# Green Spaces of Colombo: The Need for Planned Interventions

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**Abstract**

*The significant contribution of green vegetation in strengthening urban sustainability is often underestimated. Thus, the urban green spaces (UGS) are being threatened due to escalating population and developmental pressures in many countries. This paper presents a study that evaluated the temporal change of UGS in 47 wards in Colombo from 1960 to 2010. It employed geographic information systems, aerial photography and remotely sensed imagery. In order to identify the perceived value of UGS to its users, a public assessment using a questionnaire survey was conducted. Today UGS occupies 24% of the total land area of the Colombo City some being man-modified (GM) and some natural (GN). In 2010, only 4 and 11 wards contained ≥ 25% area of GN and GM respectively compared to 31 GN and 6 GM-UGS in 1960. The drop of GN highlights the depth of ecological damage that has occurred to the city environment while the growth of GM reflects the enthusiasm of city dwellers in upgrading greenery of the environment. This coincided with the perception and emotional experiences of the majority of city dwellers on UGS as they consider GM-UGS as places that provide freedom, happiness, and pleasure, and thereby strengthen bonds with Nature as well as family members. They are areas to play with children, and meet friends and relatives. It was evident that parks/recreational areas, and street trees acted as "an oasis" for the busy life of many individuals. However, active involvement of individuals with UGS was poorly represented during the public assessment of UGS. Thus the study proposes that the city planners improve existing UGS by adding walkways, jogging tracks and outdoor play and study areas to encourage active engagement of people. It is also suggested to adopt community-based tree planting and volunteer tree maintenance programmes that may contribute to increase the green cover of the City.*

***Keywords:*** *Colombo City, urban green space, spatial distribution*.

## Introduction

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Urban Green spaces (UGS) are green vegetation patches found within urban limits, said to be natural, at least in part (Handley et al., 2003) and include parks, nature reserves, roof and vertical greening, private gardens, cemeteries and churchyards. The UGS also include abandoned sites awaiting development and land alongside waterways, urban forests and trees along roads, railway, cycling routes and pedestrian paths within towns and cities (DTLR, 2002). Hence, UGS is an umbrella term that encompasses predominantly unsealed, permeable, green areas which are publicly accessible.

Urban green spaces contribute to maintain the biodiversity within city limits while ameliorating the physical urban environment, and provide urbanized societies enormous economic and environmental/ ecological services. Therefore UGS can also be considered as ecological assets in cities (Comber *et al*., 2008). Following McHarg's concept on 'ecologizing' cities, incorporation of UGS into urbanization process became a common practice in the developed world. Subsequently, while moving towards sustainable development, green patches of vegetation were considered as an essential component of the infrastructure of cities (Swyngedouw and Cook, 2009).

Despite the fact that UGS were considered important, increasing rate of human population and developmental pressures have had an ever-increasing impact on UGS. Condensation of the built-up areas often caused substantial loss of green spaces creating a significant change in land use, affecting negatively on structure, pattern and function of ecology of cities (Mathieu *et al*., 2007). Therefore, managing urban population and urban green spaces has now become one of the most important challenges. In this regards, it is of utmost importance to identify the spatial distribution of UGS and understand the pattern of their temporal change in the urban development process.

According to available literature, several studies have been conducted on development, maintenance, conservation and valuation of UGS in many countries (e.g. Getz, 1982, DTLR, 2002; GLA, 2003; Baycan- Levent and Nijkamp, 2004; McPherson *et al*., 2008; Chiesura 2004, Sanesi and Chiarello, 2006; Bonnes *et al*., 2011). However, in contrast, a handful of urban ecological studies has been found in Sri Lanka. Inventorying the biodiversity, identifying ecosystem services, assessment of public perception and pricing of cultural, social, amenity and recreational value of UGS are some of the aspects of urban studies that are of great importance to city planners, but these have been paid least attention and documented poorly in research. The decision-makers involved in the city planning and design process need to understand these aspects to make a rational and sensible choice based on economic and ecological considerations.

However, at an era during which a major development plan is being initiated for the improvement of green cover and beautification of the Colombo city and its suburbs, it would not be too late to identify the current distribution and the pattern of change of UGS over the years. Moreover, public experience on UGS and the emotional benefits they perceive would also provide immense support to identify current social demands for the landscape architects to design recreation sites among urbanities. Thus, there is a good reason to undertake studies in a variety of relatively unexplored aspects on UGS to provide a better understanding of the reality of green spaces in the City of Colombo.

Here we focus on UGS in the Colombo Municipal Council area, the country's primal urban centre that accommodates a residential population of about 642,000 and a daily floating population of another 400,000, making it a city of over one million population (Department of

Census and Statistics, 2001 as cited by Sevanatha, 2003). One of the objectives was to evaluate the current spatial distribution and temporal change of UGS in 47 wards of Colombo during the period 1960 to 2010 using geographic information system, aerial photography and remotely sensed imagery. These tools offer practical and economic means to study vegetation cover changes especially over larger areas, as they provide key data sources which can be easily obtained for earth monitoring programmes (Xie et al, 2010). Recognition of the perceived values of UGS by city dwellers was the second objective. Hence, a public assessment using a questionnaire survey to obtain their emotional views and experiences on UGS was conducted.

## Assessment of the urban green space in spatial and temporal scales:

We evaluated UGS in 47 wards of of Colombo (Figure 1) using aerial photography combined with Geographic Information System (GIS). Aerial photograph of 1960 and ward map of Colombo were geo-referenced and digitized while the digitized 2010 Colombo land use map was obtained from the Survey Department. The cover percentages of Built up areas (B) and the UGS, which were further differentiated into natural (GN) and manmade green spaces (GM) were estimated in each ward according to the cover percentage classes of >75-100%, 74-50%, 49-25% and <24%. The GN included marshlands and scrublands while play grounds, arboreta, parks, private home gardens, public recreation spaces, and barren lands, which are a result of human intervention that have taken place during developmental activities of Colombo were categorized under GM.

Figure 1: Ward map of City of Colombo and respective wards with ID

| ID | Ward | ID | Ward |
|---|---|---|---|
| 1 | Mattakkuliya | 25 | Panchikawatthe |
| 2 | Modara | 26 | Maradana |
| 3 | Mahawatta | 27 | Maligakanda |
| 4 | Aluthmawatha | 28 | Maligawatte East |
| 5 | Lunupokuna | 29 | Dematagoda |
| 6 | Bloemendhal | 30 | Wanathamulla |
| 7 | Kotahena East | 31 | Kuppiyawatte East |
| 8 | Kotahena West | 32 | Kuppiyawatte West |
| 9 | Kochchikade North | 33 | Borella North |
| 10 | Gintupitiya | 34 | Narahenpita |
| 11 | Masanger veediya | 35 | Borella South |
| 12 | New Bazaar | 36 | Cinnamon Gardens |
| 13 | Grandpass North | 37 | Kollupitiya |
| 14 | Grandpass South | 38 | Bambalapitiya |
| 15 | Maligawatha West | 39 | Milagiriya |
| 16 | Aluthkade East | 40 | Thimbirigasyaya |
| 17 | Aluthkade West | 41 | Kirula |
| 18 | Kehelwatha | 42 | Havelock Town |
| 19 | Kochchikade South | 43 | Wellawatte North |
| 20 | Fort | 44 | Kirillapona |
| 21 | Komponnaweediya | 45 | Pamankade East |
| 22 | Wekanda | 46 | Pamankade West |
| 23 | Hunupitiya | 47 | Wellawatte South |
| 24 | Suduwella | | |

Source: Survey Department, Sri Lanka

It was noted that 30% of total land area of Colombo occupied by the green spaces in 1960 has decreased to 24% in 2010. Recently (in 2010), out of the 47 wards, only four and eleven wards contained ≥ 25% area of natural and man-modified green spaces respectively, compared to the thirty one GN and six GM in 1960. This indicates that the GN green spaces have significantly

decreased while GM green spaces have increased over the last fifty years. The Figures 2a and b illustrate the frequency distribution of wards (%) in the GN and GM categories in 1956 and 2010. As far as the decrease in UGS is concerned, 15 wards in the city clearly exhibited the depletion of natural green spaces (GN- marshlands, scrubland) with the increase of built-up area (B). But these are also the wards in which the extent of man modified green spaces (GM- play grounds, parks, home garden, recreation spaces, barren lands) had grown over the last 50 years (Figure 3). Though the increase of GM does not compensate fully for the damage of the city's ecological balance, it reflects the enthusiasm and effort of the city planners and city dwellers towards arboriculture and probably amenity horticulture (growing street trees, green corridors and privately owned home gardens) in Colombo.


Figure 2a**:** The GN difference between (1960 – 2010), in wards of city of Colombo.
**Cover categories ;** □>75 %, ■75-50 %, ▫ 50-25%, ■ 25-0% indicate that by 2010, most of the wards have GN < 25% cover and only few contain 50-25% coverage of green vegetation.
Source: author


Figure 2b**:** The GM difference between (1960 – 2010), in wards of Colombo.
**Cover categories ;** □>75 %, ■75-50 %, ▫ 50-25%, ■ 25-0% indicate that by 2010, very few wards have increased their man modified green vegetation (GM) to >75% cover category as well as to 50-75% .
Source: author

Our results also show that the wards located in the peri-urban zone of the Colombo city have been the area where a greater proportion of loss of GN occurred over the past fifty years. Mattakkuliya, and Modara wards provide clear examples for such reduction of UGS while wards located near coastline such as Kollupitiya, Bambalapitiya, Milagiriya and Wellawatte North had already shown the loss of UGS by 1960. Peri-urban areas of many countries have also shown a similar pattern of land use change due to the settlement of many migrants from rural areas as well as from the city itself (Bonnes *et al*.,2011).

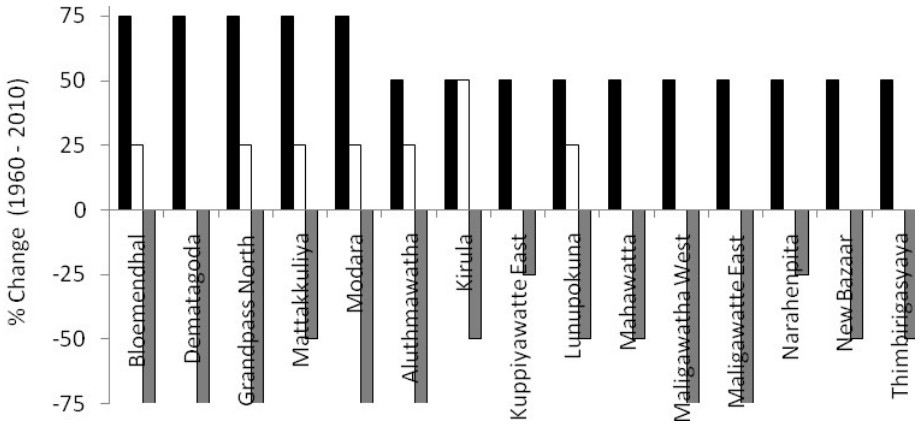


Figure 3: The growth of GM and trade off between UGS and built area 1960- 2010 in 15 wards of Colombo.
■Built area □ GM- man modified green spaces, ■ GN- natural green spaces
Source: author

## Public assessment on UGS

A public assessment was conducted from July to October 2012 by interviewing 135 respondents. These included teenagers and adult users of UGS with different professional backgrounds. Here we also considered everyday and frequent users, hence a questionnaire consisted of 15 questions which was distributed among school children, drivers, office workers, park visitors and street vendors. Response formats of the questionnaire were either open (descriptive) or closed (dichotomous, multiple choices) in ranking scale. The direct questions allowed for selecting one or two possible answers while some questions allowed small explanation to leave the respondents the freedom to express their thoughts with their own words. The first part of the questionnaire revealed basic socio-economic data of respondents. The second part (10 questions) were designed to solicit actual recreational experiences and activities of respondents related to UGS, preferable places for relaxation among UGS, reasons for choosing such venues, purpose and frequency of visitation to preferable UGS, timing of recreation pursuits, and their views on importance of recreation. Some of the questions were "Why do you come here?" , which included one or more responses such as "to sport, to meet others, to play with children, to escape from routine work/ for a change, to appreciate green vegetation/nature/ fresh air etc., to contemplate and meditate, to get artistic inspiration, to park the vehicle etc". "Which feeling does Nature evokes you?" question had a multiple response format with answers; freedom for me, luck, adventure, happiness, unity with family, unity with Nature. For question "how important are these feelings for your daily well being?" responses were; not important at all, essential, and no comment. Thus, our survey was mainly focused on i) Motives for green spaces: how do urban users perceive aesthetic function(s) of UGS ? Why do people visit UGS? In what sort of activities do they engage, and which needs do these activities fulfill?, (ii) Emotional aspect: which feelings do urban people experience, how important are they for people's general well being, and why?. The respondents explained how they emotionally benefit from UGS.

The survey for public assessment on UGS included respondent groups of school children, drivers, office workers, park visitors and street vendors of which 82 (61%) were male and 53 (39%) were female. All of them were city dwellers and belonged to any one of the three age categories 15-35, 36-55 and 56-75. The perception and emotional experience of them on UGS varied among the respondent groups. The perception of school children towards UGS, as schoolboys (27%), revealed that they experience it as a place for freedom, adventure and happiness. The schoolgirls (20%) insisted that visits to UGS provided them unity with Nature, family, happiness and adventures (Figure 4a). Majority of the park visitors (56%) and office workers (27%) felt that green areas provide them 'freedom' and happiness (Figure 4b). Visitors also expressed that their visits to parks had increased the unity and bond among family members.

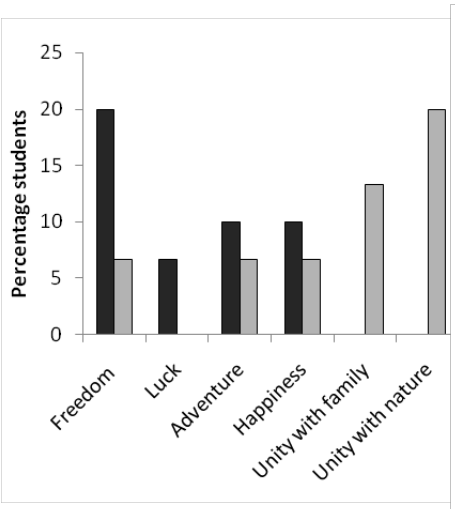


Figure 4a: Perception of school children towards UGS ■Male, ■Female
Source: author

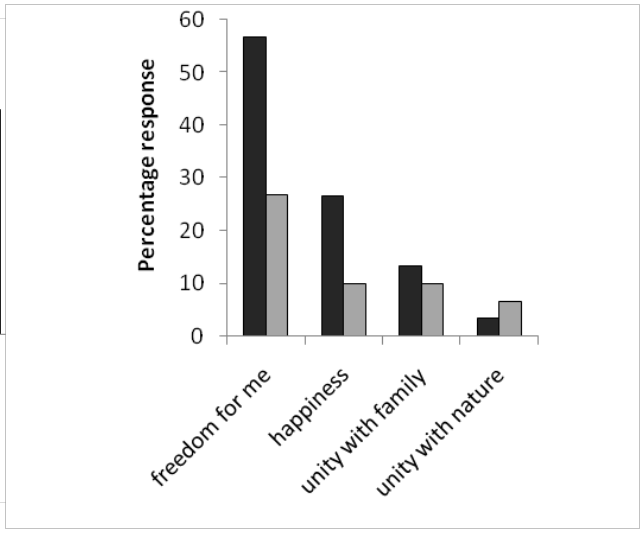


Figure 4b: Perception of Park visitors and Office workers
■Park Visitors, ■Office workers
Source: author

An 80% of office individuals and school children perceived that the pleasure provided by the green spaces is essential for their daily wellbeing. Most park visitors (77%) and drivers (73%) also felt the same (Figure 5). Drivers (57%) and street vendors (47%), who work outdoors almost all of the day perceived street trees as "places making them less tiresome".

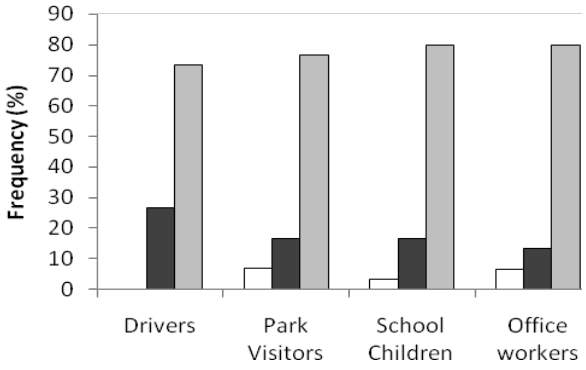


Figure 5: The perception of UGS on daily wellbeing of people
■Not important at all, □ No comment, ▭Essential.

The perception of office individuals should be highlighted. This group of respondents has been spending most of their time in indoor environments and often do not get a chance to appreciate greenery during the day time. It was found that 50% of such individuals felt stress relieved and 23% felt happy and another 23% felt 'close to Nature' at least when they pass street trees during day-to-day travel to office (Figure 6). Further, 50% of the office workers expressed that they felt relaxed when they come in contact with green spaces and suggested that they would like to have green areas in their office premises for relaxation during short breaks given in between working time. This highlights the necessity of maintaining a green landscape in all possible workplaces. Adoption of a community-based tree planting and volunteer tree maintenance programme may contribute to increase such green cover. This approach also extends the benefits of UGS that accrue to individuals to the community level. It is said that workers report greater productivity when they have a view of green space from their place of work, and their supervisors have also felt that these workers were more productive. Similarly, business districts with many trees have shown to be performing better in providing goods and services compared to that with few or no trees (Kaplan, 1993).

Our findings indicated that nearly half of the park visitors' motive was to appreciate the green recreational surroundings which provided them a pleasant and peaceful environment. Only a few respondents (17%) had visited green spaces to play with children, and 12% to meet friends and relatives (Figure 7). Findings also reflect that outdoor playing was not enjoyed by many children while visiting UGS with their parents (see also the perception of school children). Playing in an area with trees and plants is said to support children's development of skills and cognitive abilities and lessen various childhood disorders (Taylor et al., 1998). Today the life style of children has become very much different as their everyday life is being disconnected from the natural world and instead their stay is being restricted to indoors. Therefore when drawing up plans for city development, children's need of playing/studying outdoor environments should also be encouraged by the city planners. At present several green spaces of Colombo are being modified into walkways, jogging tracks and recreational areas, but little attention has been paid on improvement of play or outdoor study areas for children within UGS.

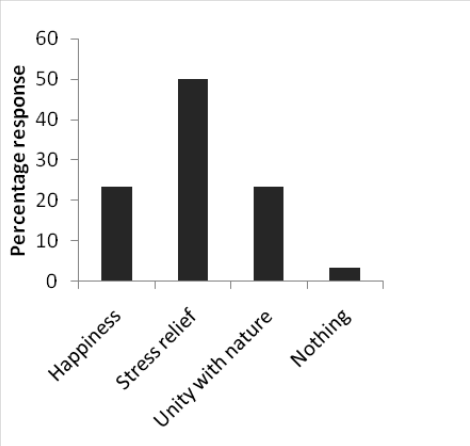


Figure 6: Office internals perception
**Towards street trees** ■Office workers

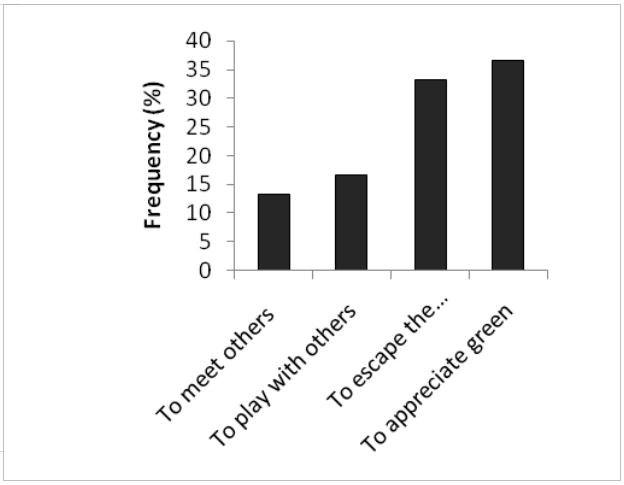


Figure 7: Motives of Park visitors
■ Park visitors

## Conclusion

Although plants (especially trees) are often seen as amenities to many of us, the psychological benefits they provide to the human society is vital to understand. Green vegetation is considered to be essential to improve mental health, enhance contemplativeness and bring healthy life style to individuals and families. However, it seems that majority of our urban society would like to accrue passive experience from the green environment rather an active experience. Therefore future landscaping programs could be improved with these benefits as intended outcomes for healthy communities and sustainable cities.

The study also highlighted the contribution of GM, the man modified UGS to the well being of urban inhabitants and reflected their desire for further expansion of parks, recreational areas and green ways in the Colombo city. As the natural green spaces have been gradually shrinking in the City of Colombo while Man-modified green spaces are slowly expanding, identification of suitable locations for future parks, play areas as well as their designs have to be carefully explored for sustainable urban planning and landscaping. Establishment of roof top and vertical gardens especially in the wards having a high proportion of built area and planting of trees in public and private properties in wards with less built up area would further increase cover of GM as a compensation for the GN which has already disappeared.

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