ex-landfill redevelopment and approach to provide adequate urban open space. Through the proposal of the development of public park at urban ex-landfill sites, the needs of ex-landfill redevelopment and the adequacy of urban open space provision is being 'united' and translated as an approach to create a sustainable urban development in Malaysia.
Keywords: ex-landfill redevelopment, open spaces, National Urban Policy, sustainable urban development

1. Introduction

The pace of urbanization experienced by Malaysia, a member of group 1 developing countries with an urbanization rate of more than 70.0% (Liu, 2013) is not the only factor in increasing the demands for urban services caused by the increase numbers of urban population, but also resulting in the expanding and spreading of the urban areas through the impact of the urban sprawl (Haliza, 2013). Urban sprawl was being identified as the cause of the increase in the total area of the ex-landfill sites within the vicinity of the urban areas and urban settlement. The existence of the urban ex-landfill is expected to increase to 296 in the year 2020. These create needs to redevelop urban ex-landfill as a new urban resource that will be beneficial to the enhancement of urban space and urban communities (Ministry of Housing and Local Government, 2004). Moreover, urbanization and urban sprawl were identified as the causes of the lack of open spaces as urban land-use in almost all Malaysia city centers. These issues have become the reasons for urban administrator for not providing adequate open space as set by the planning standard, which is 2 hectares of open space per 1,000 urban population (Abd. Mutalib, 1999; Department of Town and Country Planning Peninsular Malaysia, 2010).

Therefore, this paper aims to identify the need of ex-landfill redevelopment and adequate urban open spaces provision from the perspective of the National Urban Policy. Action Plan DPN6 and DPN9 are specifically being detailed to meet the objectives in translating the relationship between the development needs of the urban ex-landfill and the adequacy of provision of urban open space, in creating a new approach that could support the existence of sustainable urban development in Malaysia.

2. National Urban Policy and Sustainable Urban Development in Malaysia

National Urban Policy is a policy plan developed to guide and coordinate the development of the municipality in Malaysia to be more efficient and systematic (Department of Town and Country Planning Peninsular Malaysia, 2010). This policy gives particular attention to the aspects of urban social, economic and physical balance, as a way to achieve the goal of 'creating a visionary urban communities and prosperous life through sustainable urban development'.

With 5 Cores and 30 Action Plans, National Urban Policy is being regarded as the best planning strategies for every municipality in Malaysia to achieve sustainable urban development. This is due to fact that this policy have set all the implementations steps to ensure the success of each Core through the implementation of efficient and effective municipal, creating a strong, dynamic and competitive economics, providing an integrated transport system and efficient delivery services in the urban areas, providing a quality infrastructure and utilities, creating livable and identity urban environment and developing an effective urban governance. In order to ensure successful implementation of this policy, the cooperation of all parties are required, especially the urban administrator, or also known as Local Authority. This is due to the fact that as an urban administrator, Local Authority plays the most important role in ensuring the success of policy implementation and making decisions that could influence the achievement of sustainable urban development status on its administrative area.

3. Action Plan DPN6 and Ex-landfill Redevelopment

Action Plan DPN6 is stated in Core 1 National Urban Policy. It aims to create a development of an efficient and effective municipal. The Action Plan states that urban development should give priority to the redevelopment of urban areas. In this study, the development needs of urban ex-landfill were detailed in the two implementation steps outline, namely:

i) Plan and prepare programme for brownfield redevelopment

ii) Regeneration of potential areas for development

Based on 'Planning guideline for brownfield redevelopment', ex-landfill is identified as a component of brownfield (Department of Town and Country Planning Peninsular Malaysia, 2012). Ex-landfill is Malaysia development context is defined as a landfill that is no longer in operation, which means adding activities or waste disposal has been stopped or completed. Meanwhile urban ex-landfill means ex-landfill which is located within the vicinity of urban areas.

In the context of Malaysia's development, rapid urbanization and the expansion of urban areas due to the impact of urban sprawl has increased the number of ex-landfill at urban areas. In 2003, there were 115 ex-landfills (Ministry of Housing and Local Government, 2004). The number increased to 131 in 2012 and is expected to increase to 296 when all landfill sites in Malaysia ceased their operations in the year 2020 (National Solid Waste Department, 2012). Of these, 70% are expected to be located in the vicinity of urban areas and be a part of the city's image and the urban built environment. It is also identified that 13 numbers of the ex-landfill has areas of more than 8 hectares (Mazifah et al. 2014).

Despite the negative issues of ex-landfill that threaten the quality of life and quality of the urban environment, such as the production of landfill gas emissions and leachate, and health and safety risk to the surrounding community (Vreijhead, 2000; Aliyu et al. 2011; Fauziah & Agamuthu, 2012), ex-landfills are also being identified as a potential new resource to address the issues of inadequate urban open spaces and the deterioration of urban green space (National Landscape Department, 2012).

3.1 Ex-landfill Redevelopment As Urban Open Space

The requirements for ex-landfill to be redevelop have been specified in the Guideline for the safe closure and rehabilitation of municipal solid waste landfill sites (Ministry of Housing and Local Government, 2004). Based on this guidelines, the redevelopment of ex-landfill in Malaysia has been limited to five types of development, which are agricultural areas, public parks, parking areas and roads, low-capacity residential areas and commercial or industrial areas. From the five types of development, the redevelopment of ex-landfill site as a public park is decided by the National Physical Planning Council as the most appropriate type of development and should be the redevelopment priority (National Physical Planning Council, 2004). As a body that serves as an advisor in determining the direction of physical development planning in Malaysia, the National Physical Planning Council's decision becomes the basis of the policy in guiding the redevelopment of ex-landfill in Malaysia.

Therefore, to ensure the implementation of step (i) DPN6 is applied; urban administrators need to plan and prepare redevelopment programme for ex-landfill based on the National Physical Planning Council's decision, which makes the development of a public park as a development priority for ex-landfill. Meanwhile, the implementation of step (ii) DPN6 clearly demands for every and each of urban ex-landfill in Malaysia to be redeveloped. It is not only based on its development potential as has been recognized by the National Landscape Department (2010) and other researchers (Hernik et al. 2011; Greenberg et al. 1998) but also by the fact that there are an increasing numbers of ex-landfill within the Malaysia's urban and settlement vicinity.

Through the implementation of the redevelopment of urban ex-landfill sites as a public park, the total of urban open area will increase into 329.9 hectares (Table 1). Although its only give an increase of 2.4% of the total area of existing parks in Malaysia, but its positive impact is enormous. The development of public park at urban ex-landfill is not only contribute to the increase of social recreation opportunities to 164,950 urban population, but also to create 11 Local Parks and 2 Town Park that could supports the achievement of Malaysia's vision as Garden Nation.

Table 1. Potential of public park development at ex-landfill sites (based on 2003 data)

Types of open space	Quantity	Percentage (%)	Total acreage (hectares)	Potential as public park (2 hectares: 1,000 urban population)
Playground	5	10.6	2.1	1,050
Neighbourhood Park	9	19.1	11.4	5,700
Local Park	20	42.6	62.9	31,450
Town Park	11	23.4	163.5	81,750
State Park	2	4.3	90.0	45,000
Total	47	100.0	329.9	164,950

Source: Adapted from Ministry of Housing and Local Government, 2004 and Department of Town and Country Planning Peninsular Malaysia, 2010

4. Action Plan DPN9 and Urban Open Space Provision

DPN9 Action Plan is stated in the Core 1 National Urban Policy. It stated that the open space and recreation shall be adequately provided according to the needs of the urban population. In this study, the adequacy of open space provisions are being detailed in two implementation steps outlined in DPN9, namely:

i) To ensure that the recreational areas are provided based on the hierarchy, guidelines and standards

ii) To provide adequate open space based on the indicator of 2 hectares per 1,000 urban population

Open space in the context of development in Malaysia is defined as 'any area of land either specified or not, allocated or reserved wholly or partially specifically for public gardens, public parks, public sports and recreational fields, public leisure spaces, public pedestrian walkways or as public places' (Department of Town and Country Planning Peninsular Malaysia, 2000). Though this definition does not specifically explains the recreational areas and public parks, but in general, it is often referred to as recreational areas and public parks. This is caused by the function of open space as public park and its function as a recreation area (Melasutra & Mohd. Zulfa, 2006). The descriptive of open spaces as public parks is also being justified by the open spaces planning standard that categorized the open spaces based on public parks type's (Department of Town and Country Planning Peninsular Malaysia, 2000).

In this case, measures of the performance of the implementation step (i) requires the urban administrator to provide recreational areas, namely public park by the category of open spaces as indicated in Table 2. Following this standards, the provision of play lot, playground and neighborhood park should be made available in all residential areas. Meanwhile, the Local Park and Town Park should be provided in every and each urban areas. In regards to these standards, Malaysia is aiming to develop at least one Local Park in every state capital to achieve the vision as a Garden Nation (National Landscape Department, 2005).

Table 2. Open space category in Malaysia

Types of open space	Acreage	Provision requirement
Play lot	Minimum of 0.2 hectares	1 play lot per residential area
Playground	Minimum of 0.6 hectares	1 playground per residential area
Neighbourhood Park	Minimum of 2.0 hectares	1 Neighbourhood Park per residential area
Local Park	Minimum of 8.0 hectares	1 Local Park per urban area
Town Park	Minimum of 40.0 hectares	1 Town Park per state capital
State Park	Minimum of 100.0 hectares	1 State Park per state in Malaysia
National Park	No limit	

Source: Adapted from Department of Town and Country Planning Peninsular Malaysia, 2000

In order to archive adequate open spaces provision, the implementation of step (ii) states the need for urban administrator to provide adequacy urban open area by the standard of 2 hectares per 1,000 urban population. In this context, the stipulation of urban area is based on the local authority status. City Council is a city area with total urban population of more than 500,000. Meanwhile, Municipality has a population of more than 150,000 residents and District Council has less than 150,000 residents. This means, with the existence of 12 District Council, 39 Municipality and 98 City Council, Malaysia need to provide a minimum area of 112,100 hectare of open space to meet its planning standard.

4.1 Issue on Providing Adequate Urban Spaces in Malaysia

Although there are standards that stipulate the provision of 2 hectares of open space per 1,000 urban population but studies have found it very difficult to achieve. This phenomenon is caused by the rapid physical development that give impact to the deterioration of urban green space and changing the open spaces land-use.

In the year 1999, study shows that the Malaysia's capital, Kuala Lumpur could only provide 0.4 hectares of open spaces per 1,000 urban population (Ismail, 1999). This study shows that Kuala Lumpur is not only far behind the planning standard that has been set but also below the standard of other major livable cities, such as Stockholm (8.03 hectares of open spaces per 1,000 urban population), Washington (4.57 hectares of open spaces per 1,000 urban population) and Amsterdam (2.9 hectares of open spaces per 1,000 urban population). Research in the year 2010 then showed that Kuala Lumpur provided 12 square meters of green space per individual urban resident (Performance Management Delivery Unit, 2010). This result indicates that the provision of green spaces in Kuala Lumpur is below the standards set by the World Health Organization, which is 16 square meters per individual urban resident.

The issue of the adequacy of the provision of open space in urban Malaysia became more serious when a study in 2012 found that the total area of public parks in Malaysia is 13,626 hectares (National Landscape Department, 2012). It means that the public parks in Malaysia are able to accommodate the needs of social recreation for only 6.81 million people, compared to the total number of 15.09 million urban population in Malaysia. The total of public park provision is also far behind the target of open space provision based on the urban population as determined in the National Urban Policy. It is due to limited existing open spaces land use and the high demands of urban spaces that caused changes in the status of urban land uses. The phenomenon of changing open spaces land usage had then become the major constraint to the success of providing at least one Local Park for every state capital in Malaysia (Abd. Mutalib, 1999).

The issue of inadequate urban open spaces provision become increasingly complicated when green infrastructure has been an indication to the achievement of sustainable cities as being set by the UN-HABITAT (United Nations Human Settlement Programme, 2012) . Green infrastructure is defined in National Landscape Policy as 'a network of open spaces, green areas, parks, wetlands, natural habitats and areas of natural landscapes for the purpose of ecosystem preservation' (National Landscape Department, 2010a). It urges urban administrator to find a new alternative in providing adequate urban green infrastructure despite the limitation of existing open space. In regard to this, the National Landscape Department (2010b) suggests the need of public parks development in ex-landfill sites to be implemented as a new alternative in public parks development. This development is being seen as a way to increase the number of recreational areas and open spaces provision in the urban areas and at same the same time, to improve the urban derelict land and brownfield areas, particularly urban ex-landfill sites through the rehabilitation approach.

5. Integrated Approach : Redevelopment of Ex-landfill as Public Park

Based on the view of implementation steps that need to be taken in addressing the Action Plan DPN6 and DPN9, the urban administrator should implement a strategic planning to identify the suitable types for urban ex-landfill redevelopment and to ensure adequate provision of open space areas. Both the Action Plan has indirectly created the relationship between the ex-landfill site and urban open space, which resulted in the need for the existence of ex- landfill redevelopment as a public park (Figure 1).

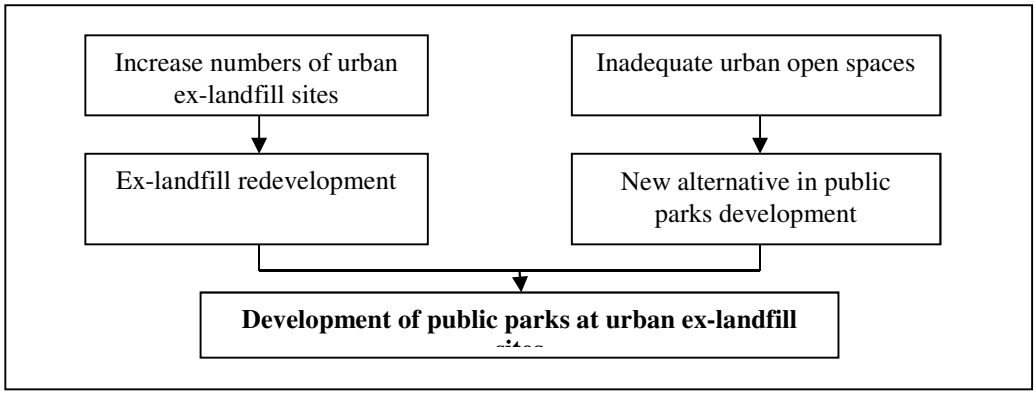

Figure 1. Integrated approach in dealing with increase numbers of urban ex-landfill and inadequate of urban open space

Development of a public park at ex-landfill site will respond to the requirements of brownfield redevelopment program and regenerate the potential of ex-landfill to become a new resource, which benefited the urban community, as mentioned in DPN6 implementation step. Redevelopment of the urban ex-landfill as a public park is also well-suited to the ex-landfill redevelopment policy.

On the other hand, the development of a public park at ex-landfill sites is the answer to a new alternative in developing public parks in Malaysia. The redevelopment of public park at urban ex-landfill sites is also the answer to a new approach to provide adequate open spaces according to the standards set in the planning guidelines, as stated in DPN9.

Through this integrated approach, the redevelopment of ex-landfill as public park would serve as a solution path to the issue of inadequate urban space due to increased numbers of urban ex-landfill sites and the issue of inadequate urban green space for urban green infrastructure provision. With the implementation of this approach, 179 public parks from urban ex-landfill site with an area of 450 hectares will be expected to exist in Malaysia by the year 2020.

6. Conclusion

Although the need of ex-landfill redevelopment and adequacy of open space provision is being stated in different National Urban Policy's Action Plan, but obviously both plans have relevance link. In dictating the most suitable programs for ex-landfill redevelopment, the redevelopment of ex-landfill as public parks should be treated as the main priority, as decided by the National Physical Planning Council. While in the context of the adequacy of open space provision, the development of a public park at ex-landfill sites is seen as the best approach to new development of urban public parks that could overcome the constraints of urban space issues and declining of urban open spaces land usage. In principle, it can be concluded that the development of public parks at ex-landfill sites could become a 'unifying' factor in linking the needs of ex-landfill redevelopment and providing adequate urban open spaces. Even though these approaches required a change in urban planning, mainly in the planning of urban green infrastructure but it should be accepted by the urban administrator as an integrated implementations towards the creation of sustainable urban development in Malaysia.

As a conclusion, this paper concludes that the redevelopment of ex-landfill is essential for developing countries future development in addressing the issue of inadequate urban open spaces in oder to fulfill the urban sustainable development needs. Therefore, the proposed integrated approach may not only serve as a win-win approach in creating sustainable urban development in Malaysia, but others developing countries for the benefits of the existing and future generations.

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