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KEPONG BOTANICAL GARDEN: THE ROLE AND CHALLENGE TOWARDS CONSERVATION PLANT DIVERSITY

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ABSTRACT

The rapid loss of plant diversity poses a critical global environmental challenge, particularly in biodiverse regions like Malaysia, encompassing diverse ecosystems from underwater realms to mountain forests. This study explores the pivotal role of botanic gardens as environmental stewards amidst this crisis, focusing on their efforts in plant conservation. This research identifies key findings through a documentation analysis of Npark Singapore Botanic Garden and Bogor Botanic Garden and semi-structured interviews with experts from Kepong Botanical Garden and Landscape Architects. Both case studies highlight the success of botanical gardens in collecting, preserving, and conserving the diversity of tropical plant species. They provide essential facilities and employ management strategies such as ex-situ conservation programs. Interviews underscore the significance of these activities in advancing plant taxonomy and habitat exploration. These findings serve as a critical reference for ongoing conservation initiatives, emphasising the potential of Kepong Botanic Garden to mitigate biodiversity loss in Malaysia.

Keywords: Botanic Garden, plant diversity, conservation, roles and challenges, Kepong Botanic Garden

1.0 INTRODUCTION

The use of botanical gardens and their social roles have shifted over time as they are entirely different from other 'green spaces'. In the 16th century, they were used to study medicinal plants. Moving to the 17th to 19th centuries, they expanded to Asia, America, and Africa, becoming hubs for introducing, cultivating, and spreading economically significant plants (e.g., rubbers, palm). In the 20th century, the need to protect biodiversity and promote sustainable use became more substantial and prominent (Spencer & Cross, 2017). According to Pimm and Raven (2017), recent estimates from the Royal Botanical Garden Kew in 2016 indicate that roughly 391,000 plant species are known to science, of which approximately 21% are nearing

Extinction. This data is supported by Tilman and Lehman (2001), where Earth is undergoing rapid and drastic loss in its plants' diversity and ecological ecosystem. It impacts all levels: local, regional, national, and international. Malaysia has the most remarkable plant diversity, yet it faces biodiversity loss faster than it can be replaced (Heywood, 2019).
Botanical gardens are viewed as breathtaking green spaces with uncommon trees and flowers and laboratories where specialists work with plants. However, the botanical garden is more than these as it holds documented living plant collections for scientific research, conservation,

display, and education (Bennett, 2014). This is supported by BGCI and CBD organisation as they established a framework outlining several criteria for botanical gardens:

Table 1: BGCI and CBD criteria for a botanical garden

BGCI	CBD
• A reasonable degree of permanence.	• General conservation and sustainable usage practices
• An underlying scientific basis for the collections.	• Identification and observation
• Proper documentation of the collections, including wild origin.	• In-situ conservation
• Monitoring of the plants in the collections.	• Ex-situ conservation
• Adequate labelling of the plants.	• Utilization of the aspects of biological variety in a sustainable manner
• Open to the public.	• Research and training
• Communication of information to other gardens, institutions, and the public.	• Public education and awareness
• Exchange of seeds or other materials with other botanical gardens, arboreta, or research institutions.	• Availability of genetic resources
• Undertaking scientific or technical research on plants in the collections.	• Information Sharing
• Maintenance research programs in plant taxonomy in associate herbaria.	• Technical and scientific collaboration

Sources: Smith and Harvey-Brown (2018). BGCI technical review: botanic gardens' economic, social, and environmental impacts.

To ensure a high-quality botanical garden standard in conserving plant diversity, these gardens must adhere to the guidelines provided by organizations such as BGCI (Botanic et al.) and the CBD (Convention on Biological Diversity). These guidelines serve as an indispensable manual for ensuring botanical gardens' efficiency, as Smith and Harvey-Brown (2018) indicated. Research also underscores the challenges and obstacles that hinder the accuracy and effectiveness of plant conservation programs in botanical gardens. This includes the difficulty of preserving all plant species and their ecosystems in the face of environmental changes, as noted in the study by Pimm and Joppa in 2015. Therefore, with its diverse collections, a botanical garden is one of the alternatives that can provide some solutions for saving plant diversity and ensuring that it can be conserved and benefit all.

2.0 LITERATURE REVIEW

Botanical gardens came with the idea and were comfortable with their status as environmental caretakers but with specific locations and operations depending on their needs (Lashley, 2012). The botanical garden has responded differently based on its geographical and physical setting, with the sorts of species, functions, and needs of the plant diversity. The natural setting's value may differ and be variable. Now, the botanical garden is also one of the major tourist sites, attracting an estimated 500 million tourists each year. As seen above, botanical gardens have recently emerged as major participants in both the conservation of flora and the education of visitors (BGCI, 2019). Based on the diagram illustrated below, the botanical garden's primary and supporting functions are now practised based on their requirements and needs.

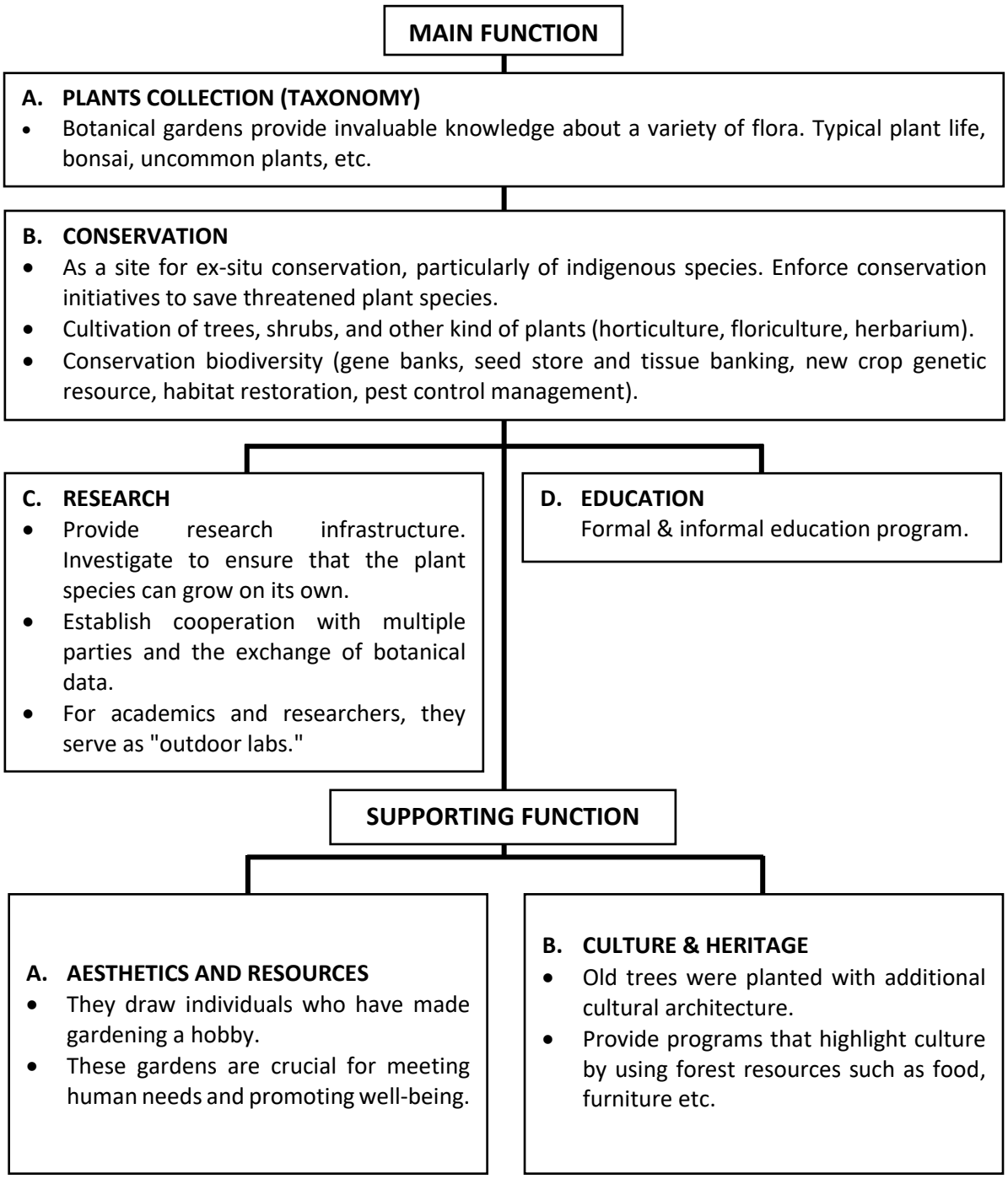

Fig. 1: The mixed functions of botanical garden

In short, a botanical garden has a unique and mixed theme. Most botanical gardens now require more profound studies, strategies, and effective management to develop and fulfil visitor experiences, and at the same time, they must effectively convey their importance as a conservation hub for plant diversity (Dodd & Jones, 2010).

2.1 Approaches Conservation Act in Botanical Garden (Integrated Plant Conservation)

When discussing conservation approaches, in-situ and ex-situ conservation activities are becoming increasingly common in many botanical gardens. In-situ means "on-site," and in-situ conservation means preserving various species in their natural habitats and ecological systems. Meanwhile, ex-situ conservation concentrates on preserving species by storing them in seed banks or living collections (Chen & Sun, 2018).

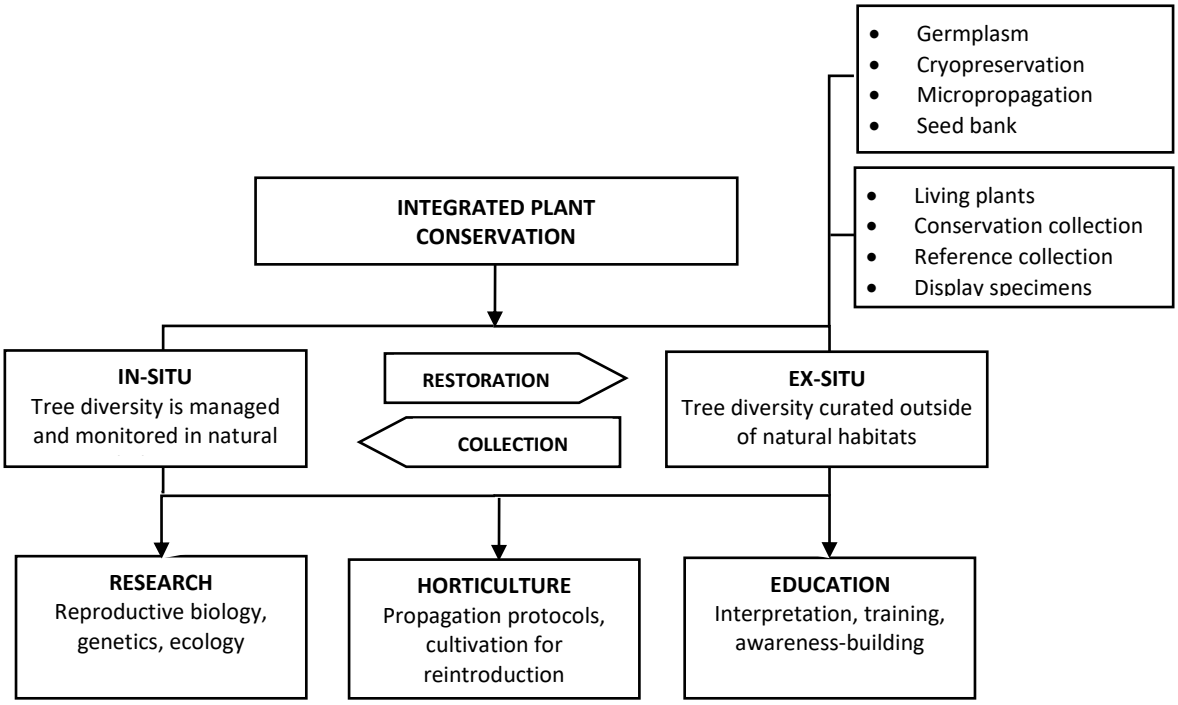

Fig. 2: Integrated plant conservation
(Source: https://www.bgci.org/about/botanic-gardens-and-plant-conservation/)

Therefore, it is crucial to simultaneously develop in-situ (on-site) and ex-situ (off-site) conservation strategies that support and reinforce each other. This combined approach, termed "integrated plant conservation," involves coordinating in-situ and ex-situ methods alongside scientific research, horticultural practices, and educational outreach. By integrating these approaches, conservation initiatives can be significantly enhanced and more effective in safeguarding plant species and biodiversity (Havens et al., 2014).

3.0 METHODOLOGY

This study incorporates comprehensive document analysis, thorough site investigations, and in-depth semi-structured interviews to gather rich, detailed qualitative data.

The document analysis focused on gathering and categorising data about botanical gardens' role as environmental stewards and studying the conservation assessment regarding conservation prioritisation. Based on case studies, a checklist of botanical garden characteristics was produced and used as a guideline to study the essential elements of the botanical garden.

Table 2: Research objective of the study

RESEARCH OBJECTIVES	METHOD	DOCUMENTS / PARTICIPANTS
1. To identify the function and challenge of Kepong Botanical Garden.	• Document analysis • Site investigation	• 2 Case studies: Npark Singapore Botanical Garden & Bogor Botanical Garden • Koleksi Pokok Taman Botani Kepong, 2018)
2. To identify the strategy and conservation approach that has been used to tackle the loss of plant diversity.	• Document analysis • Site investigation • Semi-structured interview	• **KBG 1, KBG 2 and KBG 3** are the representatives from the Kepong Botanical Garden • **NLD** is the representative of the National Landscape Department • **ILAM** is the Institute of Landscape Architects Malaysia

The Npark Singapore Botanical Garden and the Bogor Botanical Garden were chosen as references due to their significance as successful botanical gardens with rich histories. The Npark Botanical Garden is in Singapore, while the Bogor Botanical Garden is in Bogor City, West Java Province, Indonesia. Both gardens have similar climates and tropical plant diversity, and their proximity to the Kepong Botanical Garden makes it easier to study conservation efforts and challenges within the Asian context.

Fig. 3: Npark Singapore Botanic Garden
Source:Https://Edition.Cnn.Com/Travel/Article/Singapore-Botanic-Gardensunesco/Index.Htm Monument-Forget-Me-N

Fig. 4: Bogor Botanical Garden
Source:https://whc.unesco.org/en/tentativelists/6353/gardensunesco/index.htm monument-forget-me-n

A semi-structured interview was carried out with experts from the management team of the Kepong Botanical Garden (KBG), the National Landscape Department (NLD), and a representative from the Institute of Landscape Architects Malaysia (ILAM). This was done to assess the implementation of botanical garden elements from a Malaysian perspective. Five interviewees from three organisations participated in the study under KBG 1, KBG 2, KBG 3, NLD 1, and ILAM 1. The study's findings enhanced the outcomes and emphasised the critical variables related to the research.

3.1 Site Study

Kepong Botanic Garden was chosen for this research because it aims to expand its plant collection and become a unique and important national botanical garden. Further details about this site study will be thoroughly discussed as the researcher analyses the findings.

Fig.5: Kepong Botanical Garden

4.0 RESULTS AND DISCUSSION

The findings were derived from a mixture of three methods: site observation, document analysis, and semi-structured interviews, emphasising two key sections corresponding to the study's aims. The study uses two case studies to support its findings through observation, and open-ended interviews provide an additional source of professional knowledge. These strategies help to provide a full comprehension of the findings. Based on the case studies, the following information was discovered:

4.1.1 Case Study

Table 3: Npark Singapore and Bogor Botanical Garden

COMPONENTS	NPARK BOTANICAL GARDEN	BOGOR BOTANICAL GARDEN
• **History**	• Singapore Botanic Gardens were established in 1859 • Represents a British tropical colonial botanic garden • Heritage buildings are established during 1867-1930 • Has 40 heritage trees (age more than 40 years old	• Bogor Botanic Gardens represents a Dutch tropical colonial botanic garden • Heritage buildings are established 1817-1884 in which much older • Has 3,700 heritage trees • 3000 individuals of more than 50-year-old trees and 700 individuals of more than 100-year-old trees).
• **Landmarks**	• Owns Tanglin Gate (c 1890)	• Owns older landmarks such as a 234-year-old tomb (c1784)
• **Sizing**	137 ha	49 ha
• **Function**	Bear their roles in conservation, research, education, and tourism	
• **Types botanical garden**	Both are categorized as Cultural Landscape	
• **Zoning**	Offer Four Core Zones I.E. • Tanglin Core: Historic Zone • Central Core Tourist & Administration Zone • Bukit Timah Core: Education & Learning Zone, And	Offers nine zones: • Living collection zone including plants, tissue cultures, seed bank, DNA bank, spore, and pollen banks as well as a forested area. • Theme gardens/vista zone.

COMPONENTS	NPARK BOTANICAL GARDEN	BOGOR BOTANICAL GARDEN
	• Tyersal Learning Forest Core: Education & Learning Zone.	• Historic zone including buildings, landmarks, artefacts, and monuments. • Education zone. • Herbarium zone for the collection of herbarium, seed and cross-section timber cut museum and spirit herbarium. • Administration zone. • Propagation zone including nurseries and tissue-culture laboratory. • Research and development zone. • Documentary collection zone i.e., library and archive room.
• **Economic value**	• Pioneers of the rubber industry at the end of 1880's • Orchid hybrids industry in the 1920s	• Pioneer of the palm oil industry. • Highest number of orchid species living collection. • The palm oil plantations distributed all over the world originated from the seven parent trees of oil palm trees *Elaeis guineensis* grown. • Indonesia is estimated to have more than 4.000 orchid species and is an ideal place for orchid exploration. • Orchid species from this area are already used as parent stocks in breeding by other countries.
• **Public awareness**	• Conducts tour guiding, workshops and monthly discussions on biodiversity, conservation, and education	• Offers education package for schoolkids called "*Wisata Flora"* (Flora Edutainment Package). • Contributes to capacity buildings such as technical workshops/trainings, and research supervisory for bachelor and postgraduate-degree students.

The case study reveals that the design and architecture of a botanical garden are significantly more complex than those of a conventional garden. According to Gratzfeld (2016), this complexity comes from the necessity to accommodate a wide range of environmental conditions suitable for various plant species, cater to the specific desires of visitors, and adhere to guidelines defining open and closed areas within the garden's layout. Table 3 compiles findings indicating that both case studies showcase collections underlining three critical elements key to a successful botanical garden. These elements are:

1. Plant taxonomy, ensuring a well-organized and scientifically accurate classification of plants.
2. Research and education facilitate ongoing botanical studies and promote knowledge dissemination among visitors and scholars alike.

3. Conservation acts align with the broader goals of environmental preservation and sustainability, mirroring the policies and guidelines set forth by Botanic Gardens Conservation International (BGCI) and the Convention on Biological Diversity (CBD).

The above table reveals that the Npark Botanical Garden and the Bogor Botanical Garden are equipped with top-notch infrastructure, featuring nurseries, greenhouses, herbaria, seed banks, and cutting-edge research facilities.
Each garden has a list of plant types, contributing to its status as a site of Exceptional Universal Value (Kebun et al., 2018). This is crucial because a botanical garden requires global recognition to survive long-term. Also, collecting living plants is key in supporting scientific study and conservation efforts (Hengky & Kikvidze, 2018).

The management and planning of a botanical garden play a crucial role in conceptualising and implementing the design and layout of the garden. This involves careful considerations of plant species, layout designs, environmental factors, sustainability, and the overall aesthetic appeal of the garden (Espírito-Santo et al.,2020). Over time, the roles and functions of botanical gardens may shift due to various factors. However, their primary role remains as stewards of the environment, particularly in addressing the loss of plant diversity. Proper management and planning are essential in creating a beautiful and functional environment while also serving the community's needs and conservation efforts. Therefore, before proceeding with any plan, it is essential to prioritise species for monitoring and management through conservation planning. These are the important elements to ensure prioritisation is based on the degree of risk each species faces, and those with more high-level threats should be given higher priority. Limited resources should be allocated to protect species in the highest-risk group (Regan et al.,2008).

4.1.2 Site Study

After reviewing both case studies, here are the findings about the researcher site study: Kepong Botanical Garden, also known as KBG. This finding will be elaborated upon with case study references.

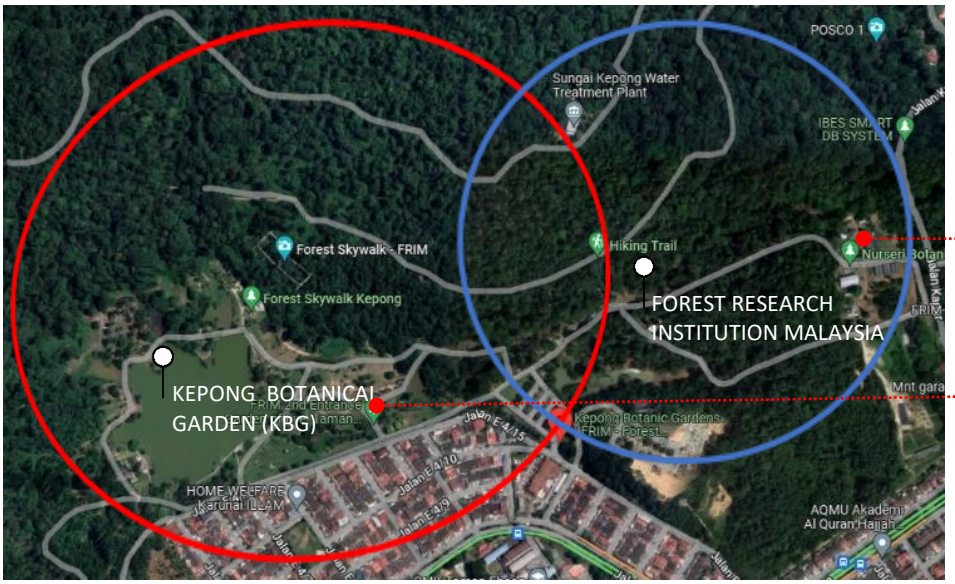

Fig.6: Map of KBG located beside FRIM

Fig.7: Entrance of FRIM

Fig.8: Entrance of KBG

Kepong Botanic Garden (KBG) is an 80-hectare garden located in Kuala Lumpur that is linked to the Forest Research Institute Malaysia (FRIM) via a dirt and paved road that runs through a nursery, providing a seamless connectivity between the two sites. The KBG and FRIM location maps are illustrated in Fig.6 above. Formerly, the establishment of KBG was to develop further FRIM's objectives in research and education in botany, horticulture, landscape, and environmental education. Its main function serves as an ex-situ conservation centre for preserving and breeding endangered, almost extinct, and endemic plant species. However, the KBG was designed with diverse applications in mind, serving as a home for living plant collections while also attracting public recreational visitors, making it a truly multi-purpose garden. This spacious area offers the opportunity for visitors to engage in activities such as jogging along the scenic trail around the lake and exploring the various collection gardens dotting the landscape. To accommodate the consistently high number of visitors, the garden has a range of amenities, including a gazebo, restroom facilities, well-marked pedestrian walkways, a floating deck for relaxation, and an information centre to guide and support guests.

Fig.9: Facilities for users

KBG recently added a new attraction: the Forest Skywalk, now open to the public. This thrilling addition allows visitors to enjoy the stunning expanse of the forest below as they gaze down from the highest tower.

Fig.10: Forest skywalk at KBG

At the same time, KBG acts as a living plant collection, where these species are allocated under an arboretum garden. According to the Koleksi Pokok Taman Botani Kepong (2018), eleven (11) theme parks have been developed, each allocating a taxonomic species to a group or family.

Table 4: Living collection at KBG

NO	THEME PARK	TYPES OF PLANT SPP.
1	Palm Collection	Coconut Palm (*Cocos nucifera*), Areca Palm (*Dypsis lutescens*), Oil Palm (*Elaeis guineensis*), Rattan Palm (*Calamus spp.*), Bismark Palm (*Bismarckia nobilis*), Fan Palm (*Livistona spp.*), Betel Nut Palm (*Areca catechu*), Foxtail Palm (*Wodyetia bifurcata*), Traveler's Palm (*Ravenala madagascariensis*)
2	Ginger Collection	Ginger family (Zingiberaceae), which is known for its aromatic rhizomes and beautiful flowers - Zingiber, Alpinia, Curcuma, Etlingera and Hedychium
3	Bambusetum	Bambusa, Dendrocalamus, Gigantochloa, and Phyllostachys.
4	Etnoflora Collection	Used for various purposes, including medicinal, culinary, ceremonial, etc Tongkat Ali (*Eurycoma longifolia*), Kacip Fatimah (*Labisia pumila*), Pandan (*Pandanus amaryllifolius*), Betel Leaf (*Piper betle*), Lemongrass (*Cymbopogon citratus*), Ginger (*Zingiber officinale*) and Bamboo (various species)
5	Herbs Garden	Medicinal Herbs: Misai Kucing (*Orthosiphon stamineus*), and Kacip Fatimah (*Labisia pumila*) etc; Culinary Herbs: Pandan (*Pandanus amaryllifolius*), Turmeric (*Curcuma longa*) etc.; Aromatic Herbs: Lavender (*Lavandula spp.*), Mint (*Mentha spp.*), Basil (*Ocimum basilicum*) etc
6	Climbers	Ornamental shrubs etc. Bauhinia (*Bauhinia spp*), Bougainvillea (*Bougainvillea spp*), Jasmine (*Jasminum spp*.), Passionflower (*Passiflora spp*), Climbing Fern (*Lygodium spp*.), Pepper Vine (*Piper nigrum*), Thunbergia (*Thunbergia spp*), Ivy (*Hedera spp*), Hoya (*Hoya spp*)
7	Fruit Trees Collection	Native fruits tree etc Durian (*Durio spp*), Mangosteen (*Garcinia mangostana*, Rambutan (*Nephelium lappaceum*), Longan (*Dimocarpus longan*), Jackfruit (*Artocarpus heterophyllus*), Papaya (*Carica papaya*),
8	Gymnosperm Collection	A group of seed-producing plants that include conifers, cycads, ginkgo, and gnetophytes.
9	Denai Razak	Dense forested shrubs, open spaces, and sections with water features such as streams and small ponds.
10	Lotus Pond	Aquatic plants etc such as water lilies (*Nymphaea spp*.), water hyacinth (Eichhornia crassipes), and various species of reeds and sedges.
11	Dipterocarp Collection	Tall canopy trees etc. *Shorea spp*., Dipterocarpus spp., and *Hopea spp*.

The theme parks have been designed to serve various functions based on the types of plantations they showcase, with each plant species playing a unique role within the park.

Fig.11: Eleven (11) theme park was developed in Kepong Botanical Garden

KBG has also embraced the opportunity to participate actively in conservation efforts. As depicted in Fig. 10, the facilities presented support the conservancy program. Under this program, trees and other plants are sourced from their natural habitat, transported to KBG, and nurtured in a controlled environment for public display and use in ex-situ restoration projects.

Fig.12: Nursery facilities to support plant growth, care, and propagation activities.

4.1.3 The challenge of Kepong Botanical Garden towards conservation of plant diversity

After observing the site, it was found that improvements are needed for the Kepong Botanical Garden (KBG) in responding towards the conservation of plant diversity. The first stage in starting a successful botanic garden is developing a detailed management and operating plan. KBG must catch up to the other botanical gardens regarding plant taxonomy research initiatives and the facilities, equipment, and approaches connected with herbaria. Specific conservation efforts and outcomes, such as seed or material exchanges with other botanic gardens, arboreta, or research organisations, should be evaluated at the organisational level.

However, despite achieving the aims, the importance and value of botanical gardens still need to be determined in Malaysia. Hence, due to this, the efficiency of a botanical garden as a conservation centre is still in doubt as this is partly because there is a lack of clear guidelines to serve as a reference for the development and execution of the botanical garden concept, resulting in uncertainty about their actual purpose. This is viewed as a challenge for Kepong Botanical Garden, mainly about conservation efforts. In addition, more understanding and knowledge of the concept of the botanical garden is needed. This assessment is supported by findings in Table 4, derived from a series of semi-structured interviews.

Following the discoveries attributed to the case study, an expert with a diverse background has provided insights into an overview of botanical gardens in Malaysia, Kepong Botanical Garden, and their importance in plant conservation.

Table 5: Interview results with experts (KBG, NLD & ILAM)

A. Experts who understand the botanical garden as a whole		
QUESTIONS		**FINDINGS**
1. For existing botanical garden in Malaysia, how can it be considered a botanical garden?	NLD 1	(BGCI) criteria: Plant species, research, conservation, teamwork as well as educational. KBG is lacking in completing those 4 components.
	ILAM 1	They may need to develop a guideline that this is a help to recognize a botanical garden; perhaps a specific number of species is required before calling it that.
2. What is the importance of having a botanical garden in a country?	ILAM 1	Allows to storage of data regarding plant species according to the families… …It allows a landscape architect to discover what types of tree species are ideally to be planted in the city...
B. Experts who understand the botanical garden as a whole		
QUESTIONS		**FINDINGS**
1. In your opinion, can KBG conserve all plant diversity?	KBG 1	Impossible due to owing to land and financial limits. Botanical gardens must prioritize which species and families must be preserved in their natural habitat.
2. What sort of program can be implemented to ensure that the objective n conserving plant diversity can be done efficiently?	KBG 1	This is based on species dependent; there is no one-size-fits-all approach. Botanical gardens will use a mix of treatments depending on the species.
	KBG 2	There is no guarantee that one strategy will work for all trees since each procedure is unique to each braid. KBG is unable to offer the best approach for all trees.
	KBG 3	Ex-situ is a normal operation in all botanical gardens for conservation. In-situ is a project initiated by the owner land itself that needs a long commitment from all agencies.
3. What are the challenges of KBG to sustainers' conservation centre of plant diversity?	KBG 3	Funding is unquestionably the biggest obstacle. To ensure the species' survival outside of its native habitat. Management & facilities

* KBG 1, KBG 2 and KBG 3 are the representatives from the Kepong Botanical Garden
* NLD 1 I is the representative of the National Landscape Department
* ILAM 1 is Institute of Landscape Architects Malaysia

The semi-structured interview with representatives from three experts, NLD, KBG, and ILAM, resulted in the discussion below, based on the sentiments from the interview and discussion.

Table 6: Interview results with experts (KBG, NLD & ILAM)

NO	QUESTION	SENTIMENT	SCORE
A. Experts who understand the botanical garden as a whole			
1	For existing botanical garden in Malaysia, how can it be considered a botanical garden?	negative	0.423604
2	What is the importance of having a botanical garden in a country?	positive	0.954892
B. Experts who understand the botanical garden as a whole			
1.	In your opinion does Kepong botanical garden can conserve all the plant's diversity?	negative	0.423604
2.	What types of programs could be implemented to ensure that the objective of conserving plant diversity can be done efficiently?	positive	0.635866
3.	What are the challenges of KBG to sustainers' conservation centre of plant diversity?	positive	0.98366

The table above shows that having positive sentiments can be relevant and beneficial for KBG. On the other hand, negative feelings might lead to overly specific actions that do not apply to Kepong Botanical Garden. KBG is actively involved in environmental protection, focusing on ex-situ conservation. However, this should be complemented with in-situ activities (Wyse et al., 2000). Furthermore, KBG must adhere to guidelines established by authorities and the Botanic Gardens Conservation International (BGCI) for effective plant biodiversity conservation. Although the garden has established plant collections and herbariums, it should prioritise botanical research to strengthen its role as a conservation steward. Collaboration with universities, flora revision, threat assessments, and conservation monitoring is crucial. Shifting priorities in resource allocation, funding, and public attention can help botanical gardens address the plant extinction crisis. Thus, enhancing the ability to scale up these efforts can increase impact and achieve cost-effective results for biodiversity conservation, as highlighted in the word frequency image below.

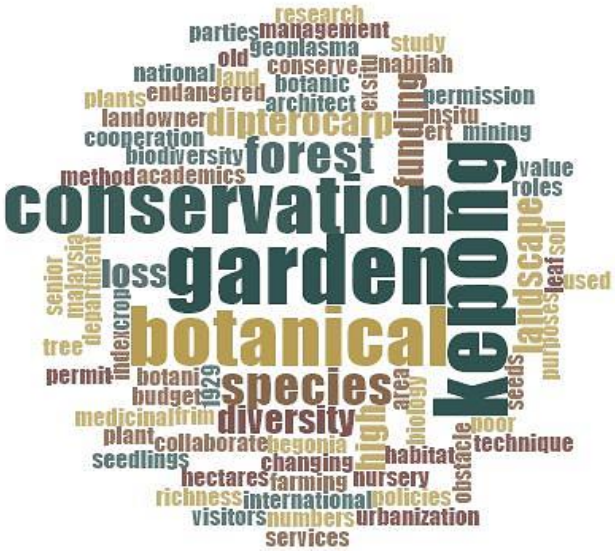

Fig.13: Word frequency from the interview

Consequently, it is important to enhance the concept of botanical gardens in Malaysia by promoting a better understanding, knowledge, and guidelines for their development in both the public and private sectors. Governmental and private organisations, as well as the public,

are increasingly recognising the importance of this concept. To facilitate the future establishment of botanical gardens in Malaysia, it is crucial to create well-defined guidelines that outline garden spaces' physical characteristics and layout.

5.0 CONCLUSION & RECOMMENDATION

To effectively position the Kepong Botanical Garden (KBG) as a leader in conservation and address the challenges mentioned, a strategic approach must be adopted as per the illustration generated from the findings above:

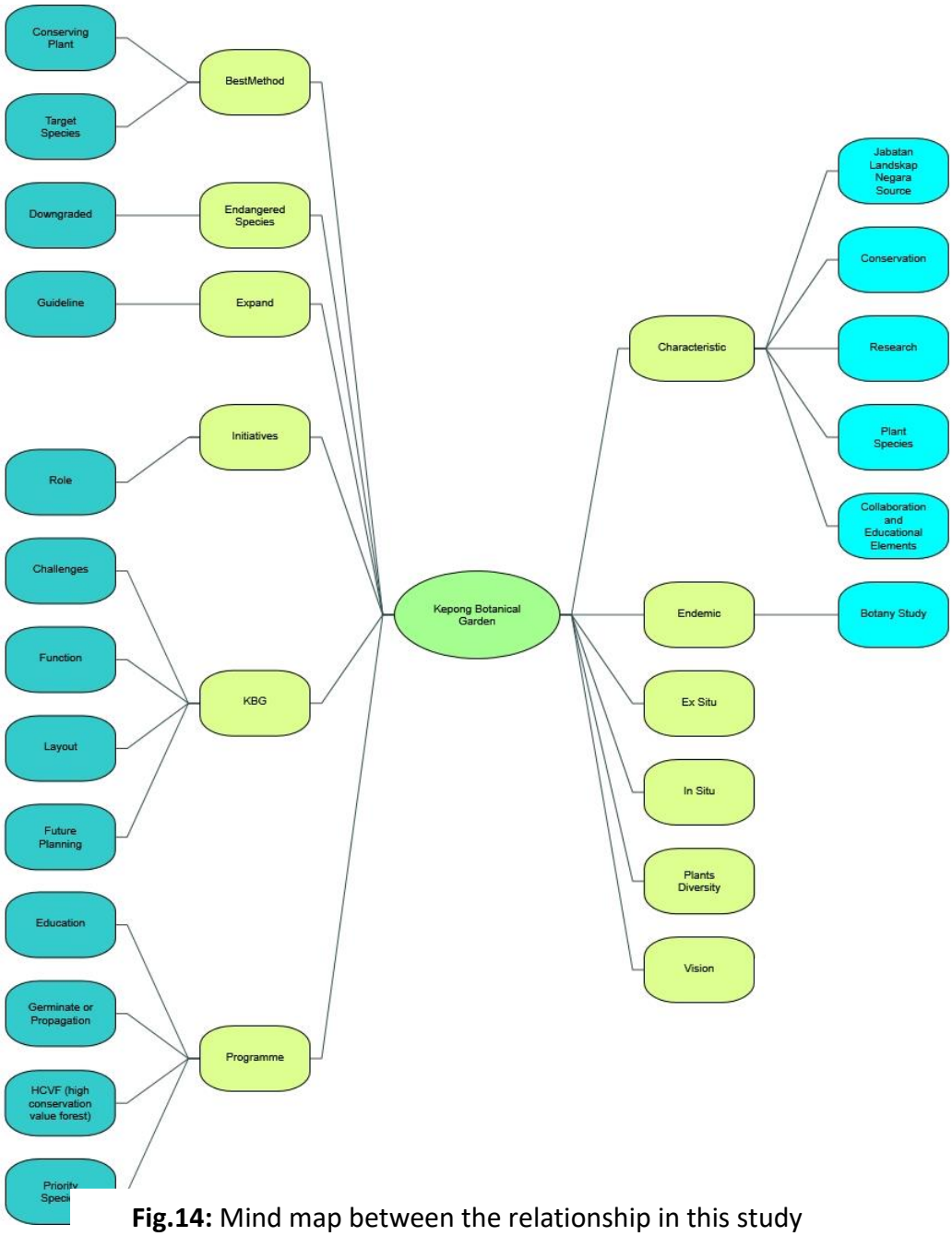

Fig.14: Mind map between the relationship in this study

This map outlines the theme of the primary purpose of Kepong Botanical Garden, the challenges it faces now, the types of methods and conservation programs implemented in the garden, and how space planning and management meet the need for botanical gardens.

Kepong Botanical Garden's conservation efforts help prevent biodiversity loss; however, this approach should align with guidelines set by the authorities and Botanic Gardens Conservation International (BGCI) while also addressing the garden's unique context and capabilities.

i. **Adhering to Conservation Guidelines and Policies**
KBG must strictly adhere to the guidelines and policies set out by BGCI and relevant Malaysian authorities. This involves adopting best practices in plant conservation, sustainable garden management, and public engagement.

ii. **Expanding Ex-Situ and In-Situ Conservation Efforts**
In addition to established ex-situ conservation endeavours, KBG needs to expand conservation efforts to include in-situ projects. This may involve forming partnerships with local communities and government bodies to conserve natural habitats and restore ecosystems.

iii. **Strengthening Research and Collaboration**
KBG should prioritise botanical research projects, focusing on taxonomy, ecology, conservation biology, and climate change impacts on plant species. Forming long-term partnerships with universities and expanding the herbarium and plant collection are crucial for research and conservation efforts.

iv. **Allocating Resources and Prioritizing Funding**
It is important to pursue diverse funding sources, including government grants, private donations, and international funding bodies, to support conservation initiatives. Increasing public engagement and awareness about plant conservation issues can also help attract support and resources.

v. **Long-Term Vision and Commitment**
Cultivating visionary leadership and integrating sustainability and resilience into garden operations are key to long-term conservation goals. This includes fostering innovation and continuous improvement within the organisation.

By following these steps, KBG can evolve into a leading botanical garden that preserves plant biodiversity and actively contributes to global conservation efforts. This approach will help KBG meet its potential as a conservation steward, ensuring the preservation of Malaysia's rich plant heritage for future generations.

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