

## **HEALTH AND GREEN INFRASTRUCTURES FOR THE LIVABLE CITY**

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### Abstract

The livable city research program at the Institute for Environment and Development (LESTARI) for the intermediate city of Seremban in Malaysia was initiated to evaluate the extent to which the city has responded to rapid development in the past twenty years. An important component of the research program is to assess the provision and impacts of health infrastructures. This paper presents some findings on place use and the behaviour of people in major green areas, as well as at more localized neighborhood areas in an increasingly fast paced urban life. These findings are then related to potential impacts of these green areas on generating a healthier way of living in an increasingly busy city. Among the findings include local methods of adapting green areas for general use, recreation and exercise that fit local culture and needs, as well as the temporal aspect of these uses given changing lifestyles. The study also linked the green areas to environmental health indicators including ambient temperature and pollutants. Seremban began as a colonial city with several green areas that provided the identity for the city, but the city is changing and many questioned the current functionality of these area.

Key words: Green Infrastructures, Seremban Municipality, environmental health, livable cities, Malaysia

### **INTRODUCTION**

All infrastructures, be they physical, social and governing, are important components in making the city livable. Apart from its economic vibrancy, exciting social progress with conscious efforts to protect the welfare of the people and the environment, the livable city is also physically safe and healthy. In sum, the city is congenial with friendly urbanites full of exuberance. The city life-world is indeed exciting (Pacione 1990; Van Kamp 2003). As an ecosystem the physical and human dimensions of the city interact in a balance trade-offs to produce a city ambience that is conducive for urban living. Making the city livable is then crucial especially in the plural culture of city life in Malaysia. For the last three decades a large proportion of the Malaysian population has left their rural loci to make the city their homes. The consequently high urbanization rate has been exacerbated by cross border flows of foreign workers into urban Malaysia, adding more varieties to the multi-cultures of Malaysian city life, but more importantly putting extra pressures on city infrastructures and amenities. Although physical and social infrastructural developments in cities in Malaysia have managed to keep abreast with the expansion of cities so as to ensure city life becomes attractive, there is need to have

initiatives from the multi-stakeholders to help promote the city congeniality especially with respect to safety and health.

Situating all forms of a city infrastructures in a wider context of environmental health, our focus should shift more towards the interactions of city people with the city infrastructures and the health of the city physical environment to deliberate on the outcomes of that interactions in a manner that always promote health enhancing activities, to fulfill the call for more ‘prevention rather than cure’ among the socio-economically divergent Malaysian city peoples. Thus, all types of infrastructures in an ecologically healthy city promote equally healthy lifestyles to produce a city life-world that is free from modern trappings of acute health problems. In this context we would like to articulate in this paper that all infrastructures, especially the green ones promote healthy living in the increasingly fast life of modern Malaysian city. Since, at the time of writing, data on types of deceases and sufferers were still not forthcoming, this paper has been oriented to discussing more on the physical health infrastructure for healthy living.

This paper then seeks to extend the argument that green areas in cities of the developing world serve more than just a green lung providing moderating effects to the hot and humid built-up city center to offer a place with ambience that is therapeutic in nature for healthier living. These green areas offer not only a social space for overlapping informal activities that contribute towards individual person’s health but also a stage for inter-ethnic mixing and interactions a relax and informal manner. Sustaining all these uses of the green areas provides the city people with some informal mechanisms for subtle social engineering to mould a multi-racial society. In the long term, the city dwellers and the society at large stand to benefit from those informal interactions. It is argued further that the green areas provide congenial public spaces for shaping meaningful inter-ethnic understanding that helps the rise of a truly multi-racial society. The Lake Garden of the Seremban Municipality in the state of Negeri Sembilan affords a suitable example.

### **Linking Infrastructures to Health of People in the Livable City**

We argue earlier that a livable Malaysian city has all the basic infrastructures to ensure that the city people and visitors to the city live and stay in comfort, free from hassles and problems associated with short – fall of infrastructure provision. An aspect of infrastructure availability revolves around the green infrastructures in the city. Many studies elsewhere have identified the importance of the green infrastructures in promoting eco-health.

Konstantinos et al (2007 p 108) define Green Infrastructure as ‘...to comprise all natural, semi-natural and artificial networks of multifunctional ecological systems within, around and between urban areas’. They pointed out further that the concept of Green Infrastructure stresses on quality and quantity of urban and peri-urban green spaces; interconnections between habitats, and more importantly, in our view in the present study it has the potential to integrate urban development, environmental conservation and public health initiatives.

Cities world wide have green areas; Malaysian cities too are no exception. City planning in the country has made it mandatory that every city should have a hierarchy of green areas for a variety of reasons but each is related to health enhancing purposes. The green areas constitute pristine, semi-natural or artificial in the sense that the green area has been recently developed.

### **The Seremban Municipality and a Hierarchy of Green Areas**

The Seremban Municipality is located in the State of Negeri Sembilan in Peninsula Malaysia (Figure 1), and is currently experiencing vibrant economic, social and physical developments. All contribute to the slow but steady modification of the urbanites' life styles of pre-industrialised urban Malaysia. Like all other state capitals in Malaysia, it has grown out of its 'sleepy hollow' of yesteryears to record a more robust collection of economic, social and cultural activities in the last thirty years or so.

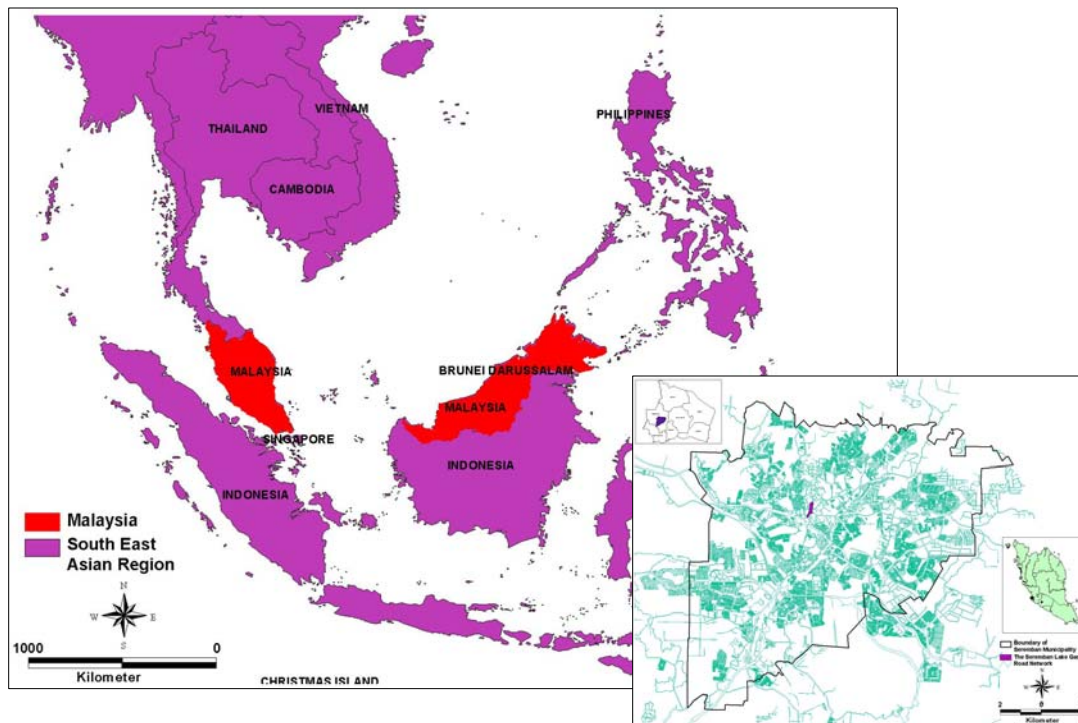


Figure 1: Peninsular Malaysia in the context of South East Asia and Seremban Municipality

Seremban is an intermediate city with a total estimated population today around 300,000. Over hundred years, the population of Seremban District increase steadily. In 1891, the number of the total population was about less that 3,000 people but increased to 383,530 in the year 2000. The number of total population is expected to increase about 594,000 by the year 2020 (Department of Statistic, Malaysia 2000). Founded by the British colonial administration in the closing years of the 19<sup>th</sup> century, the Seremban town then served as the capital of Negeri Sembilan State within the Federated Malay States over the 1895-1947 period until today. For over a century, like any other town with bustling economic activities grew in area following adjustments to its administrative boundary that took

place in the decades after Independence to accommodate the demand of jurisdiction over the growing urbanized areas taking place on the urban fringe.

Being in the most strategic location in any city the main city green area is open to development threat following increasing rate of urbanization. Yet the area has hidden values for health to the city and its people. The environment conscious urbanites have to be aware of the need to conserve the area at all cost.

What is health in the healthy city? According to the World Health Organization (WHO 1948) health is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. The Malaysian Healthy City initiative has also adopted this definition (Malaysia 2004). The definition and the concept of ecosystem health have been closely linked to the concept of stress ecology (Odum 1985; Rapport 1989). As has been pointed out by many writers the concept of ecosystem health has not gone without criticism (Wicklum and Davies 1995). However, for the present purpose the definition offers a broader meaning to the term health. As it has been acknowledged by many other writers on the subject of eco-health (Lawrence 2005; Konstantinos et al 2007) such a broad meaning of health allows us to look beyond the issues of diseases affecting human beings to venture into the concept of health related to other fields such as, in the present case, the green area health or the ecosystem health. Following Constanza (1992) ecosystem health is defined as presence of normal ecosystem processes and functions. An ecosystem is healthy when it is free from degradation and distress, and it is able to maintain its organization and autonomy (Constanza, 1992; Constanza et al, 1998, Rapport et al, 1998). A healthy ecosystem should then become the preferred area for human occupancy to pursue overlapping activities, from offering services to maintain the general well-being of the green areas to engaging in more social related activities in the area.

### **Basic Physical Health Infrastructure for “Healthy Living”**

For the purpose of the paper, we develop a simple hierarchy of green/infrastructure, namely a) Basic Physical Infrastructure for Health Maintenance; b) Basic Infrastructure for Health Sustainability. This paper will deliberate more on b) for the reason that the functions of the infrastructures in (a) are known widely through the world. Table 1 summarizes these Basic Physical Infrastructures for health maintenance. For the total population of the municipality, the physical health infrastructure provision is sufficient to meet the daily need of the people. Should there arise needs for more specialised services they can easily get to them in the Klang Valley conurbation where Kuala Lumpur is located and where there are more hospitals, government clinics and private hospitals.

Table 1: Basic Physical Health Infrastructure

No	Type of Health Infrastructure	Total	Number of Beds	Total Population of Seremban Municipality area
1	Government Hospital	1	850	383,000 in the year 2000
2	Private and Maternity Hospital	8	-	
3	Government Health Clinic	2	-	
4	Private Clinic	177	-	

Source: Department of Health, Seremban

The health infrastructures for health sustainability have also been developed in strategic location in Seremban. These infrastructures are made available for the people to engage in aspects of healthy living that is pursuing sustained exercises to remain physically fit and vibrant. The activity is certainly very encouraging about the citizen's pursuit of such healthy living.

The Seremban Municipality has a hierarchy of green spaces spread all over the Municipal area. Apart from the several golf courses for the more affordable group, usually the preserve of the local elites and the multi-national officials, there are the green areas supervised directly by the Municipal Landscape division and smaller green areas in each housing neighborhood. It is the planning requirement that the developer of each housing area is to set some spaces for recreation and relaxation for the people in the housing area.

Beyond the green spaces in the neighborhoods is the largest and the oldest green area in the Municipality; this is the Lake Garden. Straddle the commercial centre of the Municipality the Lake Garden stands to become an important artifact of the British Indirect rule in Malaysia from the 18<sup>th</sup> to the first half of the 20<sup>th</sup> centuries. Writings on post colonial states have often spoken many negativities about the effects of prolonged colonialism over the dominated locals. In this observation, we would like to differ from the conventional views about the effects of colonial rule on the dominated countries to articulate the better part of city physical planning done by the British planning teams in Malaya in those times. The Lake Garden of Seremban Municipality testifies a good part of urban planning in those years.

A landmark left for the Serembanites and the public today is the lake garden providing a useful green lung for ecological processes and an important green belt for land use development control in the Municipality. The Seremban Lake Garden is a recreational reserve in the Seremban Municipal Council. It is about 27,432 sq meters in size and is among the oldest recreational garden in Malaysia. The Lake Garden is one of the many green areas in Seremban Municipality. According to the Landscape Department in Seremban Municipality, there are numerous green areas in Seremban. These areas have been arranged in a hierarchy accordingly to Regional Park; Urban Park; and Local Park based on the administrative commitment of the municipal authority. The Regional park is still in the planning process, while the Urban Park (where the Lake Garden is) is under the municipal management while the local park is the responsibility of the neighbourhood.

## **THE LAKE GARDEN ECOSYSTEM AND THE GREEN INFRASTRUCTURES**

The Lake Garden ecosystems comprised a small valley, the lake being prominent in the center. Over the years, the original lake has been interfered with. A notable one is the artificial section added at the former head water. Physical infrastructures have been developed on the periphery of the lake such including motor roads that continued to be widened in response to the need of increasing private cars over decades. Almost all of the living quarters for high ranking British officers had lately been demolished for newer houses. The Lake Garden area proper remains intact despite the threat of the construction

of more infrastructures to make the Lake Garden area more conducive to the users. Large housing lots, especially those with dilapidated houses, of the British era further out of the Lake Garden have been subdivided for expensive houses. The interactions between the biotic, non biotic, hydrological and meteorological components of the lake have produced a healthy ecosystem, free from mosquitoes, and air and water borne diseases (The Seremban Municipality 2002). Indeed the lake Garden area is a treasure for the people of the Municipality.

Studies by urban climatologists over the last three decades have confirmed the findings of earlier studies of the effects of green areas of western cities on urban temperature regimes, that in the case of the Lake Garden area the green area has reduced the mid- day temperature on average by about 3-4 degrees Celsius twenty years ago but decreased 2-3 degrees Celsius in 2005, signaling that the Lake Garden area has become warmer lately (Jamaluddin Md. Jahi, Kadir Ariffin & Kadaruddin Aiyub 2005; Sham Sani & Jamaluddin Jahi 1989). Yet, overall the green area has brought a cooling effect on the surrounding built-up areas. Consequently it helps to moderate the daily temperature regimes of the Seremban Municipality. Even in the intense mid day heat and high humidity of the equatorial weather matured trees of the Lake Garden area offer suitable protected spaces for out door activities.

### **Green Infrastructures in the Lake Garden Perimeter**

The Lake Garden area is more than just a green area to the Seremban Municipality. It offers basic physical infrastructure and hence social foundation for activities amidst nature. In this respect it is worth to consider the concept of green infrastructure a little further. Works on green infrastructure elsewhere help to situate the upgrading of the Lake Garden in the Seremban Municipality to be more functional than just a green area that happened to be designed by the British planners then.

In the case of the Lake Garden of the Seremban Municipality, the Lake Garden area with amenities and facilities built by the authority with access to all other areas of the Municipality offers the foundation for active out door physical activities. Above all, we see in the Lake Garden situations an added role to promote closer and meaningful interactions among the multi-cultural urbanites. The green infrastructure of the Lake Garden provides spaces for local initiatives of a 'bottom-up' in nature for social mixing in a relaxed and informal atmosphere.

Different path sizes have been prepared by the Municipal authority for walking cum jogging around the perimeter of the Lake Garden. Special floating pavilions towards the lower ends of the lake offer spaces for specific activities. On the larger green gentle slopes of the Lake, there are spaces large enough for group activities. The authority has also provided with a number of benches strategically placed under the main trees for the public. A pristine forest area on the eastern edge of the Lake Garden area is being maintained for educational purposes. The forest area is made accessible by planned pathways winding through the trees. In the last three decades the lake Garden has also seen the development of children play ground and youth area sheltered by tree canopies.

The ambience of the Lake Garden becomes more than just a nice relaxing place away from the high temperature with high humidity that often forms plumes of urban heat island trapping pollutants unless scattered by breezes. With a healthy ecosystem the Lake area with a well manicured grass and free from dead leaves, revealing an appealing morphology that is aesthetically pleasant to behold. In short the green landscape of the Lake Garden softens the some what drab commercial and built-up area of the Municipal centre area. For some visitors the trees offer a deep psychological symbolism of tranquility. Dwyer, Schroeder and Gobster (1991, p. 283) go to suggest that ‘ the importance of urban trees and forests is grounded in some way deep feelings and ties that sometimes even have a spiritual quality’. Perhaps, the psychological values of trees in cities allow the busy urbanites to be close to nature, and its soothing effects may itself a contributor to health of the urbanites.

### **Green Infrastructure: Informally Organized Health Activities**

The invigorating Lake Garden ecosystem offers spaces for the urbanites to pursue a range of personal health activities. These activities may be conveniently organized into robust physical exercises, a gentler form of exercises or just relaxing under the matured lowland dipterocarp trees around the lake perimeter enjoying the cooler ambience with the intermittent cool breeze.

The most obvious green infrastructure for the people to engage in personal physical exercises is the winding jogging track that the authority has carved around the lake perimeter. Users of the jogging track can opt for either the full track covering about two kilometer circle, the shorter track covering about half of the full distance track, the track covering about a third of the whole distance, the fourth shorter and the fifth short track. Participants can pursue vigorous physical exercises such as jogging running, fast walking or just going for leisurely stroll around those tracks.

Beyond the jogging tracks occupying gentler slopes of the lake offer spaces for more gentler form of body exercises. One in point is the Chinese Tai-Chi which is lead by an elderly person for the people around to follow the slow but rhythmic movements that is said good for the body and sets to improve the body metabolism. On the opposite slope further down a covered floating stage offers some space enough for about twenty people to engage in the aerobic exercises with rhythmic movements according to the sound of modern music with occasional changes to classical Malaysian numbers or Chinese songs.

The Municipal authority has provided more facilities for the people several hundred meters from the lake perimeter on the eastern side of the lake. These facilities are mainly for young children at the play ground. Adjacent to the play ground is a bicycling area for the youth. Amenities and facilities that have been developed suit an outing involving the whole family. Parents can engage in light exercises while attending to their children. Educational green activities are also possible in the pristine urban forest with winding path for access for those who want to be with nature and learn about the nature of equatorial rain forest and the diversity that there is in it.

An enchanted activity offers by a group of elderly gentlemen, mainly Chinese. At the end of their physical exercises they rest on the pavement steps to the green on the slope of the main entrance to the Lake Garden area playing their harmonicas to the delight of the people around. The selection that this group is playing is wide ranging, but for sure the western oldies and the Malaysian patriotic songs are ever the favorite choices. While playing the tunes the group exudes the feeling of tranquility to those present. Indeed, the atmosphere is very relaxing.

Who patronizes the green infrastructure? On working day, Monday to Friday, the number of participants may attract about 500 people mainly elderly residents, male and female from the main ethnic groups of the city. They are spread over the Lake area. On the weekends the number of people on the green area could reach a few thousands with a more mixed age groups attracting both males and females and representing the main ethnic groups.

Now that the Municipal authority has built and upgraded a floating pavilion with concrete seats along the opposite banks of the Lake downstream more formal cultural shows have been organized on weekends of every month for the benefits of tourists and the local people. The authority is able to showcase local cultural shows with multi-ethnic cultural inputs. At the downstream end of the lake of the Lake Garden, at the time of the study works were progressing to prepare for seats and a stage planned for water shows based on performances by dolphins. It is assuring to note that while all the facilities and amenities need cost to maintain the people are not charged for using them. The overall cost is easily absorbed into the annual budget of the Municipality.

### **The Lake Garden: The Green Infrastructure, Social Space and the Local Social Outcome**

Looking beyond the green surrounding of the Lake as well as the opportunities opened to the urbanites to engage in a range of social and personal physical health activities the ambience of the Lake offers also a platform for inter-ethnic mixing and interactions. After fifty years of independence Malaysia still grapples some what nervously with its social engineering initiative to produce a truly harmonious multi-racial society. Authority defined space for inter-racial interactions over those years have achieved certain level of meaningful interactions among the main ethnic groups of the state, especially transparent at certain level of the society. Seemingly the elites and middle class urbanites have evolved meaningful interactions among those ethnic groups. Perhaps, there is a need also to encourage informal local initiatives to evolve meaningful interactions among the various ethnic-groups, and thus help to materialize deeper awareness about the different cultures for meaningful understanding between the ethnic groups.

The informal inter-ethnic mixing and face to face engagements on common topics of interest there in help to forge a new meaning among the multi-ethnic users of the Lake Garden. What the Malaysian authority has been less successful in building meaningful day to day interactions among the multi-ethnic population the informal engagements in the green Lake Garden offers some lessons. In the authority defined spaces of



interactions there is the tendency to bring the various ethnic groups into engagement along economic and political lines. Often such interactions are defined by the political interest of each of the various multi-ethnic groups. It is difficult to get more down-to-earth exchange of ideas on useful issues affecting the ordinary people that are of interest to all in the life world of the multi-ethnic urbanites. There is now interest expressed by the people to find the bonds of friendship as envisaged in the deeper meaning of a truly multiracial Malaysian society. This is because essentially, the political process in Malaysia is still along ethnic line. Authority defined multi-racial activities may promote interactions at a certain functional level only.

True to the spirit of the Local Agenda 21 for sustainable development that the Malaysian authority has subscribed to since the Earth Summit in Rio de Janeiro 1992, the local activities of the multi-ethnic groups in the Lake Garden offer one small example of a bottom-up initiative to allow people to come together to pursue personal or group physical health activities that are away from the more authority based initiatives.

The case of the small group of elderly Chinese playing their harmonica at one small corner of the lake for example has been attracting larger audience during weekends. They play beautiful selections of oldies, local patriotic songs and also Asian selections. All are for free and the group membership is open to any new comers with the proviso that they bring their own harmonicas. A platform is thus created for music enthusiasts to come and play or talk about beautiful music to the crowd that usually gathers around 9.0 in the morning after the walks or jogs or exercises.

Simultaneously, several groups are seen to carry out activities of their choices at other spaces in the garden. One informal group executes exercises based on modern dances. The group attracts mainly young adults in the 20-40 years age group- multi-ethnic with a Chinese majority. The fact that they offer spaces for inter-ethnic mingling of people the exercises cum modern skill dancing allow for the cultivation of inter-ethnic mingling and understanding. Urbanites coming for the recreation and exercises have come to accept the existence of the group. Its absence on certain days is widely felt. A larger mixed ethnic group however, is found among the traditional Chinese exercise called Tai- Chi. It is a form of fitness training. Usually led by a master Tai-Chi one cannot miss the slow rhythmic movements of hands, legs and body positions of 40-50 people on a wider western slope of the lake. The exercise is recognized as a holistic movement to balance the mind and body (Parry 2005). It helps to improve not only co-ordination, flexibility and concentration of the person but also his energy level and stamina. More importantly, Tai-Chi is said to relieve stress, stress-related problems and some common ailments such as arthritis, respiratory and high blood problems when the exercise is sustained regularly.

Another activity offered by the green areas around the Lake is educational in nature. In the urban forest reserve visitors are able to enjoy a walk through path in a tropical forest. School children are often brought to this forest area as parts of their extra-curricular activities. Once again the Lake allows for some form of multi-ethnic interactions in less than formal outings into the forest. Similarly, we can add the informal meetings of

parents from multi-ethnic groups while supervising their small children at the play grounds.

The point the paper likes to stress is on the informality of the initiatives. Participants are free to choose and join the group that befits his/her interest for the day. The authority has provided the Lake Garden as a functional green infrastructure for the Seremban urbanites (The Seremban Municipality 2002)

## **CONCLUSION**

It has become obvious from the discussion that the Lake Garden in the Municipality of Seremban has all the basic elements to make it functional as an eco-health area for the urbanites. The green space is more than just a space with trees, to offer the people with green infrastructures to pursue a variety of individual and group activities related to health. Basic facilities and amenities had been added for the convenience of the users and visitors; all contribute to making the Lake garden a suitable rest area.

Insofar as the Lake Garden is located to the commercial center of the Municipality and straddling the government offices it has serve as a rest area where one can be close to nature, close to the diversity of life in a healthy lake ecosystems. The fact that the authority has ensured the up-keep of the Lake Garden users have an added advantage of having to be in an invigorating ambience, soothing breeze especially in the intense heat of midday equatorial sun.

The green infrastructure along with amenities and facilities for various health related activities around the Lake area have brought personal and group benefits in the forms of several fitness exercises at no cost. At a time when the Malaysian authority is advocating active healthy living the green activities in the Lake Garden area have made useful contribution. More importantly, the Lake Garden area has emerged as a local informal platform for intermixing of ethnic groups representing the cultural pluralism of the Malaysian population. It is our contention; albeit from observation from the side line over the year of the inter-ethnic mixing in the Lake Garden is a socially healthy. Meaningful friendship develops that goes a long way to bridging the inter-ethnic divides in the country, and the process is from below. The Lake Garden eco-health goes beyond the benefits of the green ambience to cement a green multi-racial society.

That the Lake Garden has been in use for over a century and that the urbanites have been developing the habits of utilizing the green area for various types of health activities in an informal atmosphere should be sustained for posterity. We are sure that the authority will preserve it for centuries to come as a safe, healthy and open to all people.

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