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THE IMPORTANCE OF CITY BIODIVERSITY INDEX (CBI) INDICATORS FOR MALAYSIA FUTURE BIODIVERSITY MANAGEMENT AT LOCAL LEVEL: A REVIEW

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  To cite this document: Ahli, N. & Suratman, R. (2022). The Importance of City Biodiversity Index (CBI) Indicators for Malaysia Future Biodiversity Management at Local Level: A Review. *Journal of Tourism Hospitality and Environment Management, 7* (27), 50-57. **DOI:** 10.35631/JTHEM.727004. 	Urban biodiversity conservation is typically practiced in densely populated areas or areas which experiencing rapid growth. The biodiversity population in urban areas has been severe affected because of urbanization. It is risky because uncontrolled urbanization will cause the extinction of urban species. The urban species richness require protection, and thus conservation will be successful if the government focuses on managing conservation properly. City Biodiversity Index (CBI) indicators will benefits in halting the loss of urban biodiversity and proving that it is a critical component in urban areas that require attention. The researcher highlights the critical components or indicators of CBI that lead to a better conservation of urban biodiversity in Malaysia. **Keywords:** Biodiversity, Conservation, CBI, Indicators

Introduction
Malaysia is one of 17 megadiverse countries due to its amazing and incredible species richness (Von Rintelen et al., 2017; Tong P.S, 2020). In 2002, leaders from around the world participated in CBD in order to meet their target of halting biodiversity loss by 2010, but the

target was not met because the rating of biodiversity loss gradually decreased (Convention on Biodiversity). Hoban et al., (2020) stated that the biodiversity once again failed to meet its objectives during the COP-15 conference and proposes 20 new targets for 2020 (Mace et al., 2018; Secretariat of the Convention on Biological Diversity 2019) to reduce biodiversity loss until 2030. Malaysia, on the other hand, must take additional precautions to halt biodiversity loss in urban areas.

According to CBD (2021), only 8% of endangered vertebrate species exist in rapidly growing urban areas as a result of human activity in cities (Diaz et al.,2006). This is due to an increase in the number of urban dwellers who live in densely populated areas, with the percentage of urban dwellers potentially reaching 70% by 2050. (Vaughan V., 2010). Meanwhile, future planning is required to balance urban dweller population and species richness. If strict action is not taken, the city's nature areas and ecosystems will suffer (Battacharya T.R, 2017). The implementation of the City Biodiversity Index (CBI) is capable of dealing with the issue of conserving biodiversity in urban areas.

The Concept of City Biodiversity Index (CBI)

According to the Convention on Biological Diversity (CBD), CBI is a tool that works in urban areas to monitor and analyze biodiversity performance. Furthermore, the development of CBI tools is being carried out by an international task force comprised of experts from London, Germany, Stockholm, the United Nations, the CBD, and NParks, as well as Dr. Lena (National Parks Board, 2008). This demonstrates that CBI tools were not created unreasonably. As a result, CBD decided to accept a tool known as the "City Biodiversity Index" (CBI), which aids in species richness and habitat conservation in urban areas (Cabral, 2012). CBI was founded in 2008 and is also known as the Singapore Index on Cities (Chan and Djoghlaf, 2009; Chan et al., 2010; and CBD 2010). CBI can determine whether a city in a country is using a high biod score. With the help of the CBI scoring tool, the Malaysian local governments will be able to work together to conserve biodiversity in urban areas. The CBI scoring method is used to determine a city's level of biodiversity. The scoring method is used in the CBI tool to indicate the city's level of biodiversity. The crucial part is that the data must come from the city profile.

There are three critical factors to consider. According to S.Rodricks (2010), in order to calculate a city's CBI, information about the city, such as its population, size, location, and biodiversity elements, is required first. Finally, out of the 23 indicators, suitable indicators will be chosen based on the condition of the city, and the indicators will be scored.The maximum score assigned in CBI is 4, and the total score obtained with the 23 indicators should be around 92. By employing this scoring method, municipalities are able to assess the level of biodiversity in their cities and towns. The level of CBI, according to Cabral et al. (2012), influenced the quality of biodiversity in the city. The higher the number of points obtained, the higher the level of biodiversity in urban areas.

The Indicators in City Biodiversity Index (CBI)

There are a few highlighted indicators in CBI that refer to the city's profile. Only a subset of indicators will be used to calculate the country's biodiversity level. There are 23 main indicators highlighted, and the indicators are classified into three categories.

Table 1: The Structure of CBI

City Biodiversity Index (CBI)
Indicators (The Structure)

1. Numbers of natural areas
2. Ecological network to counter   fragmentation
3. Built up for bird species
4-8.   Change in number of native species (4.vascular plants, 5.birds 6.butterflies 7&8 optional)
9. Numbers of protected natural areas
10. Numbers of invasive species
11. Quantity of water regulation
12. Climate regulation
13-14. Recreational and educational services
15. Allocation of budget: Biodiversity
16. Number of biodiversity projects per year
17. Policy, laws and regulations: Local biodiversity action plans
18-19. The capacity of institutional
20-21. Partnership and participation of others organizations
22-23. Education and awareness

Source: de Camargo et al., (2021); Kohsaka R. et al., (2013); Tok and Cherylyn Xiu Hui (2011)

Who Will Be Able to Implement CBI in Malaysia?
The government has an important role to play in carrying out biodiversity conservation efforts, particularly at the local level. This is due to a specific country's participation in a few international organizations to address environmental issues in their country. Same goes to Malaysia, one of the CBD participants and with the participation, they should be able to govern and admin the biodiversity conservation in a proper way. The Malaysia government divided into three levels which are Federal, State and Local government levels.

In Act 172, it highlights that Local Authority has the most authorities in managing the city and towns. Therefore, Local Authority as a city leaders should be alert of the challenges that hits the city's nature and always prioritized the conservation of nature in the urban areas (Oke C.et al, 2021). By using CBI tool, local government is able to monitor biodiversity status in their territory areas. At local government level, CBI is designed for Municipal and City Council level because the condition of that level suit CBI requirement. Although urban areas are easily fragmented by jurisdiction and governance, however, the strategic plans which benefit the nature and the dwellers (ICLEI, 2018) should be carried out together by the local government and supported by Federal and State government.

The role of Federal and State government as a financial source is very significant. Local government able to implement any regulation related to urban biodiversity with the allocation budget provided for them.

The Importance of CBI Indicators
The indicators of CBI can be a guide to certain country to manage their urban biodiversity issues. In this section, the important over this classification of CBI will be further discussed to show how the indicators bring positive effects on urban biodiversity management of a city. The

classifications of native biodiversity in city, ecosystem services and government and management have its own criteria.

Native Biodiversity in City

Malaysia has developed a few national plans related to invasive species and database for flora and fauna information collection. In 2005, Malaysia developed a system called Flora of Peninsular Malaysia (FPMO) where it is a database to keep all the information regarding to flora species, however, the FPMO was changed into Clearing-House Mechanism MyCHM and lastly in 2014, the MyCHM database restructured into new brand which is Malaysia Biodiversity Information (MyBIS) (Abd. Latif et al., 2020). However, the database system was developed at national level. Local authorities need a specific database to record the species richness in urban areas. This is because local authorities need high quality of biodiversity information about the endangered and unique species, significant ecosystem and the pattern of the sites (LERCs, 2016). In comparison to a national database of species information, it did not limit the information and thus anyone could capture and upload information whether in a non-urban or urban area.

Ecosystem Services

Ecosystem services is critically needed for human life style in future. This is because human is one part of the ecosystem services and they play as a main role to sustain the ecosystem services especially in urban areas. The reasons why Malaysia should maintain and sustain its ecosystem because sustainable ecosystem able to provide profit for its own country. For example, in urban areas, there are many parks and zoos provided, however, some of the places are not in a good condition and did not function properly. These places are able to generate profit for its own country's economy (Oguh C.E et al.,2021) if the places are having a better maintenance annually.

In the indicators of ecosystem services, it mentions that the education and biodiversity have a linkage. It is means that in CBI tool, it concerns about the awareness of biodiversity and ecosystem in education sector at urban areas. The urban dwellers consist of various type of humans' background, such as, the students, teachers and etc. No matter what background of the urban dwellers, the awareness toward biodiversity and ecosystem in urban areas must going on. According to the research done in Malaysia by Ahmad Zamri Khairani et al, (2020), the knowledge or awareness toward biodiversity and ecosystem issues among the students is still lacking, although some of the students might have high knowledge on biodiversity but they are unable to make it into a practical way.

In addition, Ahmad Zamri Khairani et al., (2020) suggested that the Ministry of Education should implement the environment education into the school syllabus to ensure the students are able to practice biodiversity awareness at early stage of education. In this cases, local authorities should play the main role by educating the young generations on the important of urban biodiversity conservation in urban areas.

Governance and Management

One of the indicators of CBI touched on budget allocation. Budget is important component when it comes to management part. The budget is functioning as a source to allow any activities related to environment purposes can be implemented to achieve some goals. In Malaysia, the Parliament has announced their budget 2021, in order to achieve their goal for 2030 of SDGs,

Federal government of Malaysia allocated around RM100 million for environment sustainability purpose and add on another RM400 million for State government (WWF, 2020). In addition, the main purpose by providing the budget is to develop a stronger green sustainability plan (Prime Minister Office Official Website, 2020). The budget should be allocated for local government to manage the sustainable environment in urban areas especially on biodiversity conservation. Meanwhile, with the budget, it also helps the Local Authority to conduct some surveys related to parks and natural places in urban areas. Some of the information unable to be access directly and it needs a certain time to get the result.

For example, in education sector, research on biodiversity should be carried out among the students from various level such as in pre-school, primary school, secondary school and university students.

Another alternative way to successfully implement urban biodiversity conservation is by collaborating with the NGOs and communities in the city. This is what we called a multi-stakeholder approach. In this CBI indicators, it mentions about the collaboration with others organization instead of government department. By involving other organization, it helps to improve biodiversity conservation in urban areas by implementing some projects related to the conservation in the city. It means that in order to conserve the biodiversity in the city, it is not only government should responsible but also the other parties.

For example, NGOs developed an application related on biodiversity species richness. The public and government department are able to retrieve the data of species richness from the application.

Urban areas should have its own rules and regulation on biodiversity conservation especially from its method of management which is at local level. This is because the measurement and policies in urban areas might not applicable and vary compared to others areas such as non-urban and natural areas (Uchiyama Y et al., 2015). Continuous conservation of biodiversity should be done at urban areas due to active human's activities in that place. In the consequence of participating the international organization, Malaysia is able to established two national plans on biological diversity, however, the national plans are integrating at national level. Currently, Malaysia is using National Plan on Biological Diversity 2016-2025 (Tong,2020).

A proper or regulations related to management of urban biodiversity should be established at local level and being used by all states in Malaysia.

Conclusion

Every CBI classification gives an idea of how urban biodiversity management should be carried out. The study demonstrate that the indicators of CBI are the important elements to manage urban biodiversity in the city and town. Every each of the indicators represent the condition and elements in urban areas. Therefore, the government especially local level should be able to identify the elements and then develop a strategic planning to conserve the biodiversity richness in urban areas. The parties involved should not only depend on government side, however, the other NGOs organization should also responsible and play their parts to successfully manage the conservation efforts in the city.

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