

## **A Geographic Analysis on Distribution Pattern of Parks and Gardens in Yangon City**

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### **Abstract**

Recreation is an essential need for human beings. At present, due to the rapid advance in technology, a number of electronic devices for indoor recreation have widely been used in several places, especially in urban areas. However, outdoor recreation is also important for physical and mental relaxation for the sake of less expense of money as well as for healthy lifestyles. Moreover, it is the most appropriate type of recreation for all lifestyles, whether male or female, young or adult, rich or poor, single or married and so on. Therefore, this study attempts to highlight the existing distribution pattern of some outdoor recreation sites, particularly parks and gardens of Yangon City from geographical point of view.

### **Introduction**

'Recreation' means any activity done for pleasure in leisure time without expensing any money. The choice of recreation depends on individual interest, ability, one's income. This means that some hobbies e.g. golf, have a limited range of socio-economic classes involved. Personal choice is influenced by a range of factors including age and gender, education and interests, socio-economic group, occupation and status, family and stage in the life cycle, time available, distances involved transport available and facilities needed (Ganderton, 2000).

At present due to the rapid advance of technology, a number of electronic devices for indoor recreation overwhelm in several places especially in urban areas. Modern recreation facilities may temporarily remove the mental stress caused by monotonous daily routine, transport difficulties, noise pollution etc., but these facilities may, in the end, cause both physical and mental defect, unless there is insufficient fresh air, green cover and open space for exercise. Outdoor recreation is the most appropriate type for all levels whether male or female, young or adult, rich or poor, single or family and so on. Therefore, this study tends to identify the distribution pattern of some outdoor recreation sites, especially parks and gardens in Yangon City from geographical point of view.

### **Objectives**

- (i) to investigate the factors controlling the distribution pattern of parks and gardens,
- (ii) to trace the development of parks and gardens,
- (iii) to identify the spatial distribution of parks and gardens of Yangon City by using appropriate methods, and
- (iv) to assess these recreation sites are whether appropriate or not to the booming urban population and extended urban areas.

### **Study Area**

Yangon City occupies as the central portion of Yangon Region and lies between North Latitudes 16° 44' and 17° 05' and between East Longitudes 96° 00' and 96° 44'. It is bounded

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by Hmawbi Township on the north, Hlegu Township on the northeast, Thanlyin Township on the south, Twantay Township on the southwest and Htantabin Township on the west. The areal extent of Yangon City is 794.62 square kilometers (306.81 square miles). With a length of 40.57 km (25.21 miles) from north to south and a breadth of 33.79 km (21 miles) from east to west, and has a compact shape.

The city is composed of four Districts: the Eastern Yangon District, the Western Yangon District, the Southern Yangon District and the Northern Yangon District. It included 33 townships and about 5 million people inhabited in 2010. Due to its total area of 794.62 square kilometers (306.81 square miles), the population density was 6300 per square-kilometer (16,300 per square-mile).

### **Analysis on Spatial Distribution of Parks and Gardens in Yangon City**

Normally, park means public garden or recreation ground in a town and the common definition of garden is a (piece of) ground used for growing flowers, vegetables, lawns, etc. However there is no definite definition for them in YCDC (Yangon City Development Committee).

According to the YCDC there are 68 parks and gardens in Yangon City. It comprises 19 first grade, 33 second grade and 16 third grade parks and gardens. *The first grade parks or gardens* have various facilities for children, and they are highly accessible and thus a large number of people could come and relax there. *The second grade parks and gardens* have only limited facilities for children owing to small size. Therefore, the probable number of visitors is moderate. Although *the third grade* ones are wide in area, the number of visitors is small due to lack of amenities and their distant location. The establishment of third grade parks and gardens tend to protect the potential encroachment of squatters and to beautify the city.

The present spatial distribution of parks and gardens in Yangon City can be analyzed by following factors:

**(a) Geographic Location:** Due to the present distribution pattern, most of the parks and gardens are concentrated at the southern part of Yangon City, the former core of ancient capital. On the basis of district unit, the Western Yangon District has the greatest number of 21 parks and gardens and occupies about (29.41%) of total parks and gardens. On the other hand, the Eastern Yangon District possesses the least number of 14 (20.59%).

The first grade parks and gardens are mostly found in the Northern Yangon District as 7 out of 19. Whereas the second grades are concentrated mostly in the Western Yangon District (13 out of 33). The Eastern Yangon District possesses the largest number of third grade parks and gardens (6 out of 16) as well.

**(b) Zonal Location:** Based on zonal locations, parks and gardens are distributing as follows:

(1) In down town which includes six townships of *Lanmadaw, Latha, Pabedan, Kyauktada, Botahtaung, and Seikkan* possesses 6 parks, but garden is nil. They occupy a total land area of 0.05 sq-km, which accounts for (0.006%) of Yangon City area.

(2) The inner urban ring area of Yangon City which possesses nine townships (*Ahlone, Kyeemyindine, Sanchaung, Dagon, Mingala Taung Nyunt, Pazundaung, Dala, Bahan, Tarmwe*) has 18 parks and 5 gardens, totaling 23 and occupies 2.38 sq-km, represents (0.3%) of Yangon City area.

(3) The outer urban ring (*Kamaryut, Hlaing, Yankin, Thingangyun*) of Yangon City has 10 parks but no gardens. The area occupied is 0.16 sq-km, accounts for (0.02%) of Yangon City area.

(4) The suburban area has 19 parks and 6 gardens and it includes *Seikkyi Khanaungto, Dawbon, Tharkayta, South Okkalapa, Mayangone, North Okkalapa, Insein and Mingaladon* Townships. This zone has 25 recreational land pieces and occupies 7.43 sq-km of land, which represents (0.94%) of Yangon City.

(5) In the new town area (*Dagon Seikkan, Dagon Myothit (South), Dagon Myothit (East), Dagon Myothit (North), Shwe Pyi Thar, and Hlaing Tharyar*) has only 4 parks, but there has no garden. This area is occupying 0.1 sq-km as accounts for (0.01%) of the city area.

Thus, the suburban zone has the largest number of parks and gardens and it occupies by far the largest portion of recreational land. It is largely due to moderate density of population and availability of wide land spaces suitable for recreational use. Although the downtown has 6 parks, the area occupied is small because of the dominance of residential and commercial lands.

**(c) Relief:** In practice, undulating or land with more ups and downs is more favourable to use as recreational land as such land have different landscapes. However, many of relatively higher part of Yangon City, the crest of central low ridge, is occupied by residential buildings, mostly by the affluent on both sides of Pyay Road. That is why only a small portion (5.97 %) of the recreational land exists over this elevated relief. Most of the parks and gardens, (94.03 %) of the total number, are located in flat or very slightly undulated land. In terms of elevation of the relief, there are 28 parks and gardens over land with elevation lower than 20 feet, 25 between 20 and 40 feet, 6 between 40 and 60 feet, 5 between 60 and 80 feet, 2 between 80 and 100 feet and 2 above 100 feet. This implies that there is reverse relationship between elevation and number of parks and gardens.

Although most recreational lands are located in the area between the Ngamoeyeik Creek and Hlaing River, the streams with muddy water have no effect on the location of the parks and gardens. The concentration of recreational lands in Bahan Township with moderately low population density is related to the presence of Theinguttara Hill and Kandawgyi Lake and to short distance to most populous downtown area.

**(d) Accessibility:** Accessibility is of much importance for the majority of the city dwellers, as they have to depend on public transport bus. Out of 68, 46 parks, garden and zoo are located along the main roads and at the corner of road junctions and close to bus stop. The numbers of recreational land located in the middle portion of wards are 22, but they are also close to bus stop and easily accessible by car. There is no recreational land, where accessibility is extremely low.

**(e) Dispersion Degree Index:** To measure the dispersion degree of parks and gardens, the Nearest Neighbour Index (NNI) is used. The Nearest Neighbour Analysis is a quantitative procedure to determine how much a pattern departs from an expected random pattern.

Nearest neighbour analysis examines the distances between each point and the closest point to it (Fotheringham *et al*, 1994; Wulder, 1999). It is a method of exploring pattern in locational data, by comparing graphically the observed distribution functions of event-to-event

or random point to event nearest neighbour distance, either with each other or with those that may be theoretically expected from various hypothesized models, in particular that of spatial randomness (Upton, 1985); i.e. it describe distribution of points according to their spacing.

The equation for the nearest neighbour is computed through the following steps.

$Ad = (\sum d_i)/n$	$d_i$ is the distance from point $i$ to its nearest neighbour; $Ad$ is the average of nearest neighbour distance of the point pattern; $n$ is the total number of points in the chosen map area.
$Ed = 1/2 \cdot \sqrt{\frac{A}{n}}$	Expresses the expected value of the average nearest distance; $A$ denotes the map area
$NNI=Ad/Ed$	Equation for the nearest neighbour index, it is defined as the ratio of $Ad$ to $Ed$

The values of NNI range between two theoretical extremes, 0 and 2.1491. When all the points in a pattern fall at the same location, the pattern represents the theoretical extreme of spatial concentration, in this case,  $Ad = 0$  and  $NNI = 0$ . The more closely the points are clustered together, the closer to 0 NNI will be, since the average nearest neighbour distance decreases. The closer NNI gets to 1, the more randomly spaced the points are. The value of NNI approaches 2.1491 for perfectly uniformly spaced points. To compute the NNI for parks and gardens of Yangon City all 68 sites of them are marked as "points" at their respective centres on three inches to one mile scale map. Then the linear distance between each point and its closing point (nearest neighbour) is measured for all sites.

By using the NNI formula, the resulted nearest neighbour index for some outdoor recreation sites, especially parks and gardens for this study is "0.65". This means that there is a tendency towards **a random pattern** of distribution in parks and gardens of Yangon City. This is a good opportunity for the visitors. Because they could have a chance to choose their most desired place among others whether far or near from their homes. Therefore, the present distribution pattern of parks and gardens in Yangon City stands as the most significant role in recreational landuse of Yangon City.

### Conclusion

The present distribution pattern of parks and gardens is related to some geographic factors: location, size, shape, relief, population pressure and accessibility. Moreover, guidance and decision of authorities, especially that of Yangon City Development Committee, is also important for determining and establishing outdoor recreation sites.

Because of its relative large size and compact shape, Yangon City could support many outdoor recreation sites. Due to the early establishments and favourable physical conditions, most of the parks and gardens are concentrated in southern part. However, some disperse to the north, west and east parts due to the expansion of urban area.

The relationship between the number of population and distribution pattern of parks and gardens is not so strong, but 66.17 percent of parks and gardens are located in the densely populated area and there are only 34.33 percent in the area with low population density. Kyauktada Township is high in population density and it has four Parks. However, Lanmadaw, Latha, Dawbon and Hlaing have no parks. This is because these areas are filled with congested residential buildings and commercial activities.

On the other hand, Bahan, Dagon and Mayangon townships with low population density have relatively a large number of parks and gardens. Lack of recreational land in Shwe Pyi Thar Township and Dagon Seikkan Township is due to the very recent development of the towns and the location in the peripheral area.

Although the total area 10.12 sq-km (about 1.27% of YCDC area) is inappropriate and insufficient for increasing urban population and booming its urban area, its random pattern distribution could thoroughly support the outdoor recreation function. Because of its randomness dispersion, everyone could access any parks and gardens whether near or far from his home/native place easily. Therefore, the random distribution pattern of parks and gardens stands as a significant role to the outdoor recreation of Yangon City.

Nevertheless, parks and gardens are essential for congested urban areas like Yangon City. Their greening scenic views can alleviate mental stresses and their appropriate sizes whether large or small are the best for doing physical exercises such as jogging, playing aerobic exercises, cycling, etc.

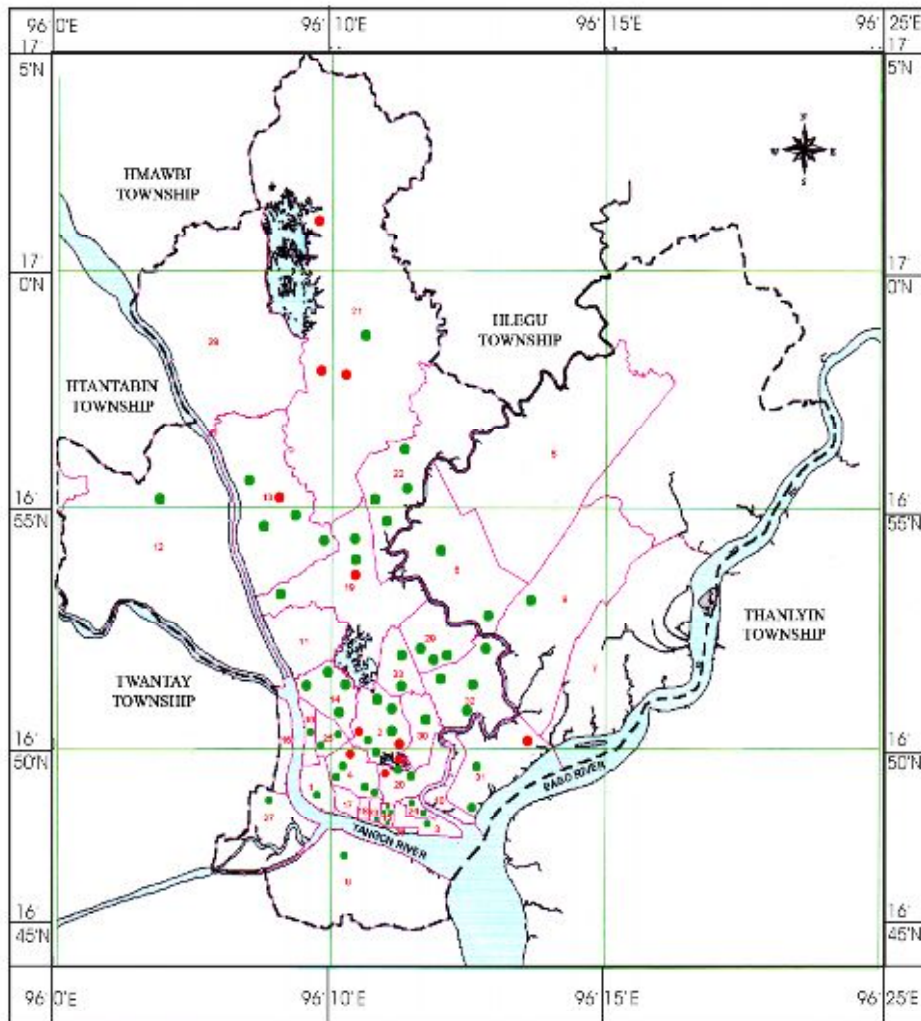
Moreover, the parks and gardens are the great environments for birds, fishes, and other animals and effectively support their habitats and life cycle. The green leaves absorb carbon dioxides which emit from motor vehicles, manufacturing plants, houses, and personal uses. Therefore, the parks and gardens stand as the important agents for sustainable urban climate and clean and fresh urban environment.

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Source: Yamin Aye, 2009 & Field Work.



1 SHLOHE	12 HLANG THARYAR	23 PARRAN	TOWNSHIP BOUNDARY
2 BANAN	13 SHIBIN	24 PAZUNG MING	
3 DOTTAUNG	14 KAMARVUT	25 SAACHAUNG	CITY BOUNDARY
4 SAON	15 KYAUKTADA	26 SEKKAH(CENT)	
5 SAON MYOTH(EGST)	16 KYE MYIDANG	27 SEKKAH(SOUTH)	
6 SAON MYOTH(SOUTH)	17 LANMASA	28 SHWEPYITHAR	
7 SAONMYOTH(SIKKAK)	18 LATNA	29 SOUTH DOKALAPA	
8 SAON MYOTH(SOUTH)	19 MAYKONG	30 TARMWE	
9 DALA	20 MINGALAR-TAUNG-NYUNT	31 THARISTA	
10 DANKHON	21 MINGALADON	32 THIRASAYUN	
11 HLABO	22 NORTH DOKALAPA	33 YAKHE	

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Figure 1. Distribution of parks and gardens in Yangon City

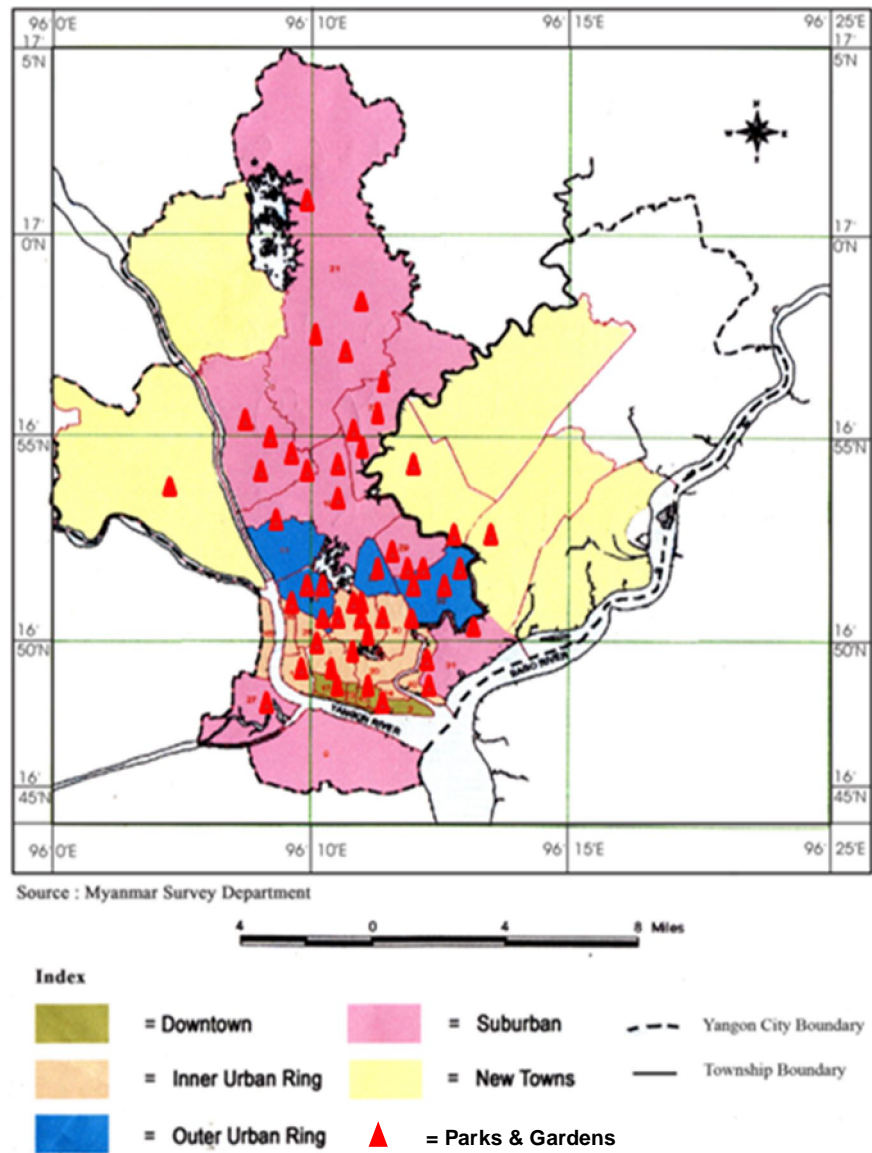


Figure 2. Zonal distribution of parks and gardens in Yangon City

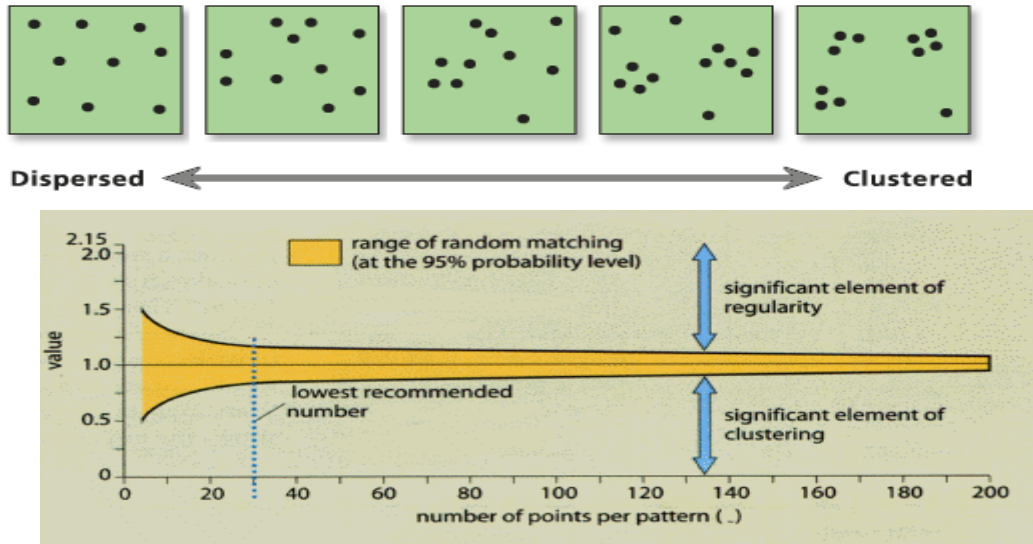
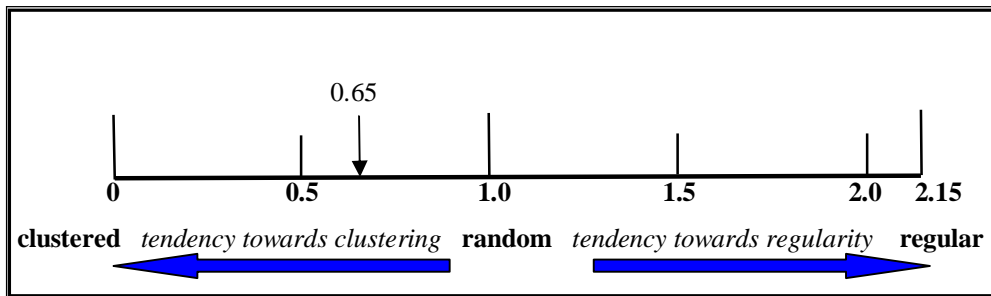


Figure 3. Interpretation of NNI statistic: significant values

(after David Waugh, with thanks)



Source: Calculation

Figure 4. The Nearest Neighbour Index for parks and gardens of Yangon City