Urban Green Spaces: Bridging cultural, ecological and political planning gaps to make the city of Colombo a leading 'Greener-City'

Sumedha Kumari Konau

A thesis submitted for the degree of PhD

Department of Landscape and Architecture

University of Essex

January 2016

Abstract

Sri Lanka is a developing country shaped by its tropical climate. Greening the cities for beautification, recreation and environmental reasons has occurred here since ancient times. Colombo, the commercial capital of Sri Lanka, is a complex fast-growing city. A history of colonisation, first Portuguese, then Dutch followed by British, influenced and created a mixed culture of ethnic and religious identities. As a diverse population with a difficult recent history of unrest, Colombo citizens are seeking stability, quality of life and new ways to engage with passive and active recreation in urban green areas.

Colombo has Urban Green Spaces (UGSs), but these are of variable quality and there is no coherent strategy for maintaining or planning, or a sustainable vision for the city. Planning failures are a big problem to the city's green spaces. Therefore, it has become urgent and necessary to make an innovative study of the theory and practice of Colombo's UGSs.

The hypothesis of this research is that there are 'a unique set of cultural, geographical, ecological and political circumstances in the city of Colombo that could enable it to become a leading "Haritha City" (Green City) in South Asia, but there are gaps in the current planning system that are preventing that aim from being realised'.

This study was conducted using a three-spheres conceptual framework, consisting of sociological and cultural, ecological and geographical, and political aspects of UGSs. Using relevant researches from global context, together with in-country sociological studies, the gaps were identified and a practical and deliverable strategy of suitable practices was developed. This thesis establishes core principles for future development and proposes a new direction and model for urban green planning in Colombo.

Acknowledgments

I would like to express my sincere gratitude to all the staff of Writtle College, the University of Essex, UK and all who assisted me during my fieldwork in Colombo Sri Lanka.

I would like to thank all my friends, especially Neeth, Chaturika, Dilani and Dileepa, as I greatly value their friendship and deeply appreciate their belief in me. I am extremely grateful to my dearest friend Dr. Erica Bower for all her support in every way to bring this study into a reality.

I am very much thankful to my husband Boris, my extended family Fritz and Renate Konau for their financial support, my brother Dhammika for his practical support and my mother and family Jayasundara for their moral support. None of this would not be possible with the love and patience of my little son Keanu, who had to smile through enduring semester after semester of late meal times and many bedtime routines without mummy.

Most of all, I am fully indebted to my academic supervisors **Dr. Saruhan Mosler** and **Dr. Peter Hobson** for their understanding, wisdom, patience, encouragement, in last few years of my life and eventually to full fill my dream into a reality.

Finally each and every person who concerned about my success!

I dedicate this thesis to my son Keanu William Fritz Konau and my late father William Jayasundara…..

Contents

List of Figures

List of Tables

Chapter 1: Introduction

CHAPTER CONTENTS

1.1. OPENING STATEMENT: PURPOSE OF RESEARCH AND OVERVIEW OF SITUATION

Colombo is a complex fast-growing city in a developing country with a diverse population and a difficult recent history of unrest. With the end of civil war, the population is seeking stability, improved quality of life and new forward-looking governance.

The tropical climate in Sri Lanka permits lush vegetation growth, but also a level of heat and humidity that can make living and working there difficult. It also brings storms, and regular flooding, and these risks are likely to increase with climate change.

As in other cities, Colombo also has similar expectations from Urban Green Spaces (UGSs). Among many functions; they can mitigate the effects of extreme environments, trees provide cooling shade, while green landscaping can function as water absorption and holding space for flood mitigation. Vegetation produces oxygen and improves air quality. UGSs also bring benefits at a personal level. They have been shown to improve physical and mental health, and they provide spaces where social interactions can occur. At a political level, green spaces can provide the character and an indication of the status of a city.

1.2. BACKGROUND OF THE RESEARCH: SCENE-SETTING

1.2.1. Global trends in urbanisation

Since 1900s the world has been significantly urbanised and will continue this trend in the future. For the first time in the human history, more people live in cities than in countryside. Although urban growth rate of developed countries is increasing relatively slowly, developing countries face many problems from rapid population growth, economic expansions, and land consumption at an unprecedented scale (United Nations Population Fund (UNFPA), 2007). In

the 21st century, urban planning is facing many challenges and opportunities due to serious issues raised in the environmental and social part of the urban society.

1.2.2. Urban Green planning in developing countries

The challenges in planning and maintaining urban public green spaces in poor towns of the developing world differ distinctly from those of the developed world. Relatively in developed countries, urban spaces tend to be well planned with parks and other green spaces included and safeguarded. Long-term strategies mean fewer problems with uncontrolled growth. However, in developing countries, reduction, fragmentation or isolation and complete disappearance of urban green spaces continues. Much of the growth in many Asian cities has been so rapid that it has been largely unplanned. There are extra challenges in most developing countries due to climate. Cities in tropical climate zones are facing huge problems with high temperatures, polluted air and noise. Urban green space research is often carried out in developed nations, with relatively little known about green space use and preferences in rapidly urbanising cities in developing countries. With high levels of urbanisation and widening inequalities in many South Asian cities, it is necessary to evaluate green space situated within these cultural and geographical contexts.

1.2.3. What is an Urban Green Space?

The green spaces within a city environment can be in many different forms. They can range from grand formal parks and urban forest and woodland, to private gardens, community gardens and allotments, courtyards, rooftop gardens, and vertical greenery on building walls. Areas with another main primary purpose can also secondarily act as green spaces, for example cemeteries, waterfronts, and linear parks along transport corridors. Roadsides can be planted with trees, while verges, central reservations and other incidental green spaces can also add to the ‘greenness’ of a city.

There are various definitions for Urban Green Space, often based on the individual context. For example; Baycan and Nijkamp (2006) defined urban green space as:

> "Public and private open spaces in urban areas, primarily covered by vegetation, which are directly active or passive recreation or indirectly positive influence on the urban environment, available for the users".

The broad definitions may incorporate a variety of public green areas in the city. As Baycan and Nijkamp (2006) explained, Urban Green Spaces do not only have a quantitative dimension (such as size, user capacity), but also a qualitative dimension, such as quality of maintenance, biological diversity, diversity in flora and fauna.

The concept of urban greening is not used or interpreted in the same way in many countries around the world, and there is no clear definition that precisely suits the Colombo or Sri Lankan context. Therefore one aim of this thesis is to prescribe a suitable definition and urban green classification that will have regional acceptance to enhance understanding of the role of these urban green spaces at a local level.

1.3. THE RESEARCH LOCATION: SRI LANKA AND THE CITY OF COLOMBO

1.3.1. Sri Lanka

The island of Sri Lanka lies to the East of India, in the Indian Ocean, separated from the Indian subcontinent by the Gulf of Mannar (see Figure 1.1). It is a relatively small country, with a total area of 65,600 km^2 (World Bank Group, 1997), similar in size to Lithuania or Ireland.

Formerly it was known as 'Taprobane' by ancient Greek geographers, as 'Serendib' by Arabs, and as 'Ceylon' by later European mapmakers. However 1972, it officially became 'Sri Lanka' (Brohier, 1984). According to historical artefacts, the island has been culturally influenced by

many ancient Asian civilizations. The identity of civilians in Sri Lanka, is determined by ethnic group, language and religion.

The climate of Sri Lanka is tropical, with average temperatures between 22 ^{0}C and33 ^{0}C in the lowland, while central highlands have between 7 ^{0}C - 21.6 ^{0}C. Humidity in Sri Lanka is generally high. At Colombo, daytime humidity stays above 70% all year and rises to almost 90% during the monsoon season. About one third of the total land area of Sri Lanka is covered with natural vegetation. The virgin forest of Sri Lanka is rich in a great variety of flora and fauna. The ecology of Sri Lanka is covered in more detail in Chapter 2.

The Sri Lankan government, which recently (2009) has won the long-run (28 years) war against a local terrorist group and gained full control of the country territory, is now focusing to develop the economy and as well as infrastructure of the country. Sri Lanka is highly varied in cultural heritage and is densely populated. A diverse and multicultural country, Sri Lanka has many religions, ethnic groups, and languages. In terms of ethnic composition, there are three main ethnic groups. The majority is Sinhalese. Followed by Sri Lankan Tamil and Indian Tamils and Muslims together make up more than 99% of the population. In addition there minor groups of Moors, Burghers, Malays and Kaffirs and the aboriginal Vedda

In 2012, the total population of Sri Lanka was, based on a 5 per cent sample size, 20.3 million. Out of this 18.3 per cent were living in the urban sector (classed as all population who fall within Municipal Councils and Urban Councils). Population has increased rapidly, by over 5.4 million from 1981 to 2012, which amounts to a 36 per cent increase. (Department of Census and Statistic of Sri Lanka, 2014).

Figure 1.1 Location of city of Sri Lanka and the city of Colombo

Source: reproduction from Google maps

1.3.2. The city of Colombo

Colombo, the largest city and the commercial capital of Sri Lanka, is located on the west coast of the island and adjacent to the administrative capital, Sri Jayewardenepura Kotte (see Figure 1.2). Like many other Southern Asian cities, it is characterised by a high population density, large traffic flows and congestion, a deteriorated environment and poor general living conditions in under-served settlements. However in the more affluent areas the mix of grand colonial buildings and modern office and residential developments give the impression of a vibrant and prosperous city.

The Colombo Metropolitan region, defined by the districts of Colombo, Gamapaha and Kalutara, covers an area of 3.7 km^2. The resident population of over 555,000 inhabitants, is increased by nearly 400,000 extra 'floating population' who travel into the city daily for work. The residential areas consist of over 103,000 housing units plus nearly 14,000 slum and other residences (Colombo Municipal Council, 2015).

For this particular research, only Urban Green Spaces within the Colombo Municipal Council (MC) area are considered.

Figure 1.2 Columbo City Metropolitan region - Colombo Municipal Council (CMC) and the neighbouring administrative capital of Sri Jayewardenepura Kotte

Source: Sri Jayawardenapura Kotte Municipal Council

1.3.3. A brief history of the growth of green structures in city of Colombo

Historical documents and photographic evidence show that the area where Colombo city now is, once comprised different types of green structural layers such as forests, wetlands, rivers, arable lands, pastures and paddy fields.

Due to its large harbour and its strategic position along the east-west sea trade routes, Colombo was well known in ancient trade history. It was colonised first by the Portuguese in the 1500s, but little evidence of their influence remains on the city plans, apart from Beira Lake, which was created as a defensive barrier for the fort.

The Dutch took the city in 1656. As the city began prosper, expansion could only occur along the costal line to the south, since the north and east were blocked by river or extensive marshes. As the city developed, the sea front and water bodies (lakes, natural rivers or man-made canals) were an important element of the transport system in the city and shaped the direction of city growth. As well as a few Dutch buildings that still stand in the city, the main Dutch influence on the city layout was in terms of the extensive canal network that runs through the city. Over the time, a combination of draining and filling of the marshes to the east allowed the city to expand in that direction. Today, the city has expanded beyond the coastal wetlands.

The British colonial period (1815-1948) had an extensive influence both on the city plans and also on the cultural and social life of the city. The first official planning approach, which was a preparation of the Urban Plan of Colombo in 1925 by Patrick Geddess, was based on the Garden City concept (more details will be found in chapter 3), which was popular in Britain at the time. In 1940, the Zoning Plan for Colombo was prepared by Prof. Clifford Holiday and in 1948, Sir Patrick Abercrombie produced the Colombo Regional Plan. These plans however were not properly implemented, with only fractional sections developed on the ground. Their

focus on urban development rather than recognition of the urban renewal required for what already existed has been a repeated pattern for the city (Hulugalle, 1965).

Although there were British plans for a 'Garden City' (section 3.1), it never materialised in full. However the majority of the parks and green spaces in the city were laid out by the British rulers, which include two of the study-sites of this research (Victoria Park, now known as Viharamahadevi Park, and Galle Face Green).

The British Colonial influence is also evident in the strong social class system that is still an undeclared theme in Sri Lankan society. One of the topics researched in this study is whether usage of urban green spaces in city of Colombo is to some extent determined by social classes or not. This is very important as private recreation clubs, cricket and other sports that cover a significant green area of the city.

Figure 1.3 shows that green spaces are scattered around the city. There are formal parks, island parks, the sea border, green corridors along canals, and some amenity parks. Many zones have no green space at all, especially in the northern part of the town, which is predominantly industrial and warehouses.

The city has developed as a patchwork with different plans were acting at different places, depending on the priorities of different governors and social classes. Wijesundara (2002) highlighted in his "urban renewal of Sri Lanka" study, that there is a serious gap between the voluminous planning proposals and their implementation and application in practice in Sri Lanka. The planning concepts have often been inappropriate, or there is not the money, the governing structure, or the necessary support to implement the plans and proposals. There has never been an overarching city plan that has kept pace with the rate of population grown or the diverse needs of the city's population.

1.3.4. Relevant social circumstances for Colombo

Other than ecological, geographical, political and decision-making the social and cultural side of Colombo also need to be considered. The richly mixed multi-cultural, multi-racial society of Colombo provides many interesting perspectives for this research. The City of Colombo's public service providers are legally required to offer opportunities for people to practise a wide range of lifestyles to suit all types of ethnic communities. Therefore taking account of the diversity in the city is essential for the research to be valid reflection of the usage of UGSs in Colombo and for this research to feed into recommendations that can be taken forward in city plans.

Even though the City of Colombo has a reasonable percentage of urban green spaces, more than other main cities in South Asia, still the City of Colombo needs a customized master plan for its future if its green spaces are to be valued and protected. The multiple different plans that have been formulated then not properly implemented, lack of collaboration and connections, and no clear management structure for developing and maintaining green spaces are a big threat to the city's open spaces. Therefore, it has become urgent and necessary to make an innovative study of the theory and practice of urban green spaces in the context of a developing country like Sri Lanka. Furthermore identifying the gaps in current UGS planning systems and developing a practical and deliverable strategy with a holistic approach is key to creating valuable and sustainable city spaces.

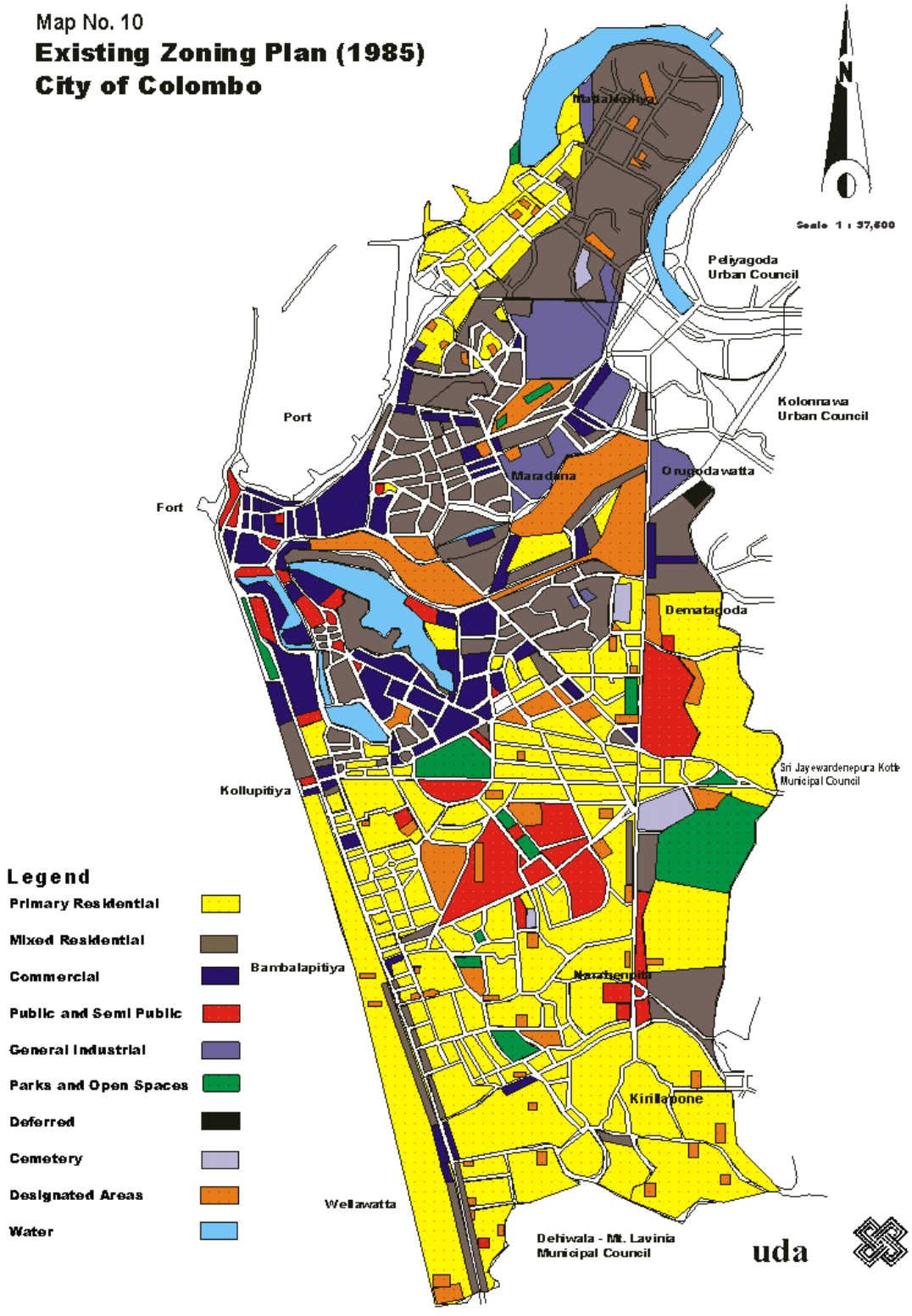


Figure 1.3 Colombo Metropolitan area showing different zones including Parks and Green Spaces

Source: Urban Development Authority 1999

1.4. INTENTIONS OF THE STUDY

As stated above, an appropriate Urban Green Spaces strategy will promote the role of UGSs as an environmental infrastructure to contribute to the anticipated growth in the region. Furthermore it could manipulate the functional attributes associated with UGSs, such as the landscape characteristics of Colombo, heritage of the city, increased biodiversity, recreation, quality of life and well-being of the local community, environmental education training and employment. The results of this research also establish very valuable core strategies and action plans which are vital for decision-making and future planning and development of a sustainable city. Furthermore, they provide knowledge and understanding to handle existing ecological and geographical advantages such as dynamic of landscape and great biodiversity together with social and cultural integration through UGSs and involvement of the community in UGSs.

The findings presented here have important implications for policy and planning at the local, city and regional level. They suggest that a special emphasis needs to be made on understanding the role and importance of vegetation in rapidly expanding south Asian cities like Colombo, to achieve a healthy urban environment. In Sri Lanka, as the benefits of urban green space have generally less recognized, it is hard to understand which urban green space has the best potential in providing benefit for urban residents, and to predict how people respond to types of urban green spaces. Therefore there is still a major need to understand and analyse the qualities of urban green space in Sri Lankan context.

According to initial research work, the researcher has found that the current UGSs-policies, standards and planning concepts are not based on a combination of environmental, economical, social and cultural values together. One of the common characters of the current strategies is, that they are based on one of the above aspects only. After thorough literature

review, the researcher has found there is very little literature available regarding Urban Green Spaces in Sri Lankan context and there is no research carried out on Urban Green spaces strategies in the Colombo context. Due to a significant gap in this particular subject area in Sri Lanka, the need for such a study has been emphasized in many academic papers. Furthermore from the pre-research investigations, the researcher has found there are gaps and shortages in relevant references and academic materials.

Therefore the researcher has recognised the importance of conducting first-hand primary research, which covers all the fundamental aspects related to UGSs in City of Colombo. As the result of this research, the first key comprehensive Urban Green Spaces Strategy for Sri Lanka will be formulated, with the aim of making Colombo a verdant city, which functions efficiently, is economically viable, environmentally sustainable and socially integrated. Development of a 'Best Practice Model' for Colombo should be a practical and a deliverable vision, which should be shared by politician, stakeholders, key personnel from the relevant authorities and communities. The UGSs strategy will be supported in national, regional and local policy objectives and should contribute the wider objectives of the Colombo Council.

The original intention of this study was to examine the potential of Colombo as a 'Garden City'. However during the research it became apparent that the term 'Garden City' was inappropriate for Colombo. Firstly, the original term 'Garden City' from Ebenezer Howard (see section 3.1) has a different concept. Secondly, the term 'Garden City' in modern city planning does not cover all the aspects that are intended to cover in this research. Generally its only implies a beautification process but the outcomes required from this study go beyond beautification to social and environmental benefits too. The term 'Green City' could be appropriate, but it has come to mean an Eco-City with very wide ecologically friendly sustainable living parameters including traffic management, power efficiencies and carbon

minimisation, that are beyond the scope of this research. The main focus of this research is appropriate and ample vegetation for the city, so the use of the word 'green' would mean colour only. In this context, the word verdant is most appropriate.

In Sri Lanka there is a specific word that means the green of vegetation: *Haritha*, from the Sanskrit *harith*, meaning green. It is a word with positive environmental connotations and is very appropriate in this context. Therefore, the revised intention of this research is to study the potential for Colombo to become a verdant or *Haritha* City.

1.5. STRUCTURE OF THE STUDY

1.5.1. Research Hypothesis:

The proposed research is based on the following hypothesis;

"There is a unique set of cultural, geographical, ecological and political circumstances in city of Colombo that could enable it to become the leading "Haritha City" in South Asia, but there are gaps in the current planning system that are preventing that aim from being realised".

1.5.2. Research Aims:

In this research, an attempt has been made to examine how to develop a 'holistic approach for City of Colombo' and use Urban Green Spaces, as a tool to vitalize the City of Colombo aesthetically, socially, environmentally and economically. More specifically the research tries to address following issues in details;

- Identify characteristics and circumstances in City of Colombo that make it unique and suitable to become a leading 'Haritha' City in South Asia

- Identify the potential benefits of UGSs in City of Colombo
- Identify the gaps in current systems that stop it from meeting that aim
- Identify suitable practices and ideas from elsewhere in the world that would be appropriate in this unique situation

1.5.3. Research Questions:

- What are the Social, Cultural, Geological, Ecological and Political factors that relate to how people use UGSs?
- What are the benefits of UGSs for community in Colombo?
- What are the current barriers to City of Colombo meeting the aspiration to become the leading Haritha City in South Asia?
- What steps could be taken in order to close the gaps in City of Colombo to meet that aspiration?

In this context several important situations are emerging. Therefore in this research the following issues are considered as the research objectives:

1.5.4. Research Objectives:

- To conduct a primary cultural, environmental and political research into the current use of UGSs in City of Colombo.
- To consolidate experience and best practices from UGSs research worldwide.
- To combine these three aspect of research to suggest a new direction for urban planning in City of Colombo.

1.6. THE NEED OF A CONCEPTUAL MODEL TO SUPPORT THE OBJECTIVES FOR THESIS

UGSs are complex spaces that require multiple levels of input to function well. Equally, this complexity means that to research and understand them requires an approach from many perspectives.

The objectives for this thesis fall under many different subject areas. Therefore using a new model based on overlapping spheres will provide a framework for organising information from diverse sources.

While different studies have looked at UGSs, in global context, but most have focussed on only one of these spheres of influence. The researcher seeks a holistic approach that takes these multiple spheres into account. The researcher's academic background is horticulture, which includes elements of each of the social, environmental and governance spheres. This provides a central perspective from which to explore in the topics.

The hypothesis seeks gaps in the current system. The model of overlapping spheres will allow focus on the many different topics and, importantly, the interaction between them. A conscious awareness of these overlapping areas will allow gaps to be identified more efficiently.

1.6.1. The Three Spheres Model for studying UGSs in City of Colombo

The conceptual framework (Figure 1.4) represents the main structure of the proposed study in a logical framework. It is hoped that by examining aspects of these spheres of influence in turn, and exploring the interactions between them, a comprehensive and coherent understanding of this complex situation will be achieved.

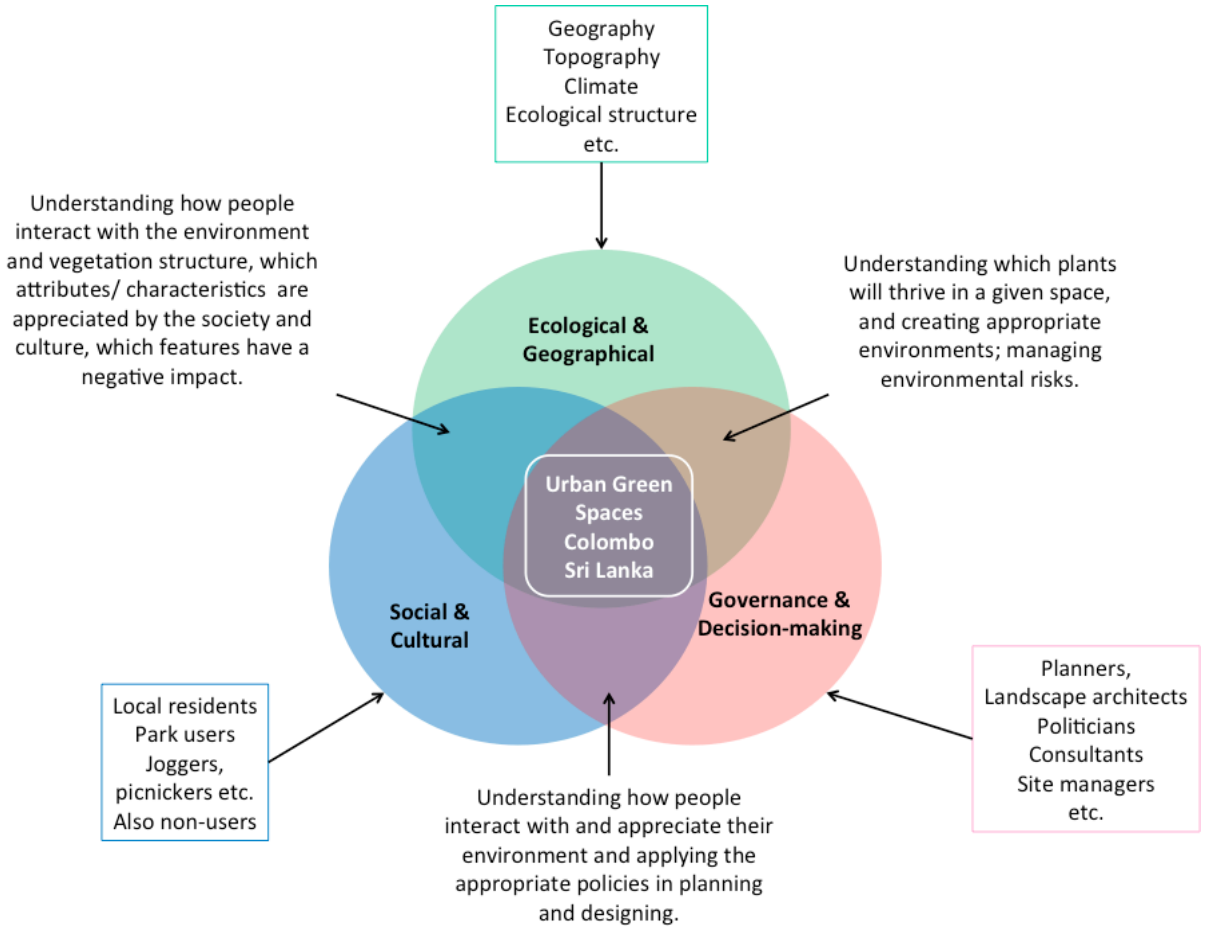


Figure 1.4 The Three Spheres of Influence on UGSs

From here onward in this text, the Social & Cultural sector may be referred to as **Social**, the Ecological & Geographical as **Environmental**, and the Governance & Decision-making as **Political**.

1.6.2. The factors involved: Spheres of influence on UGSs

An UGS can be studied from an **Environmental perspective**. The geography of the city (soil types, slope and height of land), the natural vegetation type of region, the surrounding ecology (whether the space borders on forests, farmland, sea etc.), the climate, plant growth, ecological structure and the species composition of the plants and animals that inhabit it will

be unique to each location. An urban green space can play a role in maintaining a region's biodiversity. Therefore **Ecology and Geography** will have an impact on other factors that relate to the functioning of the UGSs in Colombo. These aspects will be covered in more depth in the literature review and in Chapter 5.

From a **Social perspective**, the people who use the space (their demographics), their motives for visiting, what they use the space for and how it impacts on their daily life all matter. Urban green spaces are meeting places that can give a shared focus to diverse communities, cultures and influence how a neighbourhood functions. The human connection with nature and the inherent need for green space, often called Biophilia (Wilson, 1993), can also be examined under this sphere. These **Social and Cultura**l issues will be explored in the literature review and in Chapter 6.

From a **Political perspective** how the UGSs function within the wider social landscape of the city becomes important. Planning decisions, landscape architecture, and the demands of politicians come into play within this arena. Planned UGSs often play a political role, with grandiose schemes that are highly visible, often named after benefactors or significant political figures. An UGS can act as an outward presentation of image that political leaders want to project.

Management of UGSs also ranges on a spectrum from neglected (or consciously natural) to highly maintained. Day-to-day management decisions such as whether to irrigate, cut down a tree, or the species to plant in a formal border also fall within this sphere. The influence of these **Governance and Decision-making** aspects will be explored in the literature review (Chapter 3) and in Chapter 7.

1.6.3. Interactions between factors

None of the factors described above exist in isolation. Each is influenced by other factors (spheres). The points where these spheres of influence overlap create some of the most interesting insights into the functioning of UGSs in city of Colombo.

1.6.3.1. Social and Political overlap (S/G)

On the whole, a city is managed for the people who live and work in it. Understanding how people interact with and appreciate their environment is key to applying the appropriate policies in planning and designing UGSs that function well for the people of the city.

Although there are many benefits associated with urban green space, negative perceptions of these areas can also develop if they are congested, neglected, poorly maintained, or perceived to be unsafe, all of which can lead to a decline in use or complete avoidance (Boone et al., 2009). Therefore understanding the Social and Governance overlap is important as the environment that is in harmony with the people in it.

1.6.3.2. Social and Environmental overlap (S/E)

At the overlap of Environmental and Social science spheres is the understanding of which attributes and characteristics of vegetation structure are appreciated by the society and culture in City of Colombo.

The nature of a landscape can influence people's attitudes towards different components of the natural world. A mown lawn will encourage picnics and ball games, while longer grass and meadow plantings encourage peaceful reflection. People who have been subjected to the neat and tidy approach of flowerbeds and mown grass in cities for some time come to expect and value this style of environmental management (Özgüner and Kendle, 2006). More naturalistic or 'wild' urban landscapes may be appreciated by some social groups, but others

perceive them as threatening or potentially dangerous, which can lead to a decline in use or complete avoidance (Boone et al., 2009). Many environmental problems require community participation and locally driven environmental approaches.

1.6.3.3. Environmental and Political overlap (E/G)

On a practical level, those in charge of managing UGSs need to understand the basic ecology of the sites to maximise the success of design and planting schemes. An understanding, of which plants will thrive in a given space, and creating appropriate environments for them to do, so will result in plantings that are more likely to survive and be easy to manage in the given situation. On wider level UGSs can provide many of the services required to keep a city functioning and healthy. These ecosystem services need to be understood by the UGS governance in Colombo in order to close the gap in current system.

1.6.4. The methodology and data analysis

The type of methodology for each section of research is based on the nature of the research, and its fundamental objectives. Therefore in this research the methodology combined both qualitative and quantitative methods such as public questionnaire survey, observation, focus groups, and in depth interviews.

Initial research on study sites was carried out during the first field visit to Sri Lanka. Observation was used as a one of the first data collection methods in this research. As the very first method of data collection 'Observation' provided a full overview of how to choose other data collection methods, when and where. At the same time it also had a valuable secondary function of directing the development of a questionnaire.

To investigate the full spectrum of the public perception and attitudes, the researcher decided to carry out the public questionnaire survey in four different and contrasting sites. These sites

represented users who differed demographically, socially and culturally. Additionally the surveys took place on different days of the week under different weather conditions. A pilot questionnaire was also carried out during the first field visit. This stage helped ensure that the questions covered the correct areas and that they were framed in such a way that potential respondents were able to understand them and that they did not elicit bias.

Following the review of related literature, 'In-depth interview' was employed as one of the data collection methods. Open-ended questions were used to interview the key personnel, such as head of related authorities, decision makers, projects planners and designers. This allowed data to be obtained regarding their opinions on questions about landscape policies, theories and practices currently applied at City of Colombo and issues on planning, designing, financing, maintaining as well as dealing with bureaucracy. These interviews attempted to elicit personal opinions and viewpoints as well as factual information. Furthermore usage of 'Focus Groups' yielded a good qualitative data. The participants of three different focus groups were chosen from local clubs/societies with different characteristics to represent cross-section of the community of Colombo. More details of selection criteria and all the research limitations will be discussed in Chapter 4. The data will be analysed using the Statistical Package for Social Surveys (SPSS) and Principal Component Analysis (PCA). This will allow descriptive statistics like frequency analysis, cross tabulation, correlation & trend analysis to be carried out on the quantitative data generated by the questionnaire.

All results from different methods will be presented within the relevant chapters.

1.7. STRUCTURE OF THE THESIS

This thesis is divided into eight chapters as follows;

Chapter 1: Introduction

This Introduction chapter gives an overview to the research, which describes the research context, research hypothesis, aim, research questions and the objectives, followed by an introduction to the structure of the thesis.

Chapter 2: The history and dynamics of Colombo's Urban Green Spaces

A review of the history and dynamics of urban planning in Colombo is presented to provide context for the current study with a description of how Colombo's current UGSs have arisen.

Chapter 3: Literature review

A comprehensive review of the literature is presented in order to develop the theoretical rationale for the research. Under this chapter, found literature is discussed by exploring (i) Urban Green Spaces in a Global Context in general, (ii) detailed review in three main subject areas (ecological and geographical, social and cultural, and political aspects) (iii) case studies of global cities that have parallels with Colombo.

Chapter 4: Methodology

The methodology chapter will cover the selection of data collection methods, the selection of research sites, the development of research process and is concluded with a discussion of the research limitations and ethical issues.

From Chapter 5 onward the thesis is presented in a three different sub research areas relating to the Spheres of Influence (Figure 1.4). Here the relevant literature for each chapter is

presented under subtitles; introduction to the subject area, then results and discussion followed by conclusion relevant to that particular chapter.

Chapter 5: The Environmental factors impacting on the city of Colombo's potential as a Haritha-City

In this chapter the main focus is to study the Ecological and Geographical factors that are involved with Urban Green Spaces in city of Colombo. It includes an introduction to the chapter followed by the general overview of Ecological and Geographical factors influencing on UGSs in city of Colombo. Then the found results will be discussed and draw the chapter conclusion.

Chapter 6: Cultural and social factors relating to UGSs in the City of Colombo

As Chapter 5, first an overview to the chapter and detailed study introduction. The questions addressed include: Which sectors of Colombo society use UGSs? Is this representative of the society as a whole? Are people of City of Colombo gaining full benefits from UGSs? How does this compare to usage of UGSs in other part of the world? The above points will be discussed with research finding under; Socio- demographic of UGSs users in Colombo, Public perception and attitudes towards UGSs, Access and Usage, Motives and visitor patterns as well as Barriers to use UGSs. The chapter will be concluded with a discussion of the results of the above points.

Chapter 7: Governance and decision-making factors relating to UGSs in the City of Colombo

This chapter focuses on planning and designing of UGSs. Maintenance and management of UGSs with local political approaches towards UGSs in Colombo context will be discussed with the found results. Then results will be concluded under each sub-topic.

Chapter 8: Conclusion

In Chapter 8, the whole study will be brought together with the findings of the research summarised and presented as the defined strategies to enhance the importance of the Urban Green Spaces within the urban network of City of Colombo, in an integrated and complementary way. At the end identified gaps and recommendations from each separate aspect with proposed future studies are consolidated.

Chapter 2: The History and Dynamics of Colombo's Urban Green Spaces

CHAPTER CONTENTS

2.1. SRI LANKA: AN OVERVIEW OF THE COUNTRY

Sri Lanka is a rich and diverse country both in terms of its history and its geography. A geographic overview on Sri Lanka and Colombo is given in Chapter 1 (section 1.3). Most of the island consists of flat or gently hilled coastal plain. There are mountains in the south central region, which rise to 2,524 metres (8,281 ft.) above sea level (Figure 2.1). The Coastal zone is significant in Sri Lanka. According to Urban Development Authority (UDA-1998) Sri Lanka, and Samaranayake, (2006) the country has a 620 kilometre long coastline. Some of the richest biodiversity areas in the country occur in this zone. They include coral reefs, extensive sea-grass beds, mangrove forests, salt marshes, beaches, sand dunes, coastal wetlands, estuaries and lagoons. Sri Lanka has one of the most complex biodiversity hotspots in the world. The tropical climate of Sri Lanka is influenced by two monsoons and two inter-monsoon periods. The southwest monsoon, from May to September, is associated with cyclonic wind circulations and heavy rainfall and squally weather, especially on the south-western seaboard, which includes Colombo (Samaranayake, 2006). The annual rainfall distribution is shown in Figure 2.2.

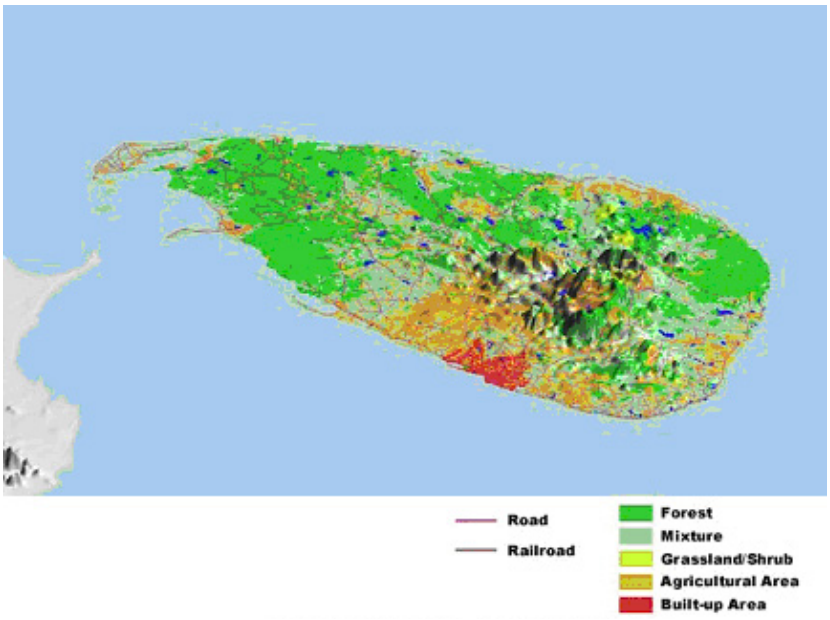


Figure 2.1 Bird's-eye view processed of Sri Lanka highlighting topography.

Source: (Hiroshi Une, Global Mapping, Geographical survey Institute , Japan, n.d.)

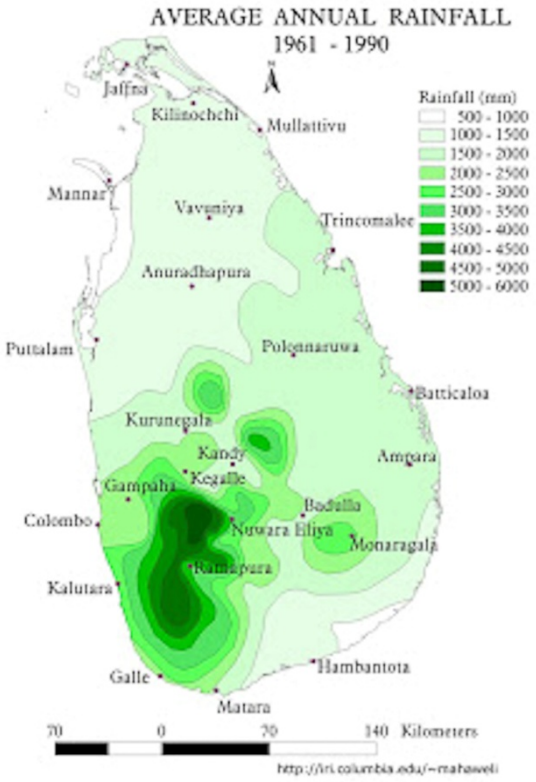


Figure 2.2 Rainfall map of Sri Lanka.

Note that Colombo city is in the Wet Zone.

Source: Srilankapedia

2.2. ENVIRONMENTAL CHARACTERISTICS OF THE CITY OF COLOMBO

The city of Colombo has changed dramatically over the centuries. Historic documents as well as photographic evidence show that the area where the city of Colombo now is once comprised different types of green structure layers such as forests, wetlands, rivers, arable lands, pastures and paddy fields.

Colombo is located in the coastal flood plains of the Kelani River. The land is flat, with the lowest areas some of which are marsh-land, lying just below sea level and the highest points at just 18 m above sea level (Horen 2002). Most of the area now considered as the 'city' had actually been marshy land, reclaimed for urban development over a period of nearly 500 years.

The climate in Colombo is constantly hot and humid with a few rainy seasons, which yield abundant rain. The humidity, warm tropical temperatures and high rainfall encourage plant growth, meaning that in many urban situations greening can be achieved relatively easily and rapidly. However, heavy rainfall and sometimes tropical cyclones affect on flooding which is a recurrent problem for many regions, including the capital city of Colombo.

2.3. ECOLOGICAL ZONES WITHIN THE CITY OF COLOMBO

The Urban Development Authority (UDA, 1998), Colombo Sri Lanka has created an ecological zone map of the Colombo urban area at the conceptual level. The zonation is not based on single entities such as the traditional soil or geology map, but on a combination of environmental parameters (UDA, 1998). Although zonation is at the conceptual level, relevant authorities agree that this is sufficient to establish any environmental strategies or implement action plans if necessary.

Identified environmental zones in city of Colombo Metropolitan Region are:

The **Marine Environment of Coastal Zone** – The coastal waters adjacent to the city boundaries constitute this zone. The location of the city was undoubtedly influenced by the possibility of building a harbour and the river mouth of the Kelani river. Although much of the air pollution is dispersed by the sea breeze, the marine eco-system itself is degraded and under heavy threat of deterioration, if prevailing trends continue. **Beach and Dunes** – this constitutes a narrow coastal strip of land. The land strip has been formed by action of the sea in recent geological/ historical times. Much of the original city would have been located in this zone, however, the uni-directional possibility of city expansion and rain water from inlands draining through this area are problems inherent to this zone. **Coastal wetlands**, and **Raised beaches and Dunes** are not found within the Colombo Municipal Council area. However, **Coastal flat and wetlands**, **Outer lateritic plain** and **Inner lateritic plain** as well as **Major river valleys** were identified within Colombo MC area (UDA, 1997)

2.4. PLANNING FOR UGSs IN THE CITY OF COLOMBO

Colombo is a multicultural multi-ethnic city with a huge workforce of both men and women. Unbuilt land is scarce, especially in the highly industrialised areas of the city. Public transport is considerably good compared to other parts of the country.

Empty relic land, which may contribute to urban greenness is often considered as wasteland and often replaced by man-made construction. Relic land will however house the natural plant and animal species of the area. Due to high demand for land and the limitation of the land resource in Colombo, it is however, not practicable to leave a large extent of relic land (Senanayake, Welivitiya and Nadeeka 2013).

A study about Urban Heat Islands (UHIs) with vegetation cover in Colombo carried out by (Senanayake, Welivitiya and Nadeeka 2013), has identified the environmentally threatening areas in Colombo city based on the distribution of Land Surface Temperature (LST) and availability of vegetation cover. Accordingly, Colombo harbour and surrounding areas were identified as the most critical areas. This can be confirmed as the author couldn't find any reasonable green patch around the harbour area to conduct the questionnaire survey. 'Crow Island' which represented the north part of the Colombo municipal area, also did not have a great deal of green cover and minimal healthy roadside vegetation. Further analysis of the impact of vegetation cover and the UHI effect in Colombo is in Chapter 5.

2.5. BLUE AND GREEN URBAN STRUCTURES (COMBINING PLANTS AND WATER IN URBAN LANDSCAPE)

Water and green spaces have a common long running history. Colombo Galle face green and Beire Lake are classic examples. Colombo city is fortunate in this perspective to naturally be bordered by the sea on one side and to already have a lake (Beire Lake) and an extensive canal system within the city. At present the Beire Lake and most of the canal system are of poor aesthetic and ecological quality. However within the past two to four years there are two newly developed urban green spaces, 'Diyatha Uyana' and the Urban Wetland Park, Kotte, Nugegoda that are within Colombo metropolitan region but not within the Colombo Municipal Council (so outside the scope of this study). These have taken into account this natural wealth of water bodies within the city premises and most newly developed parks are situated adjacent to these canals or small water bodies. Taking this fact into account, planning has already been done to improve the Urban blue-greens within the Colombo city around the Beire Lake and the canal system. However at the writing stage of this thesis, the author has not identified any proposed plans being implemented within the CMC.

The past and present of the Beire Lake and the canal system

Considered as a landmark of the Colombo city the Beira Lake', earlier known as 'Colombo Lake', is located in the heart of the port city of Colombo and has been in existence for nearly five centuries. Some argue that the lake was named after a Dutch engineer "De Beer" who constructed the moats and water defences of the Colombo fort around 1700 (UDA, 1998) while some state it was named after a Portuguese engineer named Beiro in 1554 (UDA, 1998).

Although the name 'Beira' first appears in a map around 1927, Beira Lake owes its origins to the Portuguese Period (1505 -1658). The Portuguese used the lake to some extent for transport, and it was further developed during the Dutch period (1658-1796). The Dutch enlarged the lake and connected it with the Kelani River to the north and Panadura River to the south by a canal system (Beira Lake Restoration Study - Final Report, 2001). During the British period, the lake and the canal systems were both a centre of commercial activity and a notable resort. In 1879 a botanist Dr. Trimen, whose work is greatly appreciated among the Botanists of Sri Lanka even today, observed a great diversity of water plants in the lake (Beira Lake Restoration Study - Final Report, 2001). In 1948, after Sri Lanka (Ceylon) gained independence, considerable political and economical changes took place in the country, some of which had impacts on Beira Lake. With increased port activities a section of the East Lake was reclaimed for warehouses and the boatyard (Beira Lake Restoration Study - Final Report, 2001). With heavy post-independence urbanisation, and heavy inflow of workers to Colombo city, the Lake and canal system became highly colonised by illegal squatters. Figure 2.3 shows one of the proposed (but not implemented) plans for the Beira Lake area.

The Greater Colombo canal system

This canal system is partly natural and partly man-made. It was originally built and utilized in the Portuguese period, but later improved greatly and used as an extensive inland water

transport system by the Dutch in the 17th and 18th century along with the Beire Lake. The canal system had been extensive, running from North to South, cutting across the major town centres located on the western coast of Sri Lanka. In the colonial periods, Colombo's canals had been very vibrant, as their counterparts in Bangkok. However, they have become dormant since roads grew in importance in serving transport needs.

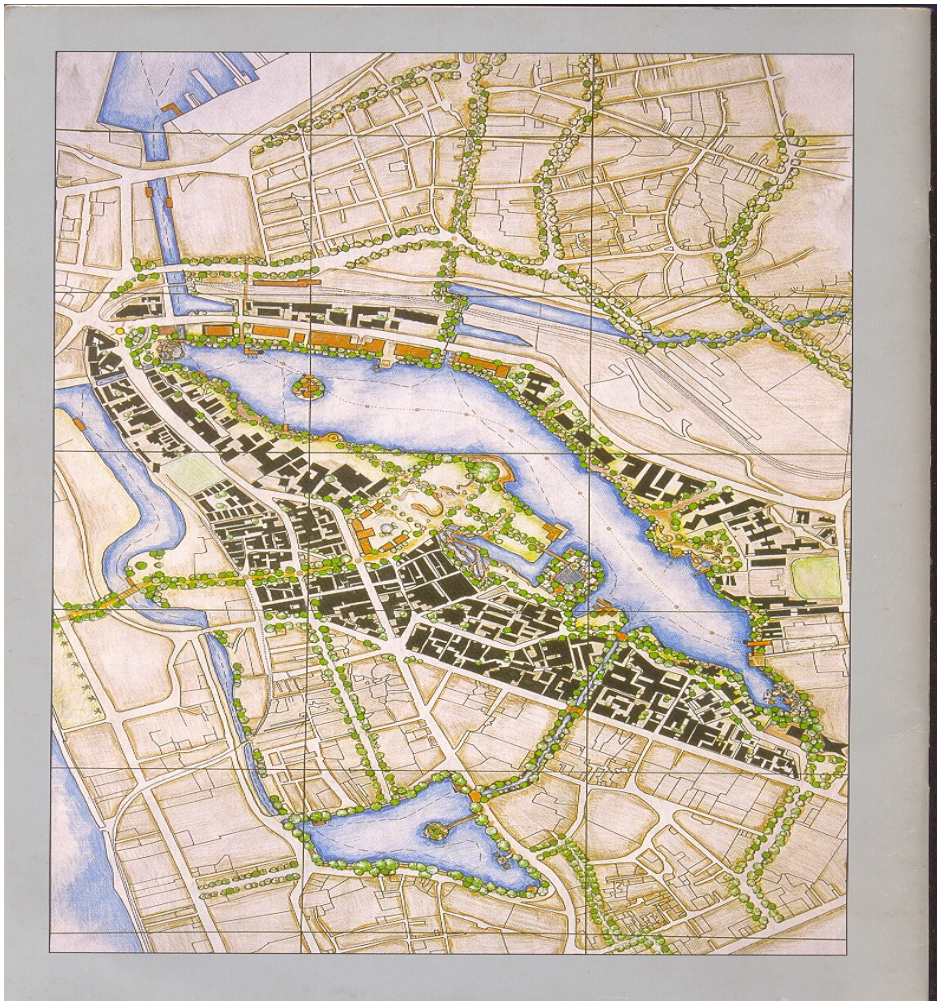


Figure 2.3 Proposed linear parks around Beire Lake by Colombo Green city challenge and waterscape network.

Source: Goethe Institute, Colombo (2002)

Note: no evidence found for plan implementation by 2012

Strategies to sustain the inland water-ways with green of Colombo

At this juncture in time it seems vital to re-develop the lake and canal system of Colombo. This is for beautification, ecological and environmental reasons, as well as to better utilise the waterways as a sustainable mode of transportation. Undoubtedly the Lake and canals should be cleaned and maintained and this alone will be a huge contribution to the environment and concept of blue and green urban spaces within the city. In addition it can serve as a tourist attraction and a transport system as it once did, giving a partial solution to the heavy traffic within the city.

2.6. EARLY HISTORY THAT SHAPED THE COUNTRY'S CITIES

Kingdoms and trade

Historically, Sri Lanka consisted of many kingdoms with significant, well-planned capital cities scattered across the island (Figure 2.4). Several of those ancient capital cities have been nominated as world heritage sites by UNESCO. Cities such as Anuradhapura, Polonnaruwa and Sigiriya are an example of exceptional capital cities in terms of sustainable city planning. Irrigation projects were among the most important public works undertaken in ancient and medieval Sri Lanka. The planning, engineering and technological skills this work required were immense. The engineers created vast lakes, dams, irrigation tanks and canals to store and distribute water from the intermittent rains. The greening of the dry land enabled large-scale food production to supply a growing population. Large-scale irrigation works allowed for an agricultural surplus. This released many people from farming roles and allowed a vibrant and dynamic culture to develop.

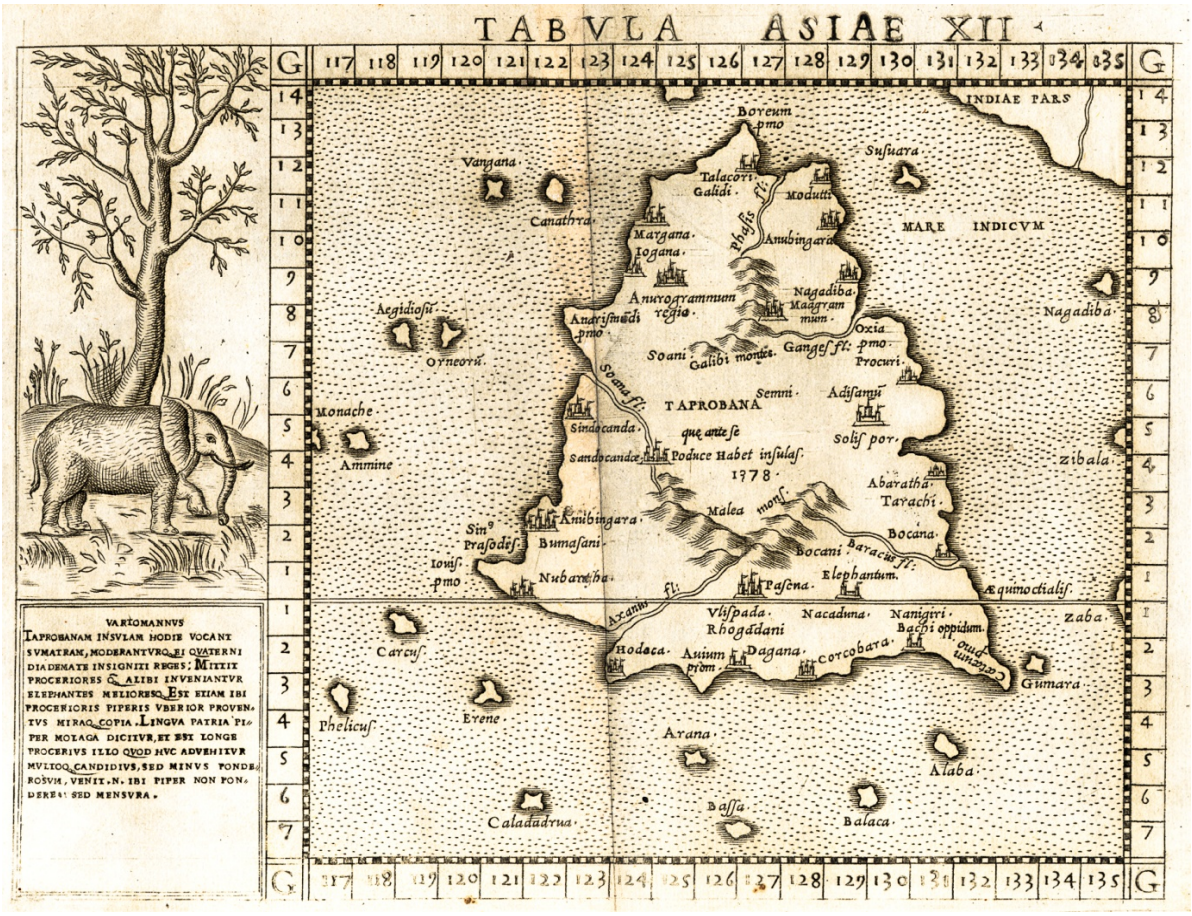


Figure 2.4 Ptolemy's map of Taprobana, now Sri Lanka, of 140 CE, reproduced in 1562 (Ruscelli).

Source: Lankapura.com (2014)

Sigiriya - a fine example of ancient urban planning

Sigiriya is an ancient palace city located in the Central Province of Sri Lanka, built by King Kassapa I (477–95). It is a site of historical and archaeological significance built on the top and steep slopes of a massive column of rock 180 metres high (Figure 2.5). Access is via a series of galleries and staircases emerging from the mouth of a gigantic lion statue. It is one of the best preserved examples of ancient urban planning. An important feature of the city is its extensive gardens, with an irrigation system feeding a network of ponds, lakes, fountains and waterways.

Figure 2.5 Aerial view of the rock fortress at Sigyria.

Source: Google maps (2010)

2.7. COLONISATION AND ITS IMPACTS ON URBAN GREENING IN THE CITY OF COLOMBO

From the 1500s till 1948 Colonial powers took over the island, starting with control of the trading ports and coastline, until the British took the whole island in 1815. During colonial times Sri Lanka was known as Ceylon.

2.7.1. Portuguese (1505-1656):

In the 16th-17th century there was a lot of competition between European colonial powers for the control of international trade. The Portuguese were the first Europeans to establish their power in Sri Lanka. Although the Sinhalese (the local civilians) did not recognise Colombo as their capital during that time, the Portuguese laid the foundation for the city of Colombo to become the prime city in Sri Lanka.

When the Portuguese arrived in 1505, the settlement was spread around the natural bay, and beyond this was covered in trees. The land between the fortress and the interior was at first unoccupied and forested. The Portuguese built the first fort in 1518 and cut a ditch from the harbour to the sea, to separate the fort from the mainland (see Figure 2.6).

Figure 2.6 Drawing of Colombo Fort, c. 1524.

Note the defensive ditch with single bridge that separates the fort from the mainland.

Source: Lankapura.com

"CEILAM" (Fortaleza de Colombo, Ceilão). Gaspar Correia. "Lendas da Índia", c. 1524. In: Arquivo Nacional da Torre do Tombo, Lisboa.

In around 1520 Portuguese engineers created Beira Lake by damming a small outlet of the Kelani river. The lake created a protective barrier on the landward side of the fort city. Maps show a well-planned city (e.g. Figure 2.8). Beira Lake still exists today. Though reduced in size due to land reclamation, it forms a centrepiece to the city.

During these historical periods, the city of Colombo would naturally be very green. Early maps show tree icons in the fort area (Figure 2.7, from 1648), and a map from 1650 details

extensive gardens and forest (Figure 2.8). This impression of a very green city is reinforced in early paintings, which also show the city surroundings as heavily forested (e.g. Figure 2.12, from 1680).

Figure 2.7 Colombo fort c. 1648.

Note the two types of trees illustrated: palm trees and another shrubby tree.

Source unknown, possibly scanned from Garcia (Lankapura.com) 2012

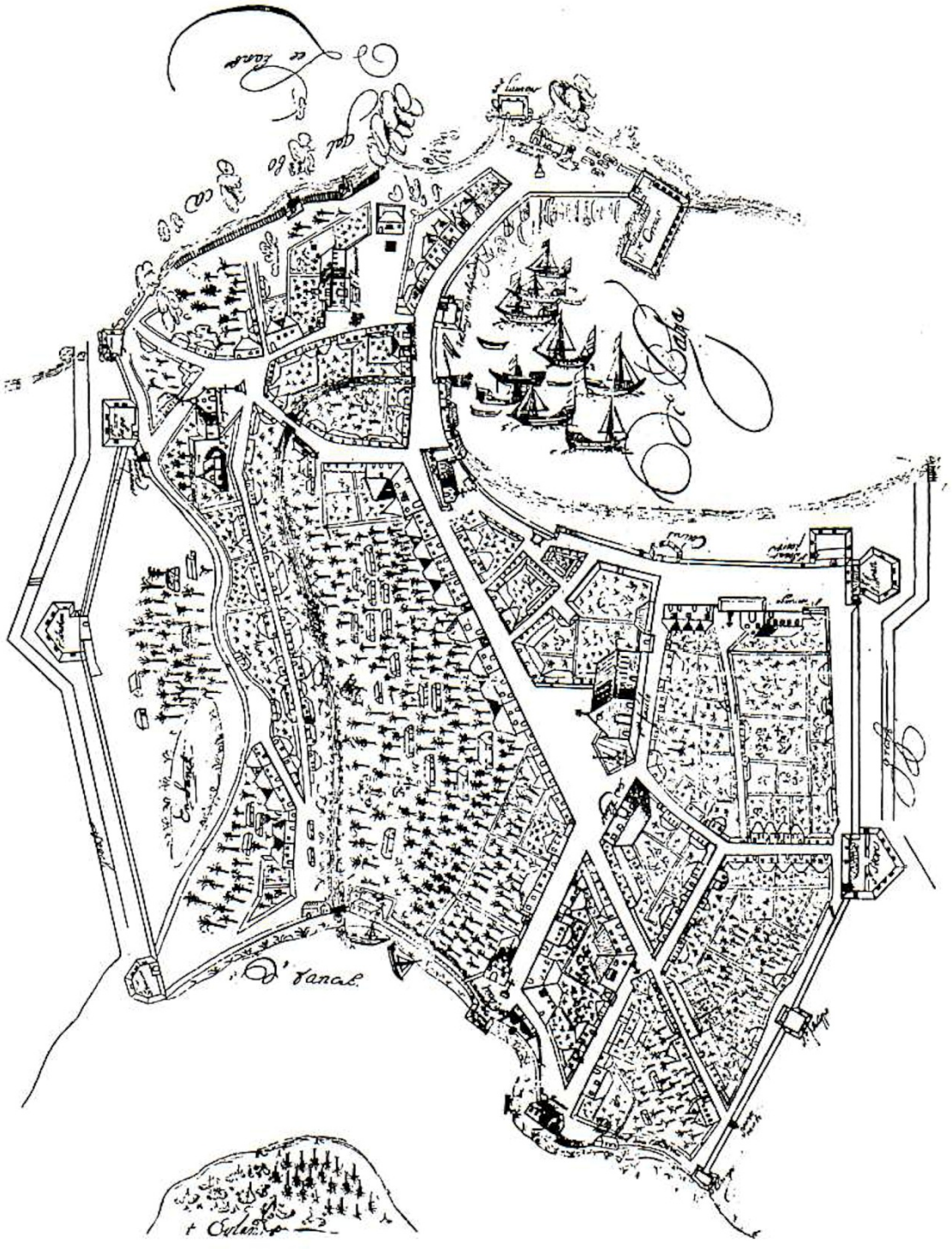


Figure 2.8 Map of Colombo city (1650) towards the end of Dutch occupancy.

Source: Fortelezas.org (2015) (Lankapura.com)

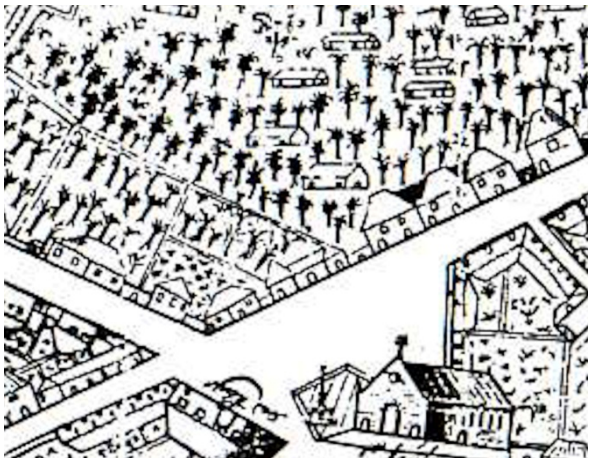


Figure 2.9 Detail from Figure 2.8 showing gardens and woodland.

2.7.2. Dutch period (1656 to 1796):

The Dutch occupied Colombo from 1656 to 1796. They demolished what was left of the Portuguese fort and rebuilt Colombo as a fortified city after the Dutch manner (see map from 1672, Figure 2.10). Christopher Schweitzer, described the nature of the city of Colombo just after the capture by the Dutch as follows:

> "when the Dutch East India Company took possession of it, they demolished many parts and rebuilt others after the Dutch manner. Within the Fort area many pretty walks and nut trees, set in uniform order; The street are clean and pleasant to walk, having trees on both sides before the houses…".
>
> Frick and Schweitzer (1700) p. 266.

This is the only written evidence found on the subject of created green areas or parks in the city of Colombo during the Dutch period to the author's knowledge. The green landscape surrounding the city is, however, evident in maps and artwork from the period (Figure 2.11, Figure 2.12 and Figure 2.13).

The Dutch laid an extensive canal system for water bodies in the city of Colombo to transport traded goods across the country to and from the ports. This allowed agricultural produce, cinnamon and timber from the forests to be traded in larger quantities than ever before. As Brohier, R.L. (1978), cited “the canals, which meander through the city of Colombo and its suburbs, connect the Kelani River to Puttalam in the North, through the Negombo and Chilaw lagoons, with a cut across to Kalpitiya”.

Figure 2.10 Map fort and city of Colombo, 1672.

Source: Waasbergen (1672) (Lnakapura.com – 2012)

Figure 2.11 Detail from map above showing interpretation of greenscape surrounding the fort.

Figure 2.12 Dutch Colombo, c. 1680. Johannes Kip.

Note the forest and palm trees surrounding the fort and harbour.

Source: Kip (1680) (Lankapura.com) -2012)

Figure 2.13 VOC (National Archieve of the Neatherlands) Map of Colombo & surrounding area 1750-1800.

Note the location of fort and city, and the surrounding fields and forest.

Artist/mapmaker: Wohlfarth, C.C. Source: (Lankapura, 2011)

2.7.3. British (1815-1948): modern town planning and cultural and political transformation

The British captured Colombo in 1796, but it was only after the conquest of Kandy in 1815 and the Kandyan Convention that formally ceded the entire country to the British Empire, when the British made Colombo the capital of the country.

British occupancy lasted for almost 150 years in Sri Lanka (1815-1948).

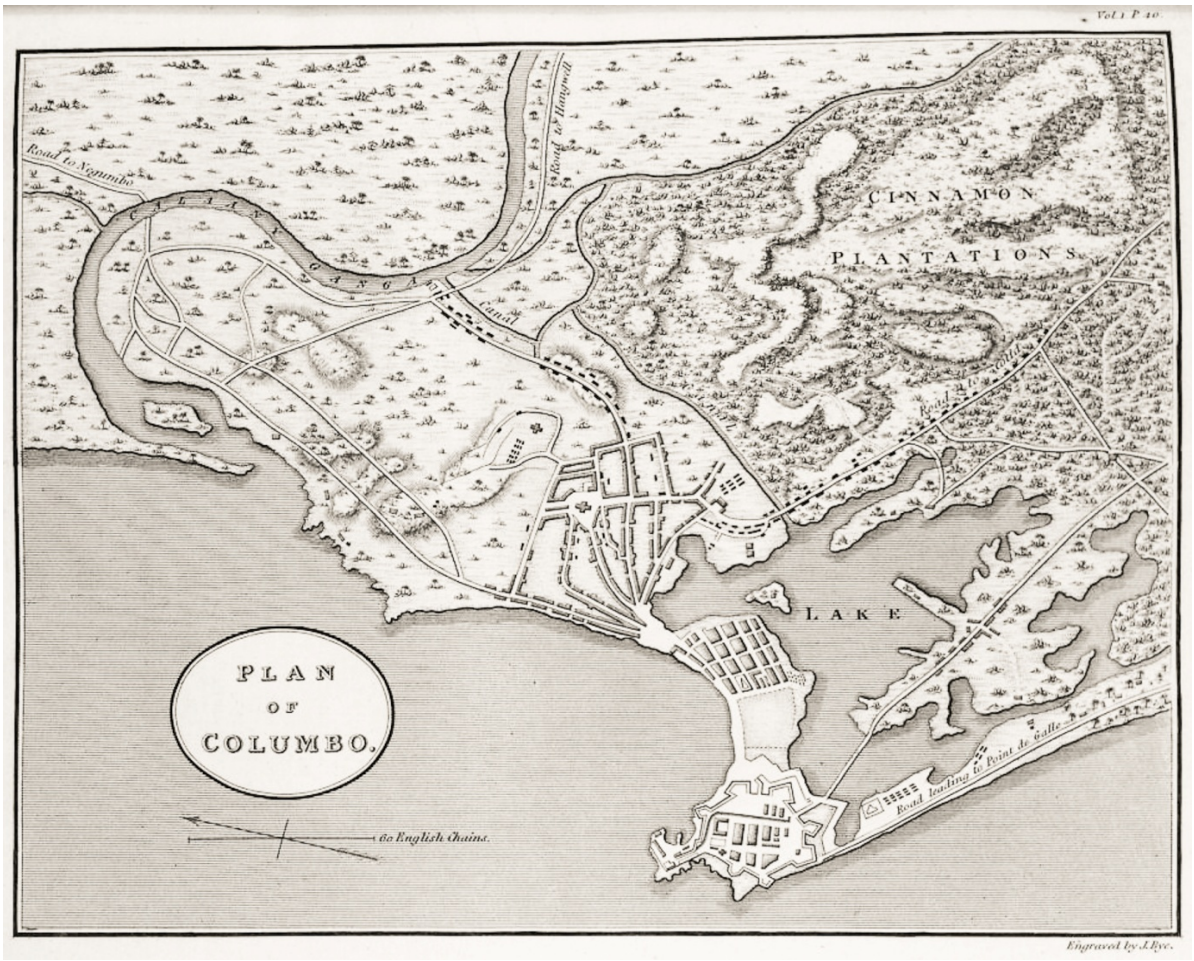


Figure 2.14 Plan of Colombo 1800.

At this point Colombo had been taken from the Dutch by the British. Note the Cinnamon plantation that borders the city. Source: Cordiner (1807), p. 40.

During the British period, the first census of the population was carried out. According to Hulugalle (1978), the recorded population in 1824 in the city of Colombo was 31,188 and by 1865 the population had increased to 80,000.

The Dutch, who had slightly different strategy than the Portuguese, mostly focused on Colombo as trade and a military point. However after all waves of colonisation, the British planned out Colombo as a city for living. In 1865 the British established the Colombo Municipal Council and under took harbour and other formal developments in the city (Horen, 2002).

The impact of British Colonialism is illustrated in this quote from a traveller on landing in Colombo in 1888:

> "I have before mentioned the constant intrusion of Europe wherever you go, and that you never can get rid of her. Here at Colombo is a striking example, and you begin with abundant proof. You will not land with difficulty on a "palm-fringed" shore, breathing spicy gales, but you will land with vulgar facility, because the late Sir John Coode devised a magnificent breakwater and protected a spacious harbour; and though the waters are crowded with natives in their hollowed-out "Catamarans" or "floating trees".
>
> J.J. Aubertin (1892)

Figure 2.15 Map of city of Colombo – 1901, during the British Period.

Source: Brohier (1978)

Figure 2.16 Colombo Harbour surrounded by Palm planation in 1800.

Source: Lankapura.com

Figure 2.17 Road scene of Cinnamon Garden Colombo ca. 1800, now one of the most prestigious areas of modern Colombo.

Source: Lankapura.com

Figure 2.18 Street scene Union Place.

Source: Lankapura.com

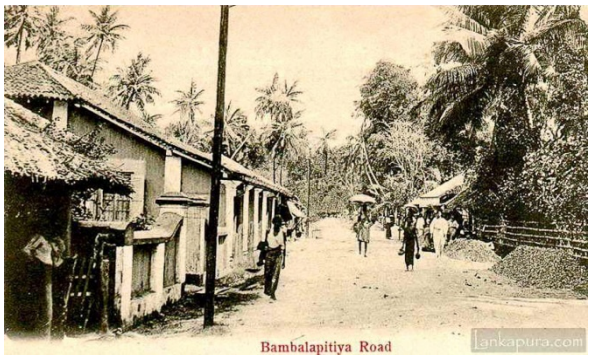


Figure 2.19 Street scene of Bamapalapitiya, ca. 1850.

Source: Lankapura.com

Figure 2.20 Bamapalapitiya, now part of the core area of modern Colombo.

Source: Worldmapz.com (2015)

From a topographical point of view Colombo was not the most suitable area to develop as a capital city as much of the land consisted of wetlands, marshes and paddy fields and other agricultural crop fields as well as many water bodies. While the Dutch had accounted for this low-lying, water-based topography by building canals, the British planners generally neglected these key features in their city planning, and removed the main part of the canal system after gaining victory.

While they continued to develop the city infrastructure, one of the most important creations in city planning during the British period was a vast extension of open spaces. Victoria Park (currently known as Viaharamahadevi Park) (section 2.9.4), Galle Face Green (Section 2.9.2), Hyde Park and Campbell Park Grounds are some of invaluable historical UGSs. Not only that, British architecture still stands out grandly in the built up environment of the city of Colombo.

Many of the green or open spaces developed during the British period, such as racecourses, golf links, and cricket grounds mainly belonged to clubs. These clubs gave limited access to these green spaces and were open to members only. Therefore although the British created a

large expanse of the open spaces now available, only a small proportion of the population has access for public use.

115. THE HAVELOCK RACE-COURSE.

116. THE GRAND STAND.

117. THE COLOMBO GOLF CLUB PAVILION.

Figure 2.21 Grand Race Couse and the Colombo Golf Club. Ca.1900.

Source: Lankapura.com

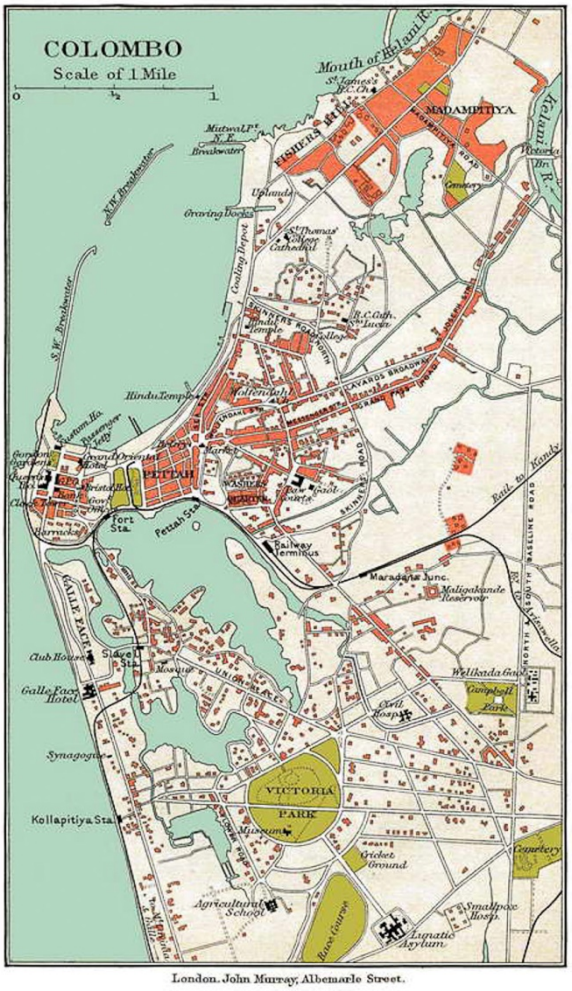


Figure 2.22 Map of Colombo dated 1895.

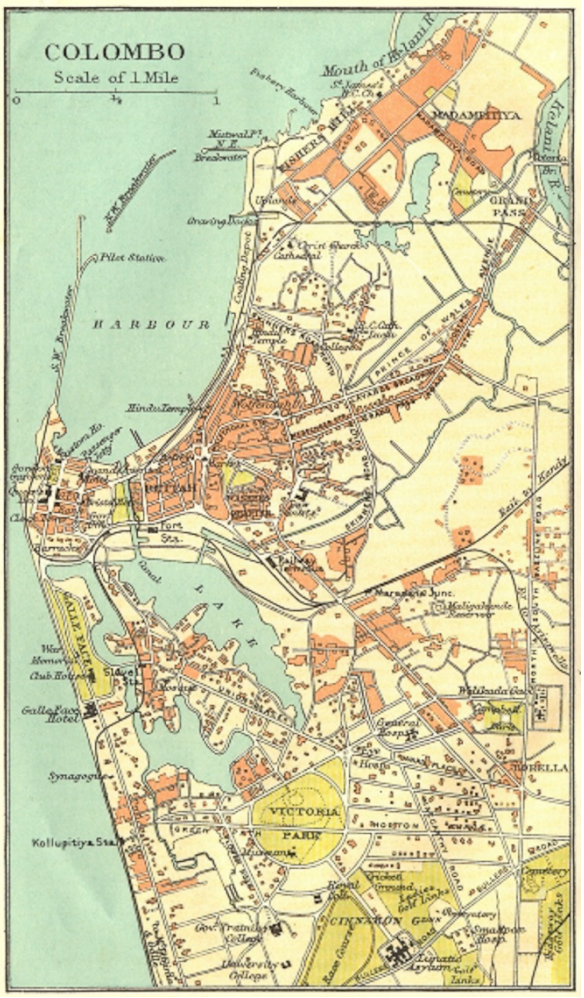


Figure 2.23 Map of Colombo dated 1924.

Source: AntiquaPrintGallery.com

Note the increased building in the Pettah district, but also the increase in UGSs.

In the tropical heat, shade trees were important. Here a description from 1834 describes the streets inside the Fort area:

> "In the interior of the Fort are several straight and regular streets, with smaller ones crossing at right angles; the former being ornamented with double rows of sooria trees, which afford a delightful shade."

The Ceylon gazetteer (1834), p. 73.

British colonial city plans for Colombo

From 1865 to 1946 numerous different urban planning Ordinances were brought forward for the betterment of the living conditions and improvement of the emerging towns in Ceylon. Due to unprecedented urban growth during the British period, the British governors had to ask for assistance from qualified town planners in order to meet the rapid urbanisation demands in the city of Colombo.

These proposed city plans include: Patrick Geddes – 1921, Clifford Holiday – 1940, Patrick Abercrombie – 1949, United Nations Development Programme (UNDP) Colombo Master Plan – 1978, City of Colombo Development Plan – 1985, Colombo Metropolitan Regional structure Plans – 1998 and 1999 (Horen, 2002).

The key features of the two main colonial plans are outlined below. City planning of the city of Colombo will be discussed in detail in Chapter 7.

The Geddes Plan (1921)

The British planner, Sir Patrick Geddes was invited by the local government to submit a report on city planning for Colombo in the early 1920s. His first impression of the city of Colombo was very positive. Geddes noted that:

> "compared to Indian cities where people largely crowd inwards towards bazars, Colombo people seem to preserve their rural spirit and express this in love of gardens and of flowers which the splendid climate and rainfall encourage to a degree rare in India. This great advantage not only to public health but to education and civilization generally has not only to be respected but preserved."
>
> (Cited by Herath and Jayasunadara, 2007).

This tropical oasis of land led him to develop a vision for developing the city of Colombo into a 'Garden City of the East'. The tree-lined streets and grid system of roads in higher-income

area of Cinnamon Gardens are among the legacies of the Geddes Plan, but it was never carried out in full.

Clifford Holiday (1940)

Followed by Sir Patrick Geddes city plan, a well-known town planner, Clifford Holiday arrived from England twenty years later. The 'Centenary Volume of the Colombo Municipal Council 1865-1965 by H.A. Hulugalle', quoted the report from Clifford Holiday:

> "It should be the object of a comprehensive planning scheme to link up existing and proposed open spaces and endeavour to create a continuous park system. Such a system would ventilate the entire city and provide pedestrians and perhaps cyclists with long and continuous stretches of parkways. Beginning at the Galle Face Green, a bridge should connect the reclaimed area on the south-west side of the large Beira Lake. From the southern end of the Galle Face Green it would be possible to continue the park strip along the southern shore of west lake and thence a boulevard connection to Victoria Park. From Victoria Park a tree-lined connection could be made to the Race Course. The Race Course can be connected to the Ladies' Golf Links including the low lying land to the south and then a further boulevard connection could be made to the Havelock Links and along the Canal, the banks of which should be opened out and planted and form a connection to the sea and the future seaside promenade."

Referring to the official documents between Municipal officials and the governor during that time, these recommendations failed to come to realisation due to a lack of money and even more a complete lack of interest. The ambitious scheme of work was considered no more than an idle dream (Hulugalle, 1965).

The Abercrombie Plan (1949)

The next city plan was prepared by a 'British town planner. By Sir Patrick Abercrombie around late 1940's. Although this plan was not fully implemented, the proposed plan had ideas of decentralisation of the city's economic actives and satellite towns around Colombo (Horen, 2002).

2.8. SRI LANKAN INDEPENDENCE: CIVIL WAR AND RAPID DEVELOPMENT

Ceylon gained independence from British rule on 4th February 1948. In 1972, the country became a republic and the name of the country was changed from Ceylon to Sri Lanka. Colombo's primacy within the national context continued to grow. By 1963, its population exceeded half a million (Hulugalle 1965).

Figure 2.24 Map of city of Colombo ,1965.

Note the UGSs scattered in between the built up city of Colombo by 1965

Source: Hulugalle (1965)

After the civil war ended few new ideas came forward from political and relevant authorities. First, the Urban Development Authority, which controls many UGSs in Colombo came under the Ministry of Defence. International development organisations have contributed towards modernising Sri Lanka, particularly in beautifying the city of Colombo. For example; the World Bank-funded beautification Colombo project was one of the main projects in city of Colombo in recent past and 'Haritha Lanka –Greening Sri Lanka' from local government are among them. Under the beautification Colombo programme the visual aspect of the city was significantly improved, through measures including rubbish collections and removal of shantytowns and roadside beggars. This process also improved the existing parks and many patches of green around the city.

Large walls that had been built during the civil war years for security purposed were removed. Removing these walls around some of the sports grounds also caused some objections, especially with private sports club concerning their privacy. However security is no longer an issue to cover properties (not private houses), therefore the majority of green areas are now visible from outside their perimeters. As a result of that, a network of green scenery can be seen from many positions in the centre of the city (Rajapaksa, 2011).

Since the end of the war, removal of security barriers and checkpoints has opened up the city and provided a peace of mind for people in daily life. One side effect of the end of war is that large numbers of army and security personal are no longer needed in the northern part of the country, and instead were used for city maintenance and development work, especially for the green maintenance work.

Other recent additions and improvements to the city include a newly cleaned canal system, which provides an attractive network for the city. There are also a few linear parks being introduced around the Colombo District area. The shanty area that covered the waterfront/sea

view/ beach areas has now been removed, leaving the space open for park development. Newly introduced jogging-tracks are being used heavily, and that has given a new image to urban fabric. Pre-research personal observations suggest that the public are using UGSs optimally wherever possible. Places are very crowded. It is obvious that peoples' attitude has changed towards usage of green space, they are aware of nature around them and seem to be willing to try out any recreational or leisure activities come along. This appears to be almost a new trend in urban society in the city of Colombo, which will be further investigated during the public survey.

2.9. CURRENT CITY PLAN, GREEN STRUCTURES AND LOCATION OF UGSs

This city has a very green appearance, particularly from an aerial view, due to the large number of mature trees.

The main types of UGSs in Colombo are: However exact percentages of each type of UGSs in Colombo were not found in referred literature.

- Private or domestic gardens in Colombo
- Street trees and planting
- Public parks and recreation grounds
- Private (club) sports and recreation grounds

As UDA- Sri Lanka 2001 report indicates;

> "Parks and playgrounds account for 95.4 Ha. or 2.5% of the total area of the municipal council . The area under parks and playgrounds have been grouped into several categories in accordance with the UDA public outdoor recreation space policies and concepts. There are also 75.91 ha of other private and semi-public outdoor recreation spaces in the CMC area, which amount to 2% of the total municipal area. Accordingly, there are a total of 171.15 Ha. of outdoor recreation

spaces in the CMC area, almost half of which belongs to private clubs and other organisations" .

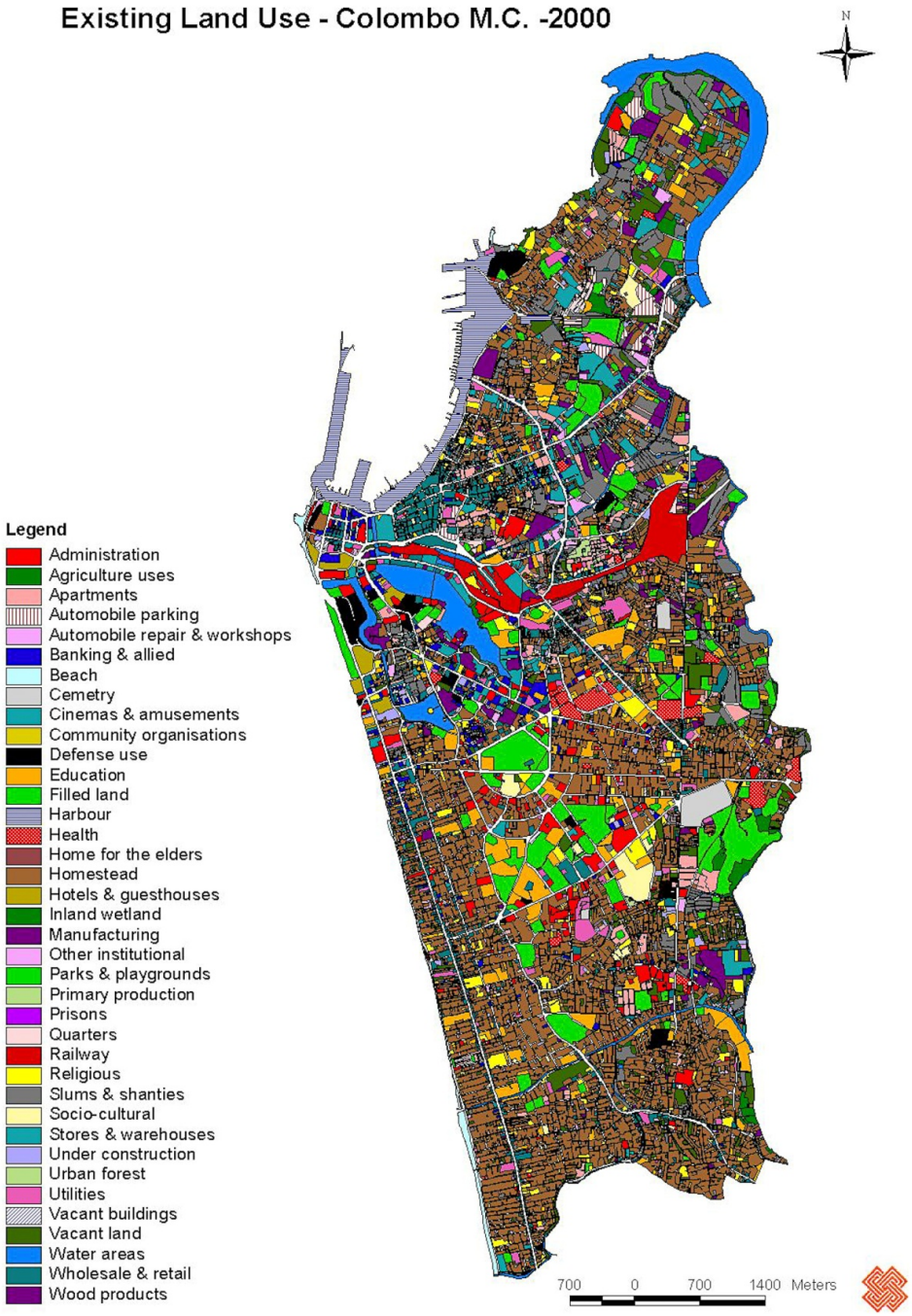


Figure 2.25 Land Use in Colombo Municipal Council, 2000.

Note: This includes all 'greenery' including in private gardens.

Source: (UDA, 2001)

2.10. SPORT AND RECREATION IN THE HISTORY OF COLOMBO'S URBAN GREEN SPACES

Since the beginning of the 19th century, outdoor sports and other recreational activities played a major role in the social lives of the citizens of Colombo, as in other parts of the world. British colonial powers and western influences encouraged the creation of city parks and other types of open space where physical activities could take place. Before the British occupancy, when Colombo was a small seaport and fortress, special provision for parks and playing fields was not considered necessary. There was great variety of hills and dales, plantations and natural vegetation within the vicinity of the city of Colombo. In that time the cinnamon plantation was situated within half a mile of the seaport and fort. This area was used to create all the main green spaces, including Victoria Park, the golf links, racecourse etc. This area of green spaces is now known as the Cinnamon Garden.

2.10.1. Sports and recreation clubs

During the British colonial period, 'The Sinhalese Sports Club' had their headquarters where the Municipal grounds are today, and at the end of Edinburgh Crescent there was a club called 'The Garden Club', which was a social amusement and recreational club almost completely limited to European members. The Garden Club included many lawn tennis courts, a few croquet courts and grounds for recreation. Campbell Park was an important patch of green in the congested part of the city. It used to be the headquarters for the Tamil Union cricket club. At the harbour end of the Cinnamon Garden, there is a small but historically very important garden known as Gordon garden, created by the side of Queen's house. On this site there previously stood an Old Dutch church, which was demolished early on in the period of British reign. After the disappearance of the church, it became a cricket field for British diplomats. Later Sir Author Gordon, the governor (1883-1890), converted this open space into a pleasure

garden at his own expense, and dedicated it to the use of the people in memory of Queen Victoria. Currently it is adjacent to the 'President's Palace' therefore there is no public access to this garden (Figure 2.26). It is more or less a publicly unknown piece of green land hidden behind a highly secured area in the city of Colombo.

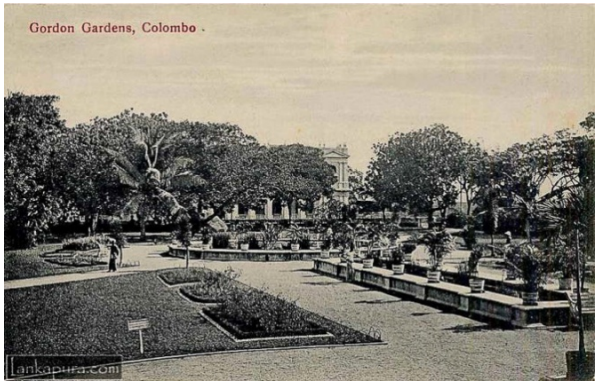


Figure 2.26 Gordon Garden, a formal garden behind the President's Palace, ca. mid 1800.

For security reasons, these grounds are currently not accessible to the public.
Source: Lankapura.com

Altogether the club history of Sri Lanka confirmed that during British rule, there were many cricket grounds, rugby, soccer and hockey grounds scattered within the core of the city of Colombo. In addition to that there were a few large golf clubs in the city. However due to demand for the land, many of these massive urban green spaces have disappeared. The only surviving golf club in the city of Colombo is 'Colombo Golf Club' which was established in 1896. (The elite club culture attached to recreational spaces in city of Colombo will be discussed in detail in Chapter 6).

2.10.2. Playgrounds

At the end of the First World War, The Colombo Municipal Council took the initiative to develop the playground movement in the city. As a result, all major schools in the city gained their own playgrounds adjacent to their schools. In addition to the school playgrounds, the council had also created many public playgrounds within the municipal area (Hulugalle, 1965).

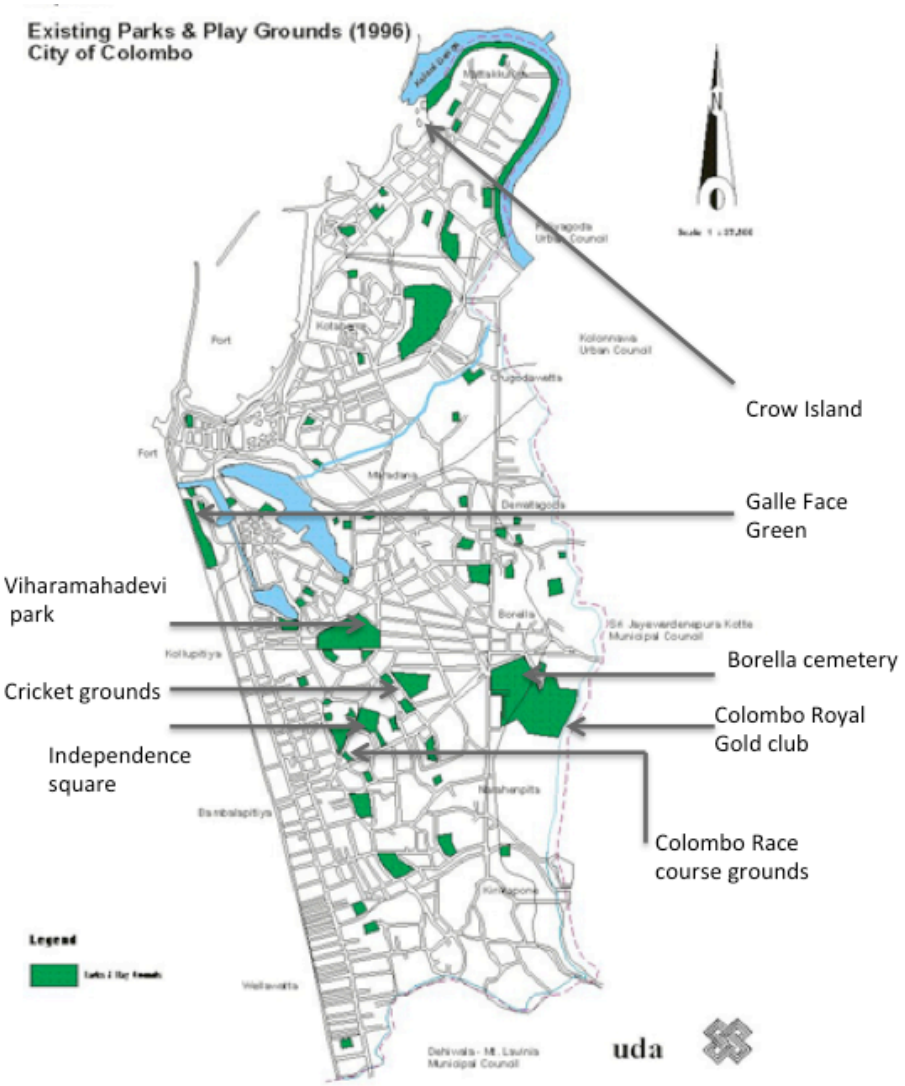


Figure 2.27 Map of Colombo with existing Parks and Play Grounds 1996.

Source: Urban Development Authority Colombo, Sri Lanka, 1998

The **cemetery** in the Borella area is the main burial ground for people of all faiths. These include, Buddhist, all branches of Christians, Hindus, Muslims and few other minor faiths within the city. The cemetery was established in 1840 and is located very near to the Colombo Golf Club. This cemetery also adds a large patch of green to the city of Colombo map, however it is not used for any form of leisure though, even gentle walking, as this is felt to be culturally inappropriate as well as too crowded. The first field visit and observations established that the cemetery in Colombo is not used other than for attending funerals and paying respects.

2.11.SUMMARY

2.11.1. A timeline of City of Colombo's History and its UGSs

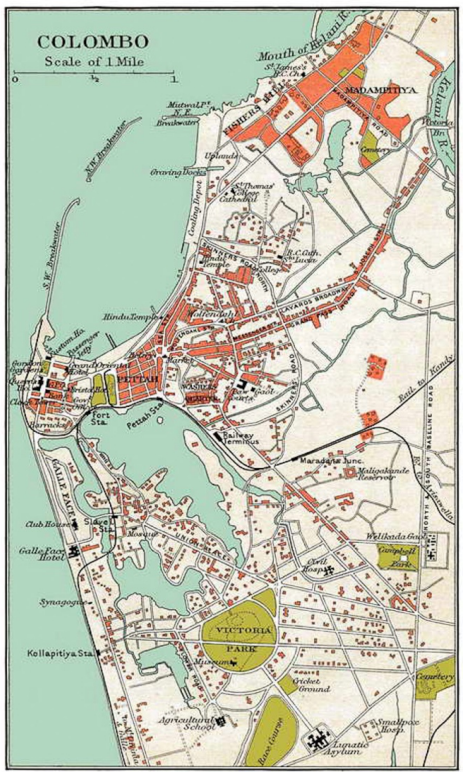
Table 2.1 below shows the UGSs related changes that have happened in the city of Colombo from early historical times till now.

Time point		**Sri Lanka (whole country)**	**Colombo city**
Distant	Pre-colonial	Very little 'urban' area, mostly small towns and villages. Agricultural lifestyle.	
307 BC	3rd BC	Arrival of Buddhism in Sri Lanka. Main cities - Anuradhapura and Polonnaruwa. Evidence of governance and town planning.	
477–95 AD		Sigiriya - palace city on rock - extensive landscaped gardens and water features.	
C6th - C9th		Muslim traders of Arab, Moorish descent. Cinnamon was a key export, from trees growing in the rainforest.	Moors begin to settle in Colombo and other trading ports.
1505-1656	Colonial Portuguese	In 1517 the Portuguese exerted control over the cinnamon trade	Colombo a small trading port, but not a significant town. The Portuguese established a fort there.
1656-1796	Colonial Dutch	The Dutch built an extensive network of canals to transport traded goods across the country to and from the ports. Agricultural produce and timber from the forests.	In Colombo, the canal network was the main mode of transport for goods.
1796	Colonial British	The British occupied coastal towns in 1796.	Plantations of coffee, then tea and rubber.

Time point		Sri Lanka (whole country)	Colombo city
1815	Colonial British	1815, the British occupied Kandy (in the central regions) then gradually established Colombo as the administrative capital of old Ceylon.	Improved infrastructure. Created many green areas in Colombo as recreational parks, sports fields (cricket, golf etc.), informal playing areas, green promenade for walks.
1948	Post-colonial	Sri Lanka gained independent status.	No completely new UGSs being created, maintained the existing UGSs, which were created by British.
1972	Under local Government	Sri Lanka became a Republic. Name changed from Ceylon to Sri Lanka.	Few UGSs reasonably maintained and other UGSs were neglected.
1982-2009	Civil war	During the civil war, less attention for development programs or recreation.	No creation of new UGSs, neither development nor maintenance of existing UGSs.
2009	To date	Since defeating the civil war, two main political parties were/are in power.	Developed few existing UGSs and created few new UGSs in Colombo and surrounding areas.

Table 2.1 Timeline City of Colombo's History and lit's UGSs.

The following four maps (Figure 2.28) compare the amount of green coverage in the city of Colombo in 1895, 1924, 1965 and 1996. It can be clearly seen that from (a) 1895 to (b) 1924 more green spaces were added to the city fabric. From (c) 1924 to (d) 1965 almost the same amount of green spaces are available, but in a more densely built up city. By 1996 green coverage was reducing and city density was increasing significantly. Since then this trend has continued, however almost all green spaces (parks, private and public sports grounds, recreational clubs) introduced within the British colonial period remain. However the quality of the greenery is being reduced due to lack of maintenance, while roadside vegetation is being lost due to building development.



(a) 1895

Source: AntiquaPrintGallery.com

(b) 1924

Source: AntiquaPrintGallery.com

(c) 1965

Source: Hulugalle (1965)

(d) 1996

Source: UDA Colombo, 1998

Figure 2.28 Urban Green Spaces in Colombo, 1895 – 1996.

2.11.2. Summary of current status for Colombo's UGSs

There are many issues facing Colombo in terms of the UGSs in the city. Each issue can be analysed in terms of problem areas leading to an exploration of the possible opportunities they generate. Some of the key issues are highlighted in Table 2.2. These opportunities can help to guide future direction.

Feature	Current status	Possible opportunities
Ecology & Geography		
A very diverse city landscape	Includes oceanfront, island, lakes, canals and diverse range of buildings. with consideration needed to which historical aspects to preserve.	Lots of potential for greening and character development.
Flat land (low gradient)	Water and pollution does not easily flow away.	Many drainage channels and other water features that could be 'greened'.
Heavy rainfall causing frequent flooding	High flood risk.	UGSs could be used as part of a flood mitigation strategy, acting as soft landscaping to absorb water and holding areas for floods.
Uncontrolled urban sprawl	No systematic plan to follow.	Strong planning laws required to protect Green Spaces.
Increasing pollution	Less land for new and existing UGSs.	Trees and other UGSs can help to improve air quality and water quality.
Tropical climate	Hot, humid conditions for residents.	Tropical conditions means that vegetation grows very abundantly.
Existing parks and open spaces	Many are underused or in poor condition.	Redevelopment of existing UGSs possible without need of virgin land for UGSs.

Feature	Current status	Possible opportunities
Canal infrastructure	The canals had suffered from years of neglect. Many waterways are or were polluted.	Extensive waterways that have the potential to be very beautiful. A network across the city of blue/green is possible.
Wetland location	High in biodiversity.	Theoretically, it should be relatively easy for planners to capitalise on this to create a 'green' city.
Social		
Sense of pride & cultural diversity	Complicated to assess people's needs, as they are often culture-dependent.	A vibrant community that could have lots of ideas and input into green space development: Architectural styles, stories of and uses for plants
Heavy use of UGSs by the public	Most parks are overcrowded, particularly at weekends.	Colombo residents use and value their UGSs.
Governance and Political		
Civil war and political unrest	Political instability meant that no focus on planning or urban greening in the past. Many security measures were in place.	A new stability and forward-looking mentality will make urban planning changes possible. The walls are being broken down. People are seeing into private green spaces for the first time in decades.
Shanty towns	These are almost all cleared now	New land available to create green spaces or special linear parks by the waterways.
Changes of political parties in Government	Different propagandas from different political parties mean frequent changes of planning direction and too much involvement of bureaucracy.	Novel ideas and different political approaches toward UGSs and different level of international or local connection for UGSs projects.

Table 2.2 Problems and opportunities relating to UGSs in Colombo.

The city of Colombo has many Urban Green Spaces (UGSs), but these are of variable quality and there is no coherent strategy for maintaining or planning, or a sustainable vision for the city. The multiple different plans that have been formulated then not properly implemented, lack of collaboration and connections, and no clear management structure for developing and maintaining green spaces are a big threat to the city's green spaces. Therefore, it has become urgent and necessary to make an innovative study of the theory and practice of urban green spaces in the context of a developing country like Sri Lanka.

This chapter provides an extensive insight into the dynamics of urban green spaces in city of Colombo, which has laid a solid base to research each of the main aspects (Ecological & Geographical, Social & Cultural and Political) in detail. Therefore next chapter is a literature review that considers the theory, case studies and best practice behind UGSs in a global context. The next three chapters will then investigate current situations and gaps in each of above aspects and identify the opportunities for increasing green space within the city of Colombo. This will then enable proposed new direction and model for urban planning in City of Colombo that maximises its verdant potential towards becoming a 'Haritha City'.

Chapter 3: Urban Green Spaces - a global review

CHAPTER CONTENTS

3.1. OVERVIEW

Urban Green Spaces (UGSs) are vital to cities globally. People have always had a relationship with nature in their cities and suburbs, but the perception of the term 'Urban Greening' varies greatly, along with prevailing attitudes and political opinions (Mumford, 1961).

Urbanisation is a reality in the world today. United Nations Fund for Population Activities (2007) predicted that this trend would come with a number of challenges at local, regional and global levels. Cities can make some aspects of sustainable living easier. Public transport is easier to coordinate, distribution of goods can be more efficient, and energy use and distribution are easier to manage. However, downside of urbanisation is well documented, including the sheer volume of pollution and waste created by such a mass of human beings, decreasing air quality, traffic gridlock and social breakdown. Last 20 years urban sprawl and intensification in urban land use were the main reason for lost of natural urban green areas (Zhanga, et.al, 2103). Nowadays, the natural landscape is gradually diminishing and agricultural land use changes are increasing (Vos and Meekes 1999, and Busch, 2006). Within many developing world cities, slums, shantytowns and other unplanned and informal settlements have resulted in increased social and spatial inequality, resource consumption, and environmental degradation (Leichenko and Solecki, 2008).

Urban green space is an important aspect of urbanisation (Wendela, Zargerb and Mihelcica 2012), because it is an indicator of the quality of the city as well as quality of lives of the local community. Improving access to green space provides a means for improving equality within urban areas (UNFPA, 2007). As Tan (2012), cited in his study "A high quality of the built environment, made possible through the functional benefits of urban greenery, has therefore emerged as an important goal of urban development to create healthy and liveable cities".

In 2003, the United Nation Department for Economic and Social Affairs showed that urban greening and urban forests are particularly critical to healthy cities in developing countries that contain some of the largest metropolitan areas. Green space and urban trees will become increasingly important because the rate of urbanization is also greatest in developing countries, mostly in smaller main cities in Asia.

UGSs can be broadly defined as public or private urban spaces primarily covered by vegetation and directly or indirectly available to users; the population or residents of the area. These could be managed areas, or fragments of natural landscapes. UGSs have both a quantitative - size, user capacity (Gilbert, 1989) and a qualitative dimension - quality of maintenance, diversity in flora and fauna. However, Rasidi (2012) has defined Urban Green Space as "any piece of land covered by vegetation and often referred to as parks, golf courses, sports field and other open spaces within urban built-up areas whether publicly accessible or not". Furthermore, Green spaces frequently comprise all natural and man-made networks of multifunctional ecological systems within, around and between urban and semi-urban green spaces (Tzoulas et al., 2007). Green spaces could be considered as public or private space. 'Privately owned' means usage is restricted in some way to a particular group, while 'publicly owned' is not (Bell, Montarzino and Travlou 2007). Baycan and Nijkamp (2006) give the broad definition: "public and private open spaces in urban areas, primarily covered by vegetation, which are directly (e.g., active or passive recreation) or indirectly (e.g., positive influence on the urban environment) available for the users". The key points generated out of all the above definitions are principally coverage of green, accessibility, and the usage in urban area.

The size, number and user capacity of UGSs, as well as the social and community links they foster, have been studied in fields ranging from landscape architecture to environmental

psychology. Although, this term is spread out through many subject areas, this research investigated all aspects in one study based on three spheres structure (section 1.6) in order to draw a holistic answer for the city of Colombo. It is more necessary in a Colombo context as UGSs are changed, altered through interventions from form, structure to function throughout the centuries, due to the constantly changing requirements of the city.

The ideas of the liveable city (Lennard and Lennard, 1987) and the ecological city (Platt, Rowntree and Muick 1994) have blossomed into the concept of the sustainable city (Roseland, 1998 and Newman, 1999), giving direction to, rather than being a target of, future urban developments. Municipal authorities may not see the value of these theories, but a concerted effort, involving government and non-governmental agencies, can bring them to fruition. Greening urban areas is widely advocated as the key to a liveable and sustainable city.

Garden Cities

The Garden City concept, which was originated by Ebenezer Howard, was a plan to improve the quality of life of the urban residential community. First he promoted this concept in *'Tomorrow; A Peaceful Path to Social Reform'* in 1898. After that in 1903, this idea was practically implemented in a full capacity in Letchworth and 1920 in Welwyn in the UK. There are currently so-called 'Garden Cities' all over the world. These, however, usually have more of an aesthetical point of view rather than Howard's original aim of a self-sustainable urban living style by interrelating country and city. The original garden city movement was based on a self-contained city in the core area surrounded by green. Some literature (e.g. Tan 2012), claims that the Howard's Garden City concept was not fully successful. However, this concept greatly influenced the modern city, eco city, and modern garden city ideas.

3.2. ENVIRONMENTAL PERSPECTIVE

There is a need to recognise that Urban Green Spaces are only a part of a city's total Urban Ecological network. UGSs can only be effectively planned, designed and managed sustainably in the long term if each space is recognised as a part of the network. Some smaller green spaces survive because they are difficult to build on, other larger spaces could easily a part of the planned provision of housing and industrial project. Often they were just grassed over, as no money was allocated for design or planting (Beer, 2003).

3.2.1. Biodiversity

Biodiversity is the variety of different types of life. Specifically, it is "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems" (Convention on Biological Diversity, 1992).

According to the Convention on Biological Diversity (Agenda 21 and the Convention on Biodiversity (CBD) UN, 1992), "maintenance of global biodiversity is identified as one of the most important issues in the global environment, because biodiversity underpins ecosystem function and the provision of all the ecosystem services that humans benefit from".

Global biodiversity is being lost at an alarming rate. One of the main threats to biodiversity in many parts of the world is habitat fragmentation or loss, due to rapid urbanisation (Collinge, 1996). Ignatieva (2010) stated that biodiversity is usually adversely affected when land use changes due to urbanisation. As forests, wetlands and other natural habitats are cleared to make way for cities, the ecosystems are degraded and species are lost. This loss can be reversed, by planning for increased rather than decreased biodiversity in urbanisation projects.

However, UGSs are the most significant way to maximise the urban biodiversity. Jim (2004) has emphasised that any kind of green structure or element will greatly contribute to the biodiversity of a city, though the origin and structure of the vegetation will differ.

As McPherson and Luttinger (1998) explain, some cities have vegetation from pre-urbanisation, while others have purposely planted trees without any natural inheritance. Further factors such as climate, soil, geographical location, plantable areas, public preferences (e.g. for maintenance levels), particular urban city planning and management regimes can directly affect city-level biodiversity.

Dunnett, Swanwick, and Woolley (2002) discovered that high levels of biodiversity are to be found not only in carefully planned UGSs but also in disturbed ground and 'brownfield sites' – which often have a better species diversity than less disturbed rural habitats. Despite the fact that many brownfield sites were previously used for landfill and waste disposal, as mentioned above the ecological diversity of living organisms can be greater. The same study explained that such sites may be composed of both native species and introduced species that have 'escaped' from parks and gardens.

In many developing countries biodiversity has a lower priority compared to other city planning goals. However, in general many studies illustrated the protection and maintenance of existing areas of biodiversity should be the top priority, with UGSs used to link or buffer them (Vogel et.al., 2008). Therefore, municipal councils in both developed and developing countries are enhancing city-level biodiversity by introducing new strategies with green planning projects.

3.2.2. Urban Ecosystem Services and UGSs

UGSs are an important part of the ecosystem, and urban ecology. The benefits of protecting and improving the ecosystem in the long term include better water storage, more pleasing landscapes and increased wildlife numbers and diversity.

The concept of 'ecosystem services' was developed to enhance the understanding of, and appreciation for, the benefit that healthy ecosystems provide for humans. The Millennium Ecosystem Assessment (2005) brought together a huge body of information on the services that ecosystems provide and how they are changing. They divide Ecosystem Services into four categories:

- **Supporting services**: These are baseline services that are necessary for the production of all other ecosystem services including soil formation, photosynthesis, primary production (making plant material), nutrient cycling and water cycling.
- **Provisioning services**: The products obtained from ecosystems, including fresh water, food, timber, fibre, fuel, genetic resources, biochemicals, medicines, and ornamental resources (including horticultural plants).
- **Regulating services**: The benefits obtained from the regulation of ecosystem processes, including climate regulation, temperature regulation, air quality regulation, water regulation, erosion regulation, water purification, disease regulation, pest regulation, pollination, natural hazard regulation.
- **Cultural services**: The non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences (which relates to landscape values in cities).

Ecosystem disservices

While vegetation and the ecosystems that it is part of usually considered as positive and beneficial, this is not always the case. As Gorman, (2004), and Lohr et al., (2004) informed, vegetation cover can be negative in different dimensions. They stated that environmental, social, economic, health, visual and aesthetic problems have been reported and can be considered to be tree costs, or 'ecosystem disservices'. In this context 'Ecosystem disservices' have been defined by McPherson and Luttinger (1998) as "the impacts or costs that negatively affect human wellbeing, such as nuisance, fear, threat of physical harm, health risks, aesthetic problems and different types of pollution".

The cooling effect of urban vegetation

Urban vegetation has the potential to improve cooling through planting. Huang, Akbari and Taha (1990) states that a single tree offers almost 270 kWh cooling per day, per tree, due to evapotranspiration effects alone. This would be a huge benefit to a warm, humid tropical city such as Colombo, where almost every room in any kind of building use cooling devices.

Many recent researchers, including Cheng (2010) suggested not only traditionally planted trees next to each other providing cooling effect, but also vertical green can reduce interior surface temperature by $>2^0$ C. Furthermore Sailor (2008) confirmed that green roofs also reduce interior temperatures through improved insulation via the substrate and the potential for evaporative cooling. Urban vegetation can provide cooling, but this depends on the available water in the soil. This is especially important with urban lawn areas (McPherson Simpson and Livingston 1989).

Urban Trees

Tree planting is one of the major ways to increase the percentage of greenery in a city. Urban trees are often planted as part of road building projects, allowing the greenery to grow along

with the city. Urban area tree cover and density is affected by neighbourhood socio-economic status; more trees are observed in wealthy than in impoverished neighbourhoods (Hope et al., 2003). However the size and type of trees should always be carefully considered. Though trees offer many positives, they can also reduce visibility and contribute to feelings of insecurity in public areas (Christmann et.al, 2003). Additional trees provide many positive Ecosystem Services for the urban community. Among them are improving the urban air quality by mitigating the carbon pollution, reducing the noises occurring in towns, reducing the storm water flooding, conserving energy, and improving the urban bio-diversity (Miller, 1997; Gorman, 2004; Lohr et al., 2004). Trees need to be considered as a long-term solution, as even fast-growing varieties take many years to reach maturity and full coverage, by which time the environment may have undergone drastic changes.

Urban Forests

Escobedo et al., (2010) have defined 'urban forest' as "the sum of all urban trees, shrubs, lawns, and pervious soils located in highly altered and extremely complex ecosystems where humans are the main drivers of their types, amounts, and distribution". Furthermore he explained "the components of urban forest that are directly enjoyed, consumed or used to produce specific, measurable human benefits". In comparison, although other urban green spaces such as urban parks provide similar benefits, they are not involved in such complex and large scale. Urban forest is a major part of urban ecosystem services (Miller, 2001), as well as widely regarded as an integral to urban green infrastructure. There are many holistic and strategic reasons to bring forests into the urban areas. Among them Collins *et.al.* (2011) highlight that urban forestry sets out to achieve long-term, environmentally balanced tree coverage in a city, which will be providing a better environment for future generations.

3.2.3. Urban Green Space networks

Bolund and Hunhammar (1999) outlined, “Urban green space network, includes physically and/or functionally interconnected formally designated green spaces as well as informal natural areas irrespective of their size, composition or use”.

The main units of Urban Green Network are urban forests, greenbelts, green fingers or wedges, greenways and different types of parks (Brennan, 2008). While urban forestry is widely regarded as an integral component of urban green infrastructures, even one specimen tree in the middle of a town square can be a great contribution to the city green network.

It seems that new urban green space systems should build on existing green ecological networks, in order to achieve maximum ecological benefits. Having UGSs scattered within the inner city, surrounded by man-made structures, is not an effective strategy. Connecting inner city green areas with the larger, established green structure is essential, as this increases the chance of mixing plant and animal populations within suburban areas (Beer, 2003). Indirectly, this approach may also extend the longevity of UGSs.

In a global context among the UGSs literature there is a relative lack of studies concerned about the recreational aspect of urban green spaces network. Commonly focus is mainly on each green space individually rather than as a network. However, networks of UGSs provide more formal and informal recreational benefits as they are more integrated functionally or physically. Sandström (2002) explained that planning of any part of an urban green spaces network, one of the priorities is the multifunctional potential. Further James et al., (2009), concluded, “this includes integrating social and ecological systems in land use, planning and management”.

When integrating green sites with other urban habitats, for instance formal parks connected by linear green ways, or green corridors to burial grounds, a main focus is ‘urban nature conservation’ and the importance of viewing green spaces as a whole. In terms of planning, methods such as ‘least-cost path analysis’ have obvious benefits in terms of identifying potential ecologically friendly green corridors and urban linear parks.

Community Gardens

In recent decades, Urban Community Gardening is a widely discussed topic due its multiple motives. According to Guitart, Pickering and Byrne (2012) the prominence of community gardens has increased rapidly across many Western nations, notably North America. As Lawson (2005) described, the urban community gardens are not only a unique green space where the users have their own rights to what they grow, but also economic benefits, the local users get contact with nature, education and overall neighbourhood revitalization. Studies by Lawson (2004) further explained that planners have not given enough attention towards urban community gardening compared to traditional parks. Part of the reason for their neglect is issues over land ownership. Security and the future of the well established community gardens also have a major challenge ahead (Guitart, Pickering and Byrne 2012).

As a solution for this issue Harnik (2010), suggested linking the planning and the management of urban community gardens with formal parks or gardens. When considering creating or adding new green patches to urban fabric, urban community gardens could have a great potential to redevelop the under-utilised land in major cities. This task has been practically proved in cities like New York in 1970s (Lawson, 2005).

3.3. SOCIAL AND CULTURAL ASPECTS OF URBAN GREEN SPACES

In last 30 years there have been rapid changes in terms of perception towards nature in the urban areas, which led to greater appreciation of nature. This has resulted in strong demand for UGSs by city dwellers (Miller, 1997). As well as the demand from users, policymakers also now recognise that UGSs have been shown to provide many social cultural benefits to the community. These include personal wellbeing to social coherence in the society.

Over the past decade the direct influence of physical fitness and outdoor activities on public health has been identified, and it has become a priority to provide outdoor areas (World Health Organization, 2011). Increasing the usage of UGSs is now on the political agenda, primarily because of the health benefits of organised and social exercise, and solo outdoor activities (Byrne and Wolch, 2009).

Taylor, Kuo and Sullivan (2002) highlighted the benefits children receive by spending time outside where vegetation exists. These benefits included being physically fit, environmental education, and social and cultural integration by playing with other children from different social backgrounds. As Elsley (2006) and Konijnendijk et al., (2006) concluded, the use of outdoor green areas increases social and cultural development, which is fundamental for child development.

Urban green spaces provide space for the expression of personal and cultural diversity. According to Pretty, Hine and Peacock (2006), one of the main aims of UGSs is to promote and reflect the cultural identity of the community. Cultural getaways such as music festivals and community events organised in UGSs provide a platform for skills and interest to be shared among the community members. Therefore as a venue for community interaction, UGSs bring people together and more importantly developing the social cohesion among the

diverse social groups in the local community (Department for Culture, Media and Sport, UK, 2010).

Recently there has been a great deal of focus on scientifically quantifying the relationship between people and nature. Scientists have looked into this from various different theoretical perspectives such as 'Biophilia concept' by Wilson (1984). Rosley et al., (2014) summarised different authors' ideas to emphasise the strong connection of human nature relationship is as follows:

> "Biophilia, a theory discussed on human affiliation toward nature has contributes to a fundamental idea of human and nature association.(Howell, Passmore and Buro 2011). Thus, the concept is strongly related with human evolution process from psychological and emotional perspectives. In addition, Kahn (1997) stated that biophilia is an intrinsic value, genes that attached mankind to nature from these two aspects that bonded mankind as one species. Despite the differences demographic factors such as cultural and ethnicity, Gullone (2000) believed that human inherited certain features in nature that appeal to be aesthetically pleasant to mankind. According to Maier (2012) these features are evolved through those features that being regard as perimeter or mankind to survive survival in the environment. Thus, the biophilia theory is a fundamental aspect of seeking the relationship of human and nature interaction. Added by Gullone (2000), human tends to demonstrate a positive and negative respond to certain natural phenomena that stimulate by their preference and perception".

As Kaplan and Kaplan (1989) explained, several studies have addressed the effect of nature on human life, with empirical evidence for its benefits steadily growing.

3.3.1. Socio-demographic categories and UGSs

Differences in culture, gender, age and social standing have an effect on how people interact with UGSs. Examples include young children using safe dog-free areas with play equipment, young adults using UGS for 'private time', office workers for peace and time away from a screen, older people for social time, families for picnics etc. (Kaplan and Kaplan, 1989). The social profiles of communities have great variance on the expectations and demands for UGSs based on their socio-demographical factors such as age, gender, level of education, occupation status and physical ability etc. As Lo and Jim (2010) explained, different times of

day attract different user profiles; in the mornings, adults tend to engage in sporting activities, in the afternoons children and teenagers cycling were more prevalent. In terms of gender difference Sanesi and Chiarello (2006) established that males tend to be more involved with physical activities such as sports and females are more likely to accompany children.

The different social groups from diverse ethnic origins and religions also have different demands, access requirements and barriers to visiting UGSs due to their specific social and cultural traditions and perceptions. Ernstson (2013) discussed (as cited in Kabisch and Haase, 2014), in most cities urban green spaces are not evenly distributed within the city, therefore availability of the UGSs is disproportional to a subset of the urban population. It could be either different ethnic group or religious group. For instance a study in Leicester in Britain illustrated that Hindus and Sikhs have limited access to UGSs due personal beliefs and physical limitations as distance (Comber, Brunsdon and Green 2008). In the United States, Davis et al., (2012) revealed that Afro-Americans clearly have less access than white Americans to green spaces in their neighbourhood in Atlanta. Similarly a city like Colombo also has different social groups and geographically disproportional distribution of UGSs (personal observation). In a global context the situation among the diverse cultures and nationalities are sometime similar but sometime different. Recently Xi-Zhang (2014) reviewed and summarised research carried out into motives of visits by other scholars around the globe and he has conclude as below;

> "In Ankara (Turkey), to while away, to rest and contemplate, to meet and chat with friends, and to escape from the stresses of urban life, constitute the main motives for visiting parks (Oguz, 2000). In Amsterdam (the Netherlands), to relax is the most important motive, followed by to listen and to observe nature, and to escape from the city (Chiesura, 2004). UGS visits of Hong Kong people are principally motivated by their need for exercise, clean air, peace, and relaxation (Lo and Jim, 2010). The most important motive of the Swiss for visiting nearby UGS is the restoration associated with nature experience, whereas social bonding is identified as the weakest motive (Home, Hunziker, and Bauer, 2012). An Australian study found that common

> motives include enjoying nature, escaping various pressures, and enjoying the outdoor climate (Weber and Anderson, 2010)".

Home, Hunziker and Bauer (2012) as well as Sanesi and Chiarello (2006) stated that motives and patterns of usage of UGSs are depend on each city differently, not same motives for every city. Even within a city there exist a range of different demographic and cultural structures, which in turn, implies a diversity of purposes that UGSs need to serve. For instance, a city-wide survey in Berlin showed that older individuals want to relax, get fresh air and enjoy nature while younger and middle-aged people prefer doing sports (Senatsverwaltung für Stadtentwicklung Berlin, 2004).

The perceptions of those who had a childhood familiarity with green space are particularly interesting. Those who visit frequently as children tend to go to places well known to them and ones that remind them of places they knew as children (Ward Thomson, 2004). A recent qualitative study carried out in Denmark by Læssøe and Iversen (2003) confirmed that childhood experience of parks or green spaces have lasting consequences such as positive attitudes towards nature.

3.3.2. Motives

According to the 'biophilia concept' of Wilson (1984), 'nature is a fundamental human need'. Previous studies carried out by Ward Thompson et al. (2012) and Schipperijn et al. (2010) identified that the most frequently reported motive of visit to an urban green spaces by local community is "enjoy fresh air and beautiful scenery". This is partly related to need of such things in any populated and polluted city in the UK. Followed by next two main motives reported in literature are "to exercise" (Lo & Jim, 2010; Sanesi and Chiarello, 2006) and "To play with children" (Chiesura, 2004; Lo & Jim, 2010; Sanesi and Chiarello, 2006). According to Peters, Elands and Buijs (2010), motives that could lead to feelings of connection and

community cohesion are also popular among the city dwellers. For example ‘enjoy meeting and seeing other people, simply to see how life go by’, are typical.—The patterns of social exclusion in society can be mirrored by the under-representation of some groups among users of UGSs (X—Zhang, 2014). Due to mobility issues and design issues the disabled and the elderly can find it difficult to access UGSs. Different cultural backgrounds and the changing needs of the different social groups may all effects the benefit to be received and how it will be received from UGSs. Therefore present research could provide answers for some current issues such as social wellbeing and quality of life in the Colombo context.

Many factors can create barriers to full and regular use of green spaces, or even prevent their creation, for example congestion, poor maintenance, neglect and safety issues. Neglected vegetation can become overgrown, reducing visibility and accessibility, and with it perceived or actual public safety (Bell, 2004). Jorgensen (2002) illustrated that having larger dense trees in a city parks in the UK was one of the main reason for users to feel unsafe. In contrast, it was discovered that smaller plants, or simply trees with less dense coverage, could alleviate the problem. Additionally distance, and landscape character of the urban green spaces deter the usage. For instance wheelchairs and baby strollers may have restrictions due to the layout of paths and other landscape features or uneven surfaces. Due to distance from home to preferred or available UGS, different transport methods may have to be used in order to get quick access, for instance many people used a ten minutes car drive rather than 40 minutes walk to a UGS (Bixler and Floyd, 1997; Schroeder and Anderson, 1983). As the Norwegian Institute of Public Health (2009), mentioned although different modes of transport can be used, still the threshold for visiting outdoor by foot is lower as fewer logistics are involved.

The term ‘Accessibility’ has different meanings when considering the usage of UGSs (El-Geneidy and Levinson, 2006). According to their explanation, ‘accessibility’ can be same as

‘mobility’, which means ability to move from place to another. Alternatively it can also mean ability to approach something. Yet both definitions are thoroughly relevant to usage of UGSs.

For Urban Green Space ‘accessibility’ is an important consideration (Brownlow, 2006). Scott and Munson (1994) have shown that people with limited personal mobility use urban green spaces less frequently due to availability of suitable public transport, availability of disabled car parking, safe and comfortable movement within the UGS and proximity to an UGS.

Various literatures have identified different types of constraints, which deter people from visiting Urban Green Spaces. Based on Burns and Graefe (2007), Crompton and Kim (2004), Henderson and Bialeschki (2005) and Jackson, (1993), a study by Byrne (2010) concluded four main constraints as follows;

1. Personal or internal constraints – include disability, motivation or interest, the possible crime that can happen in UGSs, and fear of dogs or other users.

2. Social constraints – logistic issues of lack of companions, family situations.

3. Structural constraints – cost and time, transport issues.

4. Institutional constraints – aesthetical and physical appearance and the services offered by the UGS.

The above study identified, due to undesirable park-users such as homeless persons and drug-users are increased the personal safety of the visitors. Further more the large number of older children and teenagers in groups were in UGS was a safety concern for young children and their guardians (Veitch et al., 2006, Veitch, Salmon and Ball 2007, Adams, Harvey and Brown 2008).

Residents in Nottingham, UK, were particularly anxious about the use of local green spaces by drug users, especially after dark; attempts to provide extra lighting were regularly thwarted by vandalism (Bell, *et. al*. 2004).

Preferences for sites that are being 'looked after by someone' in a maintenance perspective, and for the presence of rangers or wardens in a safety perspective indicates that management is an important aspect for many people. Although, as was shown in earlier studies, people also like to see nature that looks natural and not over-managed, so a balance between tidiness and naturalistic has to be differentiated by managers. The visible signs of management have been found to be important in the other studies already cited and observation studies have shown that women were more likely to use areas where a warden was present due to the sense of uneasiness often experienced otherwise (Beer 1994 and Beer 2010).

All above literature, emphasised that the role of Urban Green Spaces in modern cites are greatly influenced by the social and cultural characteristics of the potential visitors, their perceptions, attitudes and behaviours.

3.4. POLITICAL AND DECISION-MAKING ASPECTS OF UGSS

As identified from the previous two sections (Environmental and Social), urban areas are combination of complex ecosystems with natural, social economic and scientific subsystems (Ma and Wang, 1984). However with this multi-faceted composition, urban green spaces have complex needs in terms of planning and management of the urban environment (Landelma, Salminen and Hokkanen 2000; Pauleit and Duhme, 2000). Moreover Landelm, Salminen and Hokkanen (2000) and Tahvanainena et al. (2001) explained that in order to achieve overall

success in urban environment, it is necessary to involve participation of all stakeholders together to coordinate planning and management.

Any type of urban green space directly enhances the environmental quality of the city, which has great influence on overall quality of the city (Dunnett, Swanwick and Woolley 2002). Planning and designing a network of functioning urban green spaces can easily improve the city structure and accessibility, which attract many jobs, businesses, local and foreign visitors and even may encourage the use of modes of transport which are more environmental friendly, such as cycling (Scottish Executive, 2001).

3.4.1. Urban planning and UGS Designing

Urban planning is a practical discipline and should consider physical, social and economical aspects. The development of planning should be built on dialogue between theoreticians and practitioners; as such combinations are advantageous for all concerned. For example, an experienced structural planner does not always have a good knowledge of urban planning. However, their theories can be a valuable resource, giving perspective on the planning process (Nilsson, 2001). It is vital to gather information from both landscape ecologists and urban planners, as landscape ecologists often concentrate on the scientific study of process and pattern in landscape, while planners identify needs and priorities, and eventually develop implementation, monitor and update the strategies.

When designing an UGS one of the main areas to be considered is landscape ecology (Cook, 2002). For instance as Beatley (2000) explained, many cities in developed countries are concerned about providing and preserving greenery in developments, redevelopments and expansions. In recent years more rigorous urban sustainability planning has offered initiatives such as urban planning with nature, and conversion of brown-field to green-field projects (Goode 1998, De-Sousa 2003 and Jim 2004). Furthermore, the benefits of UGSs have been

highlighted in a more rational and convincing way, using a systematic typology of benefits (Camagni 1998, and Pauleit 2003). An ideal green space layout demands for green networks embedded within urban areas (Forman and Godron, 1986). This enhances landscape impacts by encouraging more comprehensive environmental and ecological functions within urban areas.

3.4.2. Design styles and user preferences

There are different types of landscape styles available for urban green spaces, which are classified in many different ways in the literature. According to Treib (1999), one set of terms is; Manicured and Wild. The other frequently found is Formal, Informal and Mixed. Van Berg and Winsum-Westra (2010) explained the type 'formal' is characterised by a neat and manicured look, whereas informal gardens appear more natural. The Formal type quite often includes many built up hard landscape features, such as hard paving and fountains. The Informal style can also be referred to as 'Naturalistic' style. This type of UGSs involves a wilder aesthetic, and includes hardy plants that thrive on minimal care. The studies carried out recently explain that naturalistic gardening has a more ecological approach, aiming for sustainability and the inclusion of native rather than exotic plants (Fuller and Gaston 2009). Kaplan (1984) emphasised that literature often suggests that people prefer natural over built landscapes. Trees and water and forested areas were among the most preferred features in several studies. Despite the potential benefits that urban community receive from UGSs, problems still exist between people's aesthetic preferences, how they perceive the landscape and at which level they appreciate it. For instance, people find wildflower areas particularly beautiful in one season, but untidy and unmanaged at other times (Rohde et.al 1997).

Schroeder et.al. (1983) found that least-preferred park features include buildings, fences, vegetation in poor condition, graffiti, and large monotonous fields. The presence of unmaintained, natural vegetation may also have a negative effect on security perception; in

contrast maintained grass increased both preference and sense of safety in inner city neighbourhoods (Kuo et al., 1998). Landscape design of the UGS could also bring a negative image for the UGS. For instance Talbot and Kaplan (1984) reported certain design such as too much natural vegetation. Lindgren and Nilsen (2012) reported, that shrubs also are perceived as dangerous as they are potential places for criminals to hide. This can raise security concerns. It seems that understanding of exact preferences for landscape style in an urban context is complex. This is due to many different variables involved, such as age, gender, social and cultural background and personal characteristics of the visitor too (Rohde and Kendle, 1994).

Aesthetic value or simply the beauty of the landscape has different dimensions as Lothian, (1999) describes "Beauty has been defined as aesthetic pleasure derived from experience of the natural landscape, either as an objective environmental quality that exists whether it is seen or not or as a subjective quality that exists only in perception".

3.4.3. Planning and designing needs

Urban Green Spaces need to be designed in order to offer social and nature-related recreation to all different social groups. For instant disabled people and their needs should be taken into account in the process of the planning and designing of the social infrastructure. However as Seeland and Nicole (2006) argued, due to many reasons (initial cost and maintenance cost including need of extra staff) users with disabilities often face limited service in the public spaces such as parks.

An important part of UGS design is considering what kind of living and non-living features are to be included. 'Trees' are the most preferred living landscape feature commonly identified in many studies (Yang and Brown, 1992). Flowerbeds and neat lawns have been

found to be the most preferred formal feature in UGSs (Talbot and Kaplan, 1984; Burgess, 1993; Rohde and Kendle, 1997).

On the other side the planning of an UGS could mainly focus on basic but vital factors such as those stated by Govindarajulu (2014);

***Quantity**: what is the percentage of green coverage?, **Quality**: can it improve biodiversity and provide better ecosystem?, **Connectivity**: how much of green space is connected? and **Accessibility**: how much population has access to green space?*

Landscape style preferred by key personnel

Preferred landscape style by the professionals involved in the UGS has a very significant influence on planning and designing. Over last few years it has been examined frequently in the literature. A number of studies have demonstrated that professionals related to UGS planning and designing have a strong interest towards 'naturalistic' or non-formal type of designs. Particularly in northern Europe over the last few decades, they have shown a trend towards production of more natural looking green spaces in urban areas (Flint, 1985; Kendle and Forbes, 1997; Dunnet and Hitchmough, 2004).

According to Kaplan and Herbert (1987), UGS visitors and landscape professionals tend to see the same landscape styles slightly differently. Generally public perception towards landscape style is different to many professional designers and planners (Burgess et.al.,1988). As Ozguner, Kendle and Bisgrove (2007) confirmed, due to its more beneficial side, naturalistic landscape style is positively viewed by landscape professionals. Their statements supported previous authors' (Emery, 1986; Hitchmough, 1994) common finding that naturalistic landscape style is better for UGSs as it has benefits in environment and social recreation. This encourages more naturalistic or non-formal type Urban Green Spaces that

need less maintenance costs than manicured formal gardens. Hitchmough (1994) illustrated that many urban green space designers consider that forms of naturalistic green spaces are cheaper to manage than a traditional formal style. Although much literature frequently emphasises that statement, Ozguner, Kendle and Bisgrove (2007) challenged this, as actual cost depends on many factors. For example during the initial stage to establishment of vegetation a 'naturalistic' style is not cheap as specialised staff and other resource are still involved incurring potentially high costs (Kendle and Forbes, 1997).

3.4.4. Alternative Green Spaces

Sky gardens

In the recent past roof gardens or sky gardens have become a solution for many highly populated cities where land is limited for traditional green spaces. Sky gardens can also be known as podium gardens, elevated gardens and roof top gardens. As DeNardo et al. (2005) illustrated, they can provide a wide range of services similar to other conventional UGSs. For example sky gardens perform ecological and environmental functions. They reduce surface temperatures, and minimise the heat island effect (Cheng, 2010 and Sailor 2008). Although roof gardens may not provide the same high level of biodiversity as ground level, roof gardens can also provide strong links within the urban green network (Tain and Jim, 2003). Tain and Jim (2003) explained that a reason for biodiversity not being as rich as at ground level could be due to "physical isolation from the ground crating a barrier for biotic encounters and interactions". Loder (2011) emphasised that as well as ecological benefits, roof gardens provide social benefits as access to nature, leisure and aesthetic recreation too. In terms of city planning sky gardens are an optimal way to use limited city space.

Informal green spaces

Conventional UGSs, such as parks, can be expensive to maintain and not practical to create within an existing built environment (Byrne and Sipe 2010). However there are also non–conventional vegetated spaces, which are referred to as ambiguous, liminal, or ambivalent landscape in the literature. These include roadside verges, vacant lots, brown-field sites so forth. They can have a significant impact on the greenness of a city, and are not addressed enough in recent research (Jorgensen and Tylecote 2007). Even in very dense cities, still there are enough vacant patches of land, small strip of land in between buildings, long narrow land strips by railway and canals, which are not managed or in many cases not identified as potential green space (Ward Thompson, 2002). Investigating these further to identify their locations and assess their potential role within the UGS network is a logical step for city managers.

3.4.5. Classification of UGS and Typology

No two parks or green spaces are the same. Categorising of different types of green spaces and applying a hierarchical system started few decades ago. According to Beer (2005), standards and indicators were accepted for a green space hierarchical system with an aim of influencing the pattern, surface area and functions of the green space in the city.

Factors that determine classification of urban green spaces include; size function, facilities, activities, user profiles, condition of the area, location, naturalness, age and history of UGS development philosophy and governance (e.g. Byrne et. al., 2009; Panduro et. al., 2013). Furthermore according to Bell, S., *et. al*.(2007), urban green spaces can be classified in to eight different types: **Parks** (well-maintained green areas with recreational facilities), **Lakes** (dominate feature of the green space is a lake), **Nature** (open field of grass, trees or water bodies mainly at the edge of cities), **church yards** (attached to a church, mainly used and maintained by the local community), **sports fields** (school and formal sport grounds),

common areas (shared areas by the community of housing complexes), **agriculture areas** (large fields and meadows) and **green buffers** (urban infrastructure often covered by trees).

The age of the space is a significant influencing factor, because over history the people who designed and developed UGSs have been influenced by different standards and ideas, benefits and perceptions of the role of these spaces (Cranz, 1982), and these historical influences are still very visible today. For example green spaces such as in British-colonised countries like Sri Lanka, (e.g. Galle Face Green, Colombo) and Australia (e.g. Hyde Park, Sydney) were created during the colonial times. As a result of that the planning had typical features of their era such as 'promenade' long narrow strips on which to stroll.

By considering these different factors, many researchers have categorised UGSs into a hierarchical system that spans from city or regional parks, district parks, local parks, neighbourhood parks, pocket parks, amenity parks and other green spaces. The generally accepted categories are listed below:

City green spaces; widely recognised in the literature as generally larger in size and offering a wide range of activates and facilities.

District parks; Offer number of activities and facilities, and a location for community events. Generally attract visitors from across the neighbourhood and city.

Local Green Spaces; Generally smaller than city green space and less than two hectares in size. Mainly serve the local population with fewer activities.

Neighbourhood parks; They are one of the basic units of UGS hierarchy. They offer active and passive recreation such as children's play area, social interaction or relaxation (Bengochea-Morancho, 2003) for the neighbourhood population. Miller (1997) described that

vegetation in neighbourhood parks increases the aesthetic value by offering attractive and diverse elements to soften the urban building structure.

Pocket park; fairly small and situated within or surrounded by other urban structures. From the ecological perspective, pocket parks also create a diversity of wild habitats, for example small pocket parks in central London have reported with high biodiversity (Johnston, 1990).

Amenity parks; Similar characteristics as neighbourhood and pocket parks. Usually adjacent or connected to residential community and mainly used by the immediate local community.

Other Urban Green Space; This category includes any patch of green in an urban areas (other than listed above). Namely formal sports-grounds, informal play pitches, school-grounds, cemeteries, allotments, civic spaces and so forth.

3.4.6. Geographical Information Systems

Geographical Information Systems (GIS) are powerful tools that can be used to provide important figures such as green space ratio, and be used to monitor the land use pattern and changes in greenery in urban areas. Faryadi et. al*.,* (2009) pointed out that there are many situations where GIS has incorporated data and information from the previous technologies such as aerial photographs. Together these systems can be used to evaluate, manage and monitor the progress of UGSs in a local or a global context. Studies such as Ruangrit et. al*.,* (2004) identified how technologies like remote sensing images together with GIS are vital for future development and management of UGS in 21st century.

Green space ratio and distance to nearest UGS are the useful indicators to see to how much accessible green is available for the local community. The literature shows that different countries and even major cities around the world have different recommendations as the ideal green ratio for an urban population. For instance in the UK a recommendation by the Urban

Green Spaces Task Force (2002) was that ‘a person shall live no more than 300m from their nearest areas of natural green space of at least 2ha in size’.

3.4.7. What is an ideal strategy for urban green space?

According to CABE, UK (2006), “a green space strategy is a very comprehensive document that sets out an authority’s vision for using its green space and the goals it wants to achieve, plus the resources, methods and time needed to meet these goals. Furthermore it may include more detailed strategies, such as tree strategies and sport strategies, which will feed into the green space strategy”. CABE UK (2006) also states that the main elements of a ‘good strategy’ are to “establish an action plan that sets out design, strategic links between networks of green spaces, management and maintenance principles, and an implementation of program that includes monitoring and review procedures”.

As commonly stated in the literature, the primary requirement is that the UGS strategy should be practical and deliverable (CABE, 2004). To enable this, various elements need to be in place, including an understanding of the regional circumstances such as population growth, social demographical issues with landscape character, ecological needs, heritage, recreation, education and economical aspects such as employments so forth. For example, Southampton Council, UK (2004), suggested that fundamentals for ‘Good Strategy’ are:

- While developing a shared vision, need to generate political and inter-departmental support for UGSs in full capacity.
- Creation of a policy framework for protecting and developing UGSs.
- Meeting community and corporate aims and objectives as well as allocate resources to maximise the values of investments also important.
- Ecologically need to insure that UGSs fulfil local environmental needs while promoting community involvement, civic pride and social inclusion.

The next section of this chapter will review the three main aspects (Social, Environmental and Political) of Urban Green Spaces in a global context, with more focus on three example countries from South and East Asia; Singapore, Hong Kong and India. In terms of UGSs, the opportunities, problems and issues they have, how authorities have dealt with them in past, current situation and proposed future plans will all be examined.

3.5. EXAMPLES FROM SOUTH AND EAST ASIA

3.5.1. UGSs in Asia: an introduction

Currently Asian cities are the most rapidly growing regions of the world and 16 of the world's 24 mega cities (cities with more than 10 million people) will be located in Asia by end of the year 2015 (United Nation Population Division 2007). This rapid population growth concentrated in the city areas allows unique opportunities to study the long-term effects of and attempts at the introduction or furthering of Urban Green Spaces. City expansion and urban growth is most obvious in countries like Singapore, China and India, which have experienced unprecedented economic prosperity in recent years. Urbanisation in these countries, as in other parts of South and South-east Asia, develops quite differently to some of its Western counterparts (Murakami et al., 2005). The most obvious differences are that much of the growth in many Asian cities has been so rapid that it has been largely unplanned (Taubenböck et al., 2009).

There has been minimal success creating Urban Green Spaces in developing countries and they are particularly difficult to sustain, however the social demand for these spaces has begun to increase (Choumert et.al., 2008). In these rapidly growing Asian cities compared to non-urban areas this is particularly difficult due to lack of available space, suitable location and accessibility for all section of society. This is particularly true in areas of India where

there are many pockets of dense population which appeared rapidly and less existing green spaces in comparison to similar European and Asian cities (Kuchelmeister, 1998). The following examples highlight the huge variance in the successes of Urban Green Spaces in three different locations in Asia and the reasons for those variances.

3.5.2. Singapore

As a 'city-state', Singapore needs to provide both the diverse land functions of a city such as residential, commercial, recreation facilities, with elements of a state such as nature reserves and heavy industry, while protecting its water catchment areas and other key land services. Like Sri Lanka, Singapore is also an island, so land availability is strictly limited. Recognising these limits, Singapore started, its active urban greening programs since the beginning of city developmental projects with a special focus on creating a greener environment in the city.

Politically as well as geographically since the independency (1965), Singapore went through a massive transformation that in many ways parallels the changes in Colombo. As Hassan (1969) described, Singapore was transformed from a post-colonial harbour city, which was surrounded by an overcrowded population and housing with many social issues, to a cosmopolitan global city-state with sustainable green spaces, good public housing and transportation and thriving industry. Nowadays Singapore is referred to as not only a positive example of a country with a compact, but also a highly developed city-state in the South-Asian region. These desirable traits include a well-developed transportation network, a public housing programme and a port that is one of the busiest in the world (Tana, Wang and Sia 2013).

According to Yuen (1996), Singapore in the early 1960s had one of the largest slum areas in South Asia. In the years prior to its independence there was a significant rise in the population

numbers combined with a fall in the quality of the infrastructure and general living conditions, which led to the existence of what are commonly called slums. The slums and problems associated with them such as overcrowding, poor sanitation, and social integration issues meant that the creation of urban green spaces was not as highly prioritised as the need for housing and better infrastructure to support the rapidly growing population. This changed somewhat in the 1970s to 1980s, when new township were developed, designed to prevent the existence of further slums. These incorporated open spaces, through a hierarchy system of parks such as zone gardens, neighbourhood parks and town parks, which were systematically planned for and introduced as integral spaces (Yuen, 1996). Roadside greenery was created directly in proportion to the creation of new roadways. Public park areas continued to increase over the past decade, and took up about 3.2% of Singapore's land area in 2010 (National Parks Board Singapore, 2011). Managed UGS accounts for approximately half of all existing green spaces in Singapore, the remainder being natural green spaces, for example forest and mangrove areas. The total percentage of green space in Singapore, including forest and mangrove, is very high, at 56% (Berland, 2012).

Both the population number and the density of this population in Singapore have experienced dramatic increases from the early 1900s to the present day. For instance, between 1970 and 2011, population density more than doubled (Department of Statistic Singapore, 2012). This increasing population density directly affects the ratio of green space per person in the city. Despite a high percentage of green space per land area, the green coverage per capita is much lower than in similar cities. In the year 2010, the park provision ratio (PPR), which is park area per 1000 residents, was 0.75 hectares per 1000 residents. This is a low to moderate level compared to other cities in the Asia-Pacific, North America and Europe (Tan et.al., 2012).

Singapore is commonly known as the ‘Garden City’ in various popular and scholarly literatures, for example in Yuen (1996), Warren (2012) and Kingsbury (2012). A garden city usually has an urban centre surrounded by multiple green spaces serving the multiple needs of the city; ideally a garden city would be self-sufficient due to the calculated balance of green space per person. In Singapore the ‘garden city’ effect is achieved without distinct borderlines between urban and rural areas (Yang and Matthews 2012).

Residents and visitors appreciate the importance of green areas in their surroundings according to a survey that was carried out to capture their opinions on their view of Singapore as a Garden City (Lui, 2012). Parks and greenery are considered to be one of the top five most important elements to the quality of life in Singapore. Moreover, according to the residents of Singapore, parks and greenery are ranked top as a feature that makes Singapore special among other countries around the globe (Urban Redevelopment Authority, 2010). A survey conducted by the Singapore government in 2007 indicates that Singapore residents show a high level of satisfaction (81%) with the overall provision of greenery in their environment (Ministry Of Finance, Singapore, 2010).

In Singapore, as with other major cities in the world, rapid population influx has led to demands for converting natural areas to public housing (Tana, Wang J. and Sia 2013). Deforestation removed the majority of Singapore’s natural forest and greenery. Much of it has been replaced with carefully planned urban green spaces. The two predominantly natural green areas that exist, the primary forest in the middle of the island and the open recreation area in the northeast of the island, are located in the northern part of the country. The southern part is the built up region, which has a greater concentration of residential and industrial areas. Therefore, the northern part of the country can be considered as a relatively non-urban area of the country. Because of their distance from urban centres, such large spaces would logically

have a lower level of direct-use values for recreation, but could serve important ecological functions for biodiversity conservation and as water catchment areas (Chua, 2012).

The rapid urbanisation and the disappearance of most of the primary rainforests in Singapore have modified the local climatic conditions. According to Tan (2012) one of the most well known effects is the urban heat island (which is a phenomenon in urban air temperatures are higher than the surrounding rural environment). Mobile surveys in Singapore found a maximum difference of 4.01 ºC between well-planted green areas and built environment (Wong 2002). Having a cooling effect from surrounding vegetation in a tropical country like Singapore plays a major role in quality of life of the citizens.

One of the ways in which natural green spaces have been replaced is through tree planting campaigns. The first tree planting campaign began in 1963 (Lee & Chua, 1992). According to Tan (2006), this first tree planting, by the Prime Minister, was an enormous success. Further Tan (2006), cited that the Prime Minister has emphasised “a careful tree planting campaign not only for the roadside and public places, but for all private land owners”. Ever since tree planting campaigns have taken place in Singapore on a regular basis and that huge success greatly contributes to the ‘Singapore Garden City Action Plan’ (Ministry of Environment & Water Resources-Singapore, 2002).

Tree planting is a good example of the long term planning aspect of green spaces. Trees take time, and usually decades to reach maturity when their full benefit can be appreciated and their contribution to a distinctive green ambience in Singapore felt.

In Singapore, green spaces have been created in different forms to serve different needs and planned with an element of innovation required in such a constricted land area. As well as tree cover and urban parks, greenery has been created in public and private areas, on the sides of existing buildings, on podiums and rooftops. Particular attention has been given to how

Singapore can maximise the space in its high-rise environment to create a ‘‘Vertical Garden City’’ through active greening of the vertical space, such as in the form of rooftop gardens, vertical green walls, and sky terraces (Tan, 2012). Although such green spaces continue to add to the overall greenery of Singapore they do not meet one of the key components of Urban Green Space, namely public accessibility. These rooftop and vertical spaces while visually appealing and unique are generally not places for the public. They are mainly designed for access of occupants of the buildings on which they appear. In addition, when considering having vertical gardening on the sides of buildings must be balanced with proper care and protection of the buildings and their history.

For Singapore to achieve a higher level of greenery throughout the island, recent research suggests that other than the greening of buildings, currently unused spaces offer opportunities to further expand the range of spaces suitable for recreational use. These spaces beyond traditional site boundaries could include those under road flyovers, and open spaces in educational and other public institutions (NParks –National Parks Board Singapore, 2011). The key is to find land that is accessible yet currently unused, a challenge in a small land area with high population. In addition, it is also critical that as Singapore looks to the future, that attention given to not just keeping it green, but also to making it more ecological in order to become a ‘Green City’ in the world with long term goals in mind. Greenery does not grow or flourish overnight and it can take many years for plants to achieve maturity and have their full desired effect on the surrounding area. This is something that managers in Singapore realised many years ago as the results can be seen today. Despite the fact that the majority of the natural rainforest in Singapore has disappeared, over time, careful planning for biodiversity in manufactured green spaces has allowed nature to maintain balance and have a positive impact on life in the city.

3.5.3. Hong Kong

The population of Hong Kong is approximately 7 million, however this population is concentrated into merely 21% of the total land area of 1104 km^2, which means Hong Kong has most densely cities in the world.(Census and Statistics Department Hong Kong, 2012). Hong Kong has a humid-subtropical climate characterised by heat and humidity in the summer with frequent rainstorms (May–August) and lower winter temperatures with little rain (November–February), and managed by the Asian Monsoon system. This provides good conditions for the creation of Urban Green Spaces (Lam, 2011).

According to City Planning Department Hong Kong (2012), since 1840s, urban development in Hong Kong has had to adapt to account for the lack of space and the high population density, this eventually led it to become by the beginning of the 1960's a city of exceptionally high skyscrapers (high-rise blocks) with most new residential buildings having over 30 stories and in some cases up to 60 stories. It is an extreme example of a congested and compact city with inadequate ground-level urban green spaces. The public urban green space provision in built-up areas stands at very low per capita, which is one of the lowest in the world for cities of a comparable size (Lo & Jim, 2012). Furthermore Jim (1998 and 2000) explained in his studies that, due to lack of available land Hong Kong had no choice but to follow very 'Compact Urban Foam' (intensified urban foam in high-density areas with mixed-used), which created too much constrains management and designing of UGSs. As results of that, UGSs got poor ecological quality and limited leisure and recreational facilities for the users. For an example tree planning has physical limitations due to shortage of land in cities.

Historically the city has struggled for many years with the battle to acquire usable urban land from the surrounding areas. As Jim (2004) found, around 40% of the land lying outside urban

areas has been designated as country parks as is traditional for the Garden City model. The protected areas provide a significant impact on the city, housing diverse species of plants and animals and contribute greatly to the aesthetic value and habitability of the city in general.

There is larger inner-city UGSs, such as ‘Hong Kong Park’. However, these are affected by poor public security and unhygienic conditions (Jim, 2004). When the UGS becomes a place where crime and homelessness occurs, any facilities suffer also and as a result some residents’ refrain from using them as they no longer provide an enjoyable experience. To combat this problem there has been more focus and importance put on smaller green spaces located closer to residential and work areas to promote easy access. Having access to local green spaces is one of cultural importance in the social life of the inhabitants. The authorities are searching and introducing new ways to provide green contacts to the local community. For instance some urban areas of mainland China encourage private gardening in public spaces, particularly where the venue and the neighbourhoods attract regular visitors (Jim, 2004).

As Lorenzo et al., (2000), stated, many case studies conducted in Hong Kong and mainland China show that the residents are willing to pay in order to be able to visit urban parks. Furthermore illustrated that the local community treats outdoor recreation in urban green spaces as an important leisure pursuit, and that they show willingness to pay to fulfil this need (Brunson and Reiter, 1996).

In many Chinese cities the government owns the land and any decisions regarding the UGS must adhere to the rules and legislations that exist. Specifically, the authority for Forestry and Urban Parks as a government unit is actually in charge of planning, management, design and funding of UGS. Although the government will often take advice from experts and professionals in the field of urban greening when making decisions, the ultimate final say is firmly in the hands of the government. Under this structure, little or only minimum public

participation is introduced. This is likely to lead to mismatches between resident demands and provision of UGSs (Jim and Chen, 2006).

Hong Kong uses geographic information systems (GIS), remote sensing and factor-analysis techniques, to study and analyse the landscape patterns of UGSs in Hong Kong (Jim and Chen, 2006). These high-tech computing methods greatly contribute to Hong Kong's current and future planning and maintenance of UGSs.

3.5.4. India

A flourishing economy with a high population rate combined with increased urbanisation, means that India has less green space compared to European and other Asian countries (Kuchelmeister, et al., 1993). During the last 50 years the population of India has grown two and a half times, however the urban population has grown nearly five times (Taubenböck, 2009).

In particular, since the 1991 post-economic reform era, the Indian urban landscape has faced substantial changes such as extreme urbanisation and rapid population growth. For example in some areas the population has doubled or tripled over the past decade, which puts the existing infrastructure under immense pressure. This is seen through inadequate traffic corridors and rapid unplanned expansion of urban areas. As well as expanding outwards, the space within cities has become more in demand for housing and industrial buildings. As land use intensifies, many Indian cities such as Delhi have experienced large-scale destruction of thousands of street trees, and the clearing of a variety of green areas to make way for buildings, industries and other infrastructure projects (Nagendra and Gopal, 2010). This threatens biodiversity especially in urban and peri-urban areas, as well as bringing complex changes to the ecology, economy and society (DeFries and Pandey, 2010). This is a relatively recent occurrence in India, where the process of urbanisation only begun to take off at the beginning of the industrial revolution and globalisation in the 1970s (Nagendra et al., 2012).

According to a study by Kumar and Nair (2004), the condition of the urban environment in India is undergoing such intense deterioration that the cities may cease to be sustainable. There are unauthorised and unplanned developments in practically all major cities and towns and the resulting strain on the current system is a devastating situation of environmental chaos.

Delhi, the capital city of India is the fastest growing metro city with an approximate population of over 17 million (Census of India, 2011). The city is located on the banks of Yamuna River. There many unauthorised colonies in the east of Delhi often referred to as slums. These arose as a direct result of a high number of immigrants who arrived after India gained its independence. These unauthorised areas are extremely compact and access is by extremely narrow pathways where it is difficult even for small cars to enter.

The rapid growth of Delhi in past decades, as with other cities in India, has resulted in a significant decrease in the quality of the environment. This is mainly due to unplanned expansion on open vacant green areas, where excellent environmental conditions have been replaced by poorer ones.

Bangalore, a fast growing city in southern India, and has experienced major destruction of greenery in recent years, due to city expansion. Embodying concepts of both “high-tech” and “green”, once the garden city of India, Bangalore, traces its history as far back as 900 AD (Sudhira, Ramachandra and Subrahmanya 2007). The city has a welcoming climate, and was once well known for having a large number of open spaces including two historic parks and botanical gardens, and a number of wetlands and water bodies (Nagendra, 2010; Nair, 2005; Sudhira, Ramachandra and Subrahmanya 2007). The city was famous for its tree-lined avenues, but these have become increasingly under threat, with large sections of vegetation having been cleared in recent years for road widening despite numerous protests by local citizens (Nair, 2005; Sudhira, Ramachandra and Subrahmanya 2007).

Satellite images of Bangalore, show extensive changes in greenery coverage in Bangalore between 2000 and 2007. Nagendra et al., (2012) explain that the core of the city is not suffering as much from this destruction as land prices are high and there are a large number of public institutions but even this is beginning to change. Taubenböck et al., (2009) also believe this according to a study that was done in multiple Indian cities, and have suggested that the pattern in Bangalore is moving from a formerly centralised-growth pattern to a growth pattern that stems from multiple areas further out from the centre of the city. These new points are experiencing rapid urbanisation, clearing of vegetation and fragmentation. Moreover it can be seen that although green areas are being created and maintained outside the central city limits (as is traditional for a Garden City), it appears to have no long-term goal and has focused on fast growing water-demanding plant species.

According to Nagendra (2012) still, certain cites in India have relatively high percentages of urban greenery. For instance Nagpur is one of the greenest cities in India with 18 per cent of its area under forests and plantations and 17 per cent under cultivation.

Kumar and Nair (2004) conclude from their findings, “that the urban growth in India is also much less directed by state policies or colonial legacies than for many other parts of the world, and as a result growth appears to be random. This is particularly true in those newer areas of settlement at the edges of the main cities and communities. Yet, even within Indian cities, there can be significant differences in the new extensions planned at the periphery, which tend to have more open space and vegetated areas, as compared to the densely built inner city areas that tend to be more congested”.

Over the last few decades, cities like Delhi have undergone impressive development of the public’s awareness of environmental issues and planning, and the ability of individuals, groups and communities to influence urban planning. Growth and expansion is monitored

where possible using satellite imagery. Remote sensing data and GIS techniques are very useful for extraction of information in built-up areas, open green spaces, urban land use and mapping which is an important attribute for assessing the urban environmental quality for a large urban collection.

3.5.5. Parallels from the examples from South and East Asia

As mentioned above the countries in this study and Colombo Sri Lanka, have similar issues, limitations and barriers to becoming a 'Haritha (Green) City'. These include geographical and environmental barriers such as high humidity, urban heat islands, lack of land; social barriers such as coping with increasing population, unplanned city expansions and how to enhance the well being and quality of life of the community; and political limitations in terms of decision making, planning and designing issues such as suitable locations for all, amenities to accommodate for all together with management, maintenance and financial problems.

Singapore and Colombo Sri Lanka are islands with similar environmental situations, as well as characteristics of former colonial habour cities with similar historical backgrounds. However, UGSs in Singapore are in a much better status than those of Colombo. The way Singapore has handled the situation is very impressive, as they knew their limitations, and planned many development projects in other sectors, systematically integrating with urban green space planning. Most of the programmes are long term and have already shown very high satisfaction rates in environmental, social and political aspects of UGSs. As an example of active urban greening programmes; large scale tree planting in every possible opportunity has effectively replaced the amount of green destroyed during other infrastructural developments. At same time they have introduced integral spaces within other development projects. Urban forest programs on the northern part of the island focus on more biodiversity

and ecological qualities, while UGSs in south part of the island pay more attention towards social and recreational aspect of UGSs.

The government encourages both public and private UGSs. Private green spaces although not accessible to all (for example, roof gardens on private housing that only allow access for residents of the building), still greatly contribute towards urban green fabric.

As with Colombo, Singapore has no virgin land available to build traditional parks and gardens. However, they find alternative places such as vertical greening, greening on road flyovers and educational and institutions grounds. Furthermore UGSs designs are very well balanced. While fulfilling current social demands they are laying the foundation for 'Eco and sustainable city' concepts in future.

Hong Kong, as a comparison, is also very crowded. The city follows a more compact urban form. Heavy usage of hi-tech methods and Geographic Information Systems has brought more advantages, for example, control and analysis of landscape patterns, regular management and maintenance of UGSs as well as for future planning of UGSs. Adapting such technologies may be very beneficial for Colombo too.

The lessons that could be learnt from parallels with India include living example of long-lasting bad consequences of large-scale destruction of mature trees. This happened when focusing on other infrastructural developments and caused complex ecological issues. Also it is important to control and find solutions for unplanned settlements on allocated land for city greening. The 'City environmental awareness programmes' (ex. in Delhi) are very useful to bring the attention of importance of UGSs among the urban community.

As discussed above where those countries have managed to overcome and deal effectively (most of the time) with their issues with UGSs, there is relevance to the Colombo context too.

Colombo could apply similar approaches and Good Practices found and discussed here, through part of action plans in the main ‘Urban Space Strategy for Colombo’, which will be presented in the Conclusion (Chapter 8).

Chapter 4: Methodology

CHAPTER CONTENTS

4.1. OVERVIEW

In this chapter research design, the instruments employed and their rationale will be described. Details concerning preparation of survey instruments, selection of survey sites, sampling, data collection and survey implementations will be explored. The remaining sections will briefly consider the data analysis, ethical concerns and research limitations respectively.

As Chapter 1 described, the hypothesis is "there is a unique set of cultural, geographical, ecological and political circumstances in city of Colombo that could enable it to become the leading "Greener City" in South Asia, but there are gaps in the current planning system that are preventing that aim from being realised". Therefore the aim of this research is to identify the gaps in all aspects (Environmental, Social and Political) of UGSs in Colombo.

In order to progress with the aim, the following research questions were generated:

- What are the characteristics and circumstances in City of Colombo that make it unique and suitable to become a leading Greener/Haritha City in South Asia?
- What are the Social, Cultural, Geological, Ecological and Political factors that relate to how people use UGSs?
- What are the benefits of UGSs for community in Colombo?
- What are the current barriers to City of Colombo meeting the aspiration to become the leading Greener/ Haritha City in South Asia?
- What steps could be taken in order to close the gaps in City of Colombo to meet that aspiration?

For testing the hypothesis and obtaining the answers to the research questions, the objectives in research were: (i) to consolidate experience and best practices from UGSs research worldwide; (ii) to conduct a primary social, environmental and political research into the

current use of UGSs in City of Colombo; (iii) to combine these three aspects of research to suggest a new direction for urban planning in City of Colombo.

The chosen research instruments had questions/discussions in all three aspects of the subject areas, however in Chapters 5, 6 and 7 (where data analysis and results are presented), only relevant parts of field data are analysed, discussed and concluded. In Chapter 8 all results and conclusions are brought together.

4.2. RESEARCH DESIGN

4.2.1. Design overview

Urban Green Spaces and the interactions that people have with them are very complex. The difficulties in defining and measuring the contribution of Urban Green Spaces (UGS) were highlighted by Burgess, Harrison and Limb (1988), who suggested that conventional methods of social survey based on questionnaires are inadequate for exploring the values and emotions of UGS users, while observational research methods fail to establish what people think or feel about such environments. It cannot be assumed that to obtain an insight by just the general public who are visiting the parks. A wide variety of personal, organizational and environmental circumstances can either facilitate or hinder the outcome. Kaczynski and Henderson (2007) explained that qualitative methods could complement quantitative findings and provide unique contributions to our understanding of the influence urban parks have on physical activity and behaviour. Notably, it is vital to investigate in the Colombo context the dynamics of user characteristics, the park characteristics, as well as the physical, cultural, social, and political environment in which these interactions occur. These are often overlooked in quantitative research methods. The blend of qualitative (observation, interviews and focus group discussions) and quantitative (questionnaire survey) research

methods is used here with the aim of providing a holistic understanding of a complex and dynamic situation.

As explained above, in order to fully understand the usage of UGSs in Colombo, a range of methods were used. Four sites were selected with different visitor profiles, landscape qualities and amenities, to represent the range of UGS experiences in the city. At each of these sites, visitor questionnaires were conducted. Prior to these site surveys, observations of visitor type and behaviour had been conducted at various UGS sites. Focus groups were used to shape the questionnaire and further inform understanding of user perspectives of UGSs. GIS, maps and aerial photographs were used to get extra understanding of UGS geography in Colombo. In-depth interviews with key personnel were conducted to gain an insight into the professional management issues and policies that shape these green spaces.

For this research also, as Bell et al. (2004) mentioned, “the use of focus groups yielded good qualitative data, which also provided a valuable secondary function of directing the development of a questionnaire to be used for the structured interviews”. The second phase used a questionnaire as part of the structured, on-site interviews. Responses from the questions from the questionnaire were coded to facilitate data analysis. The Public Questionnaire is in appendix A.

Opinions were sought from a wide diversity of people, from different cultural and social classes, different user groups of UGSs, and professional managers of UGSs. All four methods, sumarised in Table 4.1, provided extensive data and information covering all key aspects of the urban green spaces in city of Colombo.

Research Method	People involved	Locations	Type of data collected	Total numbers
Direct observation	General public – park visitors	1. Viharamahadevi Park 2.An elite members-only sports club 3. Independence Square	Qualitative (behaviour patterns, types of people using parks)	N/a
Focus groups	1.Sports club members 2.Voluntary environmental group 3.Expatriate community	1.A clubhouse of a cricket club 2. Cafe 3.Pub frequented by expatriates	Qualitative (opinions and insight)	16
Questionnaire survey	General public – park visitors	1. Galle Face Green 2. Viharamahadevi Park 3. Independence Square 4. Crow Island	Quantitative (counts, Likert scale scores), qualitative (opinions and feelings)	295
In-depth interviews with key personnel	Current and retired staff of academic and managerial institutions related to Colombo UGSs	Various (offices and homes)	Qualitative (opinions and insight)	12 people (of 20 requested)

Table 4.1 Summary of research methods used.

4.2.2. Observation

Intention for Observation exercise

Direct observation was used as a method in this research to collect high quality data in a small-scale social setting. This data was needed to form decisions on survey site selection, and to enhance understanding of the users and activities in UGSs.

Approach

Observation took place on three sunny (temperature between 26-31^{o}C) days, in Sept and Oct 2011. Each observation site had two sessions one on a weekday morning (9.30-12.30am) and on a weekend afternoon (3.00-6.00pm).

During each observation the researcher was able to gather multiple perspectives in a natural setting. An observational checklist was used to record the estimated age and gender of users, activity performed, whom the user was with, and total time spent at the park (The observation check-list in Appendix D). During each observation, notes were taken, maps jotted and diagrams were drawn up and photographs taken. Although data was collected, by closely watching and listening to each individual situation, the researcher did not participate or become involved in any of the activities observed. The first observational study was undertaken by the author in the Viharamahadevi (Victoria) park, the second site was, a privately owned sports ground, and the third was at a newly reconstructed green area of Independence Square.

Discussion of observation method and issues

The three sites for observation were chosen to provide a variety of geographical locations with three different landscapes within the city of Colombo. They were also chosen to help the researcher become familiar with the variety of activities and the diversity of events happening in the parks, as well as the type of people visiting.

The sports ground presented an interesting perspective. Up until recently (2012), (‘recent history’ in Chapter 2) all these private grounds were fully blocked from access to the general public (both actively and passively), therefore the community who are not members had no idea what is going on behind the concrete walls or fences.

Independence Square was selected because of the lack of boundaries or fences (in contrast to the second site) and its central location. Direct observation was used as the first data collection method in this research. As the very first method of data collection 'observation' provided an overview and insights into how to choose other data collection methods, when and where.

It was difficult but essential, to carefully watch how visitors expressed themselves their social information, feelings, and attitudes and to capture that atmosphere, using nonverbal communication. Sometimes apart from ordinary events the researcher identified a few additional unusual occurrences such as a dog attack and a few young Muslim women were insulted by a couple of youths etc.

This observation exercise was very valuable in directing the development of a questionnaire.

4.2.3. Public questionnaire surveys

Intention for public questionnaire survey

The questionnaire was developed to investigate public perception and attitudes towards urban green spaces. The survey also aimed to gather more information about the complex research issues; to obtain data regarding public opinions on what the expectations are from UGSs in terms of design, facilities, management, maintenance and how the public would like to be involved with UGSs.

In the process of designing the survey questionnaire the following outcomes were expected:

- A reliable indicator of the different categories of users of urban green spaces (age, gender and ethic group) and how they use the range and types of such urban green

spaces, especially children and young people, the elderly, the disabled and people from an ethnic minority background.

- To determine the frequency and extent of use of urban green spaces and how this varies depending on the different types of users, different social classes in Colombo society and different geographical locations in the city.

- How the Colombo community understands the range and nature of activity in urban green spaces, and the facilities offered and to investigate what users want from urban green spaces and the extent to which the spaces meet these expectations.

- To examine how and to what extent parks and urban green spaces contribute to enhancing the quality and performance of urban environments in terms of their social, economic and environmental benefits.

- Identification of the barriers, which deter different groups of people from using urban green spaces and play areas and to identify the key factors that would encourage greater use.

Approach

The survey was conducted with the assistance of six local university students. These research assistants who were hired on a temporary basis were carefully selected from the landscape architecture department of the local university. They were given a brief introduction and training on how to conduct the survey efficiently and effectively but without influencing the answers. Attention was paid in hiring of research assistants who were fluent in two out of three official languages in Sri Lanka (Sinhala or Tamil and English).

The questionnaire was developed using information gained from research material and the observational study. A pilot test of the public survey was conducted using interviews with 11 people. These were conducted by the researcher, the assisting students, and five Colombo expatriate community members. Feedback from these pilot surveys informed modifications to the final survey design. It highlighted questions which were vague, or that contained emotion and bias. As a result, wording of a few ambiguous questions were changed. As an example, an extra comment (open ended) query was added for question C7 (appendix A).

4.2.3.1. Questionnaire design

The questionnaire had three main sections, which contained all of the pre-coded/ close-ended, open-ended and scale-formatted questions where they were appropriate. Open-ended questions provided an opportunity for the visitor to make individual comments regarding each aspect of UGSs.

The length of the questionnaire was three and half, A4 size pages. The three main parts (A, B and C) was structured according to three overall themes: (1) the demographical data of the visitor, (2) access and motives (3) perceptions, preferences and attitudes towards UGSs.

The duration of the interviews was between 12-16 minutes. This included a brief introduction to the research too.

As well as verbal questions, the researcher used one set of photos in order to find out the public's preference over formal, informal or mixed planting in urban green areas. Each of these styles was represented by a photograph to aid the understanding of the interviewees.

Implementation of the public survey

Fieldwork was carried out in public parks and green spaces in the city of Colombo during the second half of 2011, in four Colombo public parks described in section

The surveys were conducted on one weekday and on one weekend afternoon, in October to December 2011 and February to March 2012. Children appeared to be under age of 12 were excluded from participation. The interviews were conducted in a relatively quiet place at a distance from other visitors. Each interviewer was instructed to begin each interview by asking the responder their language preferences.

Verbal informed consent was obtained from the participant before the administration of the questionnaire. A standard process was followed by all interviewers to confirm consent. This included; introducing the author, the subject of the study, the purpose and who would be benefiting from this study, an idea about the time commitment for each questionnaire and information regarding confidentiality (i.e. no need for respondent's identity).

Sampling strategy

The 'simple random' sampling strategy was used. Therefore samples were randomly selected among the users of the selected sites, on a 'next available person' basis. During the interviewing process, the six research assistants were widely dispersed across the site.

Data handling

The data from survey questionnaires were coded into SPSS software for descriptive statistical analysis, e.g. the cross tabulation and correlation analysis. PCA analysis (Jolliffe, 2002) was carried out on the data to search for correlations between different factors.

Discussion of survey method and issues

Data obtained from quantitative surveys can be used to explore aspects of a situation, to seek explanation, or to provide data for testing hypotheses by answering to many issues at one time. Many environmental research studies have used questionnaire surveys to find out what goes on in people's mind in terms of how they feel about a particular environment they use. If data

and opinions vary widely, large sample sizes are needed for effective surveys to test many variables and multiple hypotheses.

Face-to-face interviews were the preferred method. In order to achieve a high quantity of data, postal or self-completion, and telephone surveys were not employed as these have been shown to have a very poor response rate (Futrell and Lamb 1981).

Using photographs to describe the actual landscape setup (photo–questionnaires) are widely used in landscape research. However, Scott, Carter and Brown (2009) , suggested that use of photo-questionnaires in landscape perception and preference studies are debatable as they are unlikely assess the respondents' actual experiences made in real places. He has further explained, that perceptions and preferences expressed on the basis of two-dimensional photos are different from the experience they get in real places; for example photographs cannot transfer the sounds and smells of the real landscape setting. In this particular study the researcher had to use one set of photos in order to find out the public's preference over formal, informal or mixed planting in urban green areas. This was because the four selected sites did not contain all three different types of landscape settings. The use of photographs in this exceptional situation can be justified, as the researcher's intention was just to give a same visual description of the three different types of landscape style in order to get more valid data.

Sample strategy and size issues

Determination of an adequate sample size is important in order to minimise any sample errors. Having considered the objectives of this study, and information gathered for the literature review, the sample size was decided as 400 in total (100 per park). However due to many reasons such as incomplete questionnaires or some sort of interruption during the interviews, only 295 questionnaires were used in data analysis. This total is broken down for each park in Table 4.2 below.

Achieving a representative sample from the targeted population is important in social research. However perfect representative samples are very rare (Bryman and Cramer, 2011). Conducting research at both a weekend and a weekday, and using a random 'next available person' strategy for this public questionnaire survey helped to minimise any bias that might occur.

An equal representation of users for each park was difficult to achieve because of the low visitor numbers at Crow Island. As a result, only 17% of completed surveys were from that site (Table 4.2).

Site	Surveys completed	Percentage of total
1. Galle Face Green	78	26%
2. Viharamahadevi Park	82	28%
3. Independence Square	85	29%
4. Crow Island	50	17%
Totals:	**295**	**100%**

Table 4.2 Number of questionnaires completed for each site.

Questionnaire design considerations

The design of the research questionnaire involves the incorporation of many factors such as the type of questions, wording and conceptual framework of the research (Veal, 1997). When there is an ambiguous meaning, the researcher cannot be certain of the respondent's intention. Neuman (2000) suggested that avoiding leading questions and avoiding questions that are beyond respondents' capabilities are also important in designing a questionnaire. Recent literature emphasised that there has been a long debate about open versus closed questions in research surveys. Each type of question has advantages as well as disadvantages. Taking into

account the difficulties above, the nature of the research question posed in this study is (to discover the 'best' model for urban green spaces in the city of Colombo) allowed for a balance of both closed and open questions.

As there are three official languages in Sri Lanka, care had to be taken to avoid misinterpretation that could alter the understanding of the issues involved between different cultural groups. As only research assistants who were fluent in two languages were chosen, this omitted the negative aspect of this study. This minimized the confusion in understanding the context of the questions. Also, almost all Tamil and Muslim communities living in the city of Colombo are fluent in both Sinhala and the English language. However, each interviewer was instructed to begin each interview by asking the responder their language preferences. This indirectly allowed the researchers to understand the cultural and social background of the responder and helped in avoiding some possible ethical or data collection bias issues that could have occurred during the survey.

Implementation issues

The four different locations successfully capture a wide range of respondents. The responders to the questionnaire-survey represented demographically, socially and culturally different sections of Colombo society. Only a very small percentage (approximately less than 5%) of those approached refused to participate in the survey.

The survey assistants were carefully selected. The selection criteria was fluency in two or more official languages in Sri Lanka, a combination of good field survey skills; i.e. strong social skills, including ability to listen, and quickly absorb details, with sensitivity, patience and empathy (Neuman, 2000). This was important, as the social setting of the interview environment was likely to affect the answers. Although, many questions were posed in multiple answers or in scale format, most of the questions had an additional section that

allowed for comment on the questions just answered in order to obtain further insight into the responder's thoughts. The questionnaire was administered orally to all respondents, but on some occasions the respondents were keen to read the questions by themselves.

Data handling issues

PCA analysis: The nature of the data (non-normally distributed, scalar or nominative), and the complexity of the chart resulting from this analysis meant that no useful results could be interpreted using this method.

4.2.4. In-depth interviews with key personnel

Intention for in-depth interviews

The main objectives of the in-depth interviews were to identify the current practices and ideas among the professionals and to gain direction for the research.

The primary goal of in-depth interviews was to explore the opinions and perceptions held by these professionals (the key personnel from the relevant authorities). This could then be compared to those of the public and to form a picture of how this small group people who are professionally working in the field understand concepts of nature and its value, the terms they use and the definitions they apply to urban green spaces in the city of Colombo. This process aims to help to identify and evaluate the range of innovative models that are being developed or could be developed for creating, managing and maintaining urban green spaces in the city of Colombo. A secondary purpose was to identify any significant issues that could be used as a starting point for discussions that will take place in focus groups as the next stage of the research.

Approach

For this study, the stratified sampling method was adapted to select key personnel for in-depth interviews. Interviewees were equally selected from the different sectors such as landscape architecture, city planning and design, mangers and politicians. All interviews were conducted by the researcher, between October 2011 and April 2012. A total of 20 key professional people from both academic and practical fields were identified. Out of these 20, twelve were available for an interview. They are detailed in Table 4.3.

A complete list of the interview questions can be found in appendix: B

The first phase of the in depth interviews were with key personal from the landscape division of the Urban Development Authority Sri Lanka. The second interviews were held with government and non-government agencies working in the field of nature in the city of Colombo.

The meeting began with a brief introduction to the research and the aims of the proposed study. Among the interviewees who agreed to take part were the heads of related authorities, decision makers, projects planners and designers. The areas explored included the landscape policies, theories and practices currently applied by the city of Colombo as well as issues on planning, designing, financing, maintaining and dealing with bureaucracy, what could be the appropriate definition for UGS in a Sri Lankan context, and professionals' perceptions, attitudes and behaviour towards UGS.

A total of twenty-six questions were used, all were open-ended questions. The questions posed used descriptive language and were structured with contrasting elements. Questions were presented in both Sinhala (the primary language in Sri Lanka) and in English. The researcher attempted to mould the communication pattern as a semi-informal conversation but

within the structured framework imposed by the questions and details offered. Interviews took place in respondents' own offices, and in some cases their private homes.

Notably all interviewees were assured that the information gathered from the interviews would be treated confidentially and anonymously, and that the results would be used for the purpose of this study only.

Discussion of in-depth interview method and issues

Interviews may offer several advantages over other data collection techniques. An interview offers the possibility of modifying the line of enquiry and the opportunity to follow up interesting responses, and allows for the investigation of underlying motives (Robson 2002). Additionally, personal interviews allow individuals' responses to be explored and probed in depth, and thus provide a more complete understanding of a respondent's characteristics. However, they involve significant time and effort in both data collection and data analysis. Choosing the most appropriate methods often requires a compromise. While in-depth interviews are limited to small sample sizes and relatively few research questions, longer interviews are possible, but they are time consuming and costly. In-depth interviews encourage more informative answers, which is essential in preliminary fieldwork.

Stratified sampling divides the population into strata, draws a random sample from each subpopulation and produces samples that are more representative of the population, and it could therefore deliver more accurate results. However there were limitations to this approach, as eight of the 20 people approached were not able or willing to be interviewed. A large proportion of respondents who refuse to participate can skew the data away from a representative sample.

Interviewee	Role	Organisation	Nature of responses
1 & 2	Director/ Manager	Urban Development Authority (UDA)	Less insight, but up-to-date fact and figures
3, 4 & 5	Former Director / Manager	UDA	Detailed insight, info & past projects
6 & 7	Senior Landscape Architect	UDA	Proposed or on-going designs and plans
8	Junior Landscape Architect	UDA	Proposed or on-going designs and plans
9	Section head: open spaces	Colombo Municipal Council	Current projects taking place in Colombo
10 & 11	Landscape Project Officers	Colombo Municipal Council	Current projects talking place in Colombo
12	Environmental Officer	Central Environmental Authority	Environmental and ecological aspects for Colombo

Table 4.3 Role and affiliation of interviewees

Note: Information provided is limited due to the confidential nature of the interviews (see section 4.4)

Interviews took place in respondents' own offices, and in some cases their private homes. This allowed them be more comfortable and removed the expectations of being in a serious formal interview scenario. A personal and friendly approach had the added bonus of encouraging interviewees to offer more information, extra relevant materials and useful contacts in the subject area. The interviews were seen as an ordinary conversation but it was still 'a conversation with purpose' (Kahn and Cannell, 1957).

Due to the politically sensitive nature of the topic, interviewees were not always comfortable in responding, even with assurances of anonymity. In a few cases some of them completely refused to answer the questions and in most cases the researcher had to offer extra reassurance

over concerns about risks to their professional role. In their reluctance to respond the researcher identified concerns that politically sensitive information might be revealed. As well as the fear of exposure, some respondents also stated that they had nothing to gain by assisting with the research. Therefore the interviews had to be conducted with diplomacy and sensitivity, as well as discretion.

Fewer concerns were raised during interviews with retired or ex-officials. These respondents were able to offer more personal opinions and were much more willing to participate. Most of the project reports completed by the relevant authorities were not available for public or any academic purpose, but were privately held by individuals. Sourcing this information using standard formal channels were not always possible. Therefore the researcher had to build rapport and strong interpersonal networks before staffs were willing to share documents and other information. While these issues made it difficult to follow a formal ethical procedure, the research was always conducted with full respect towards the participants.

Although the intention was to follow a formal structure, interviews were difficult to conduct, with many participants unwilling to answer direct questions or to provide information. All requested anonymity. Much of their discomfort was due to the politically sensitive nature of the topic at this current time. Insights and information that were revealed are detailed below under appropriate headings.

4.2.5. Focus group

Intention for Focus groups

In this study three focus groups (4-6 members in each group) were interviewed in order to gather data about urban green spaces in the city of Colombo in different dimensions.

Approach

Interviews were conducted in a semi-structured informal manner. There were no fixed questions but a number of topics were raised that had been identified from the relevant literature. The topic discussed included:

- What is the definition of nature in the view of the Sri Lankan, particularly in Colombo?
- What role does nature play for social wellbeing and inclusion?
- What does nature contribute to the quality of life?
- Their attitudes towards the environment.
- Their knowledge and perception of the urban green spaces in the city of Colombo and in general.
- The motives, and barriers people face in using UGS in city of Colombo.

One of the groups comprised of general members of one of the prestigious sport clubs. The second group was a voluntary national environmental group; mainly based in the city of Colombo, with members scattered around the country. The last group was made up of members from the expatriate community living in Colombo.

On average, each discussion took about one and half hours. Focus groups were conducted on weekend evenings in a café, a club house that belongs to the sports club and in a pub which is a former British colonial pub mainly used by the expatriate community. Times and venues were decided, based on what convenient and comfortable for the participants. Snacks and non-alcoholic beverages were provided. Potential participants received an email two weeks before the focus group, followed up by a reminder telephone call the day before the meetings.

As a warm-up exercise, participants were given a map of the Colombo municipal council area indicating all green spaces, which helped to familiarise them with the area under discussion.

Participants introduced themselves, and told the group how long they had been living in the city of Colombo, what they do for a living, and the types of recreational activities they enjoy in their spare time.

The discussions were conducted in a mixture of Sinhala and the English language. Participants' comments were recorded in written form. To protect their anonymity, the discussions were not tape-recorded and all participants' names were changed to identification codes.

Discussion of focus group method and issues

As all the responders were involved on a voluntary basis, it was important to keep the atmosphere relaxed and friendly. The researcher felt that this approach would encourage a more open expression of participants' true perceptions toward UGSs in the city of Colombo.

4.2.6. GIS maps, photographs, standard survey maps other artefacts

Intention for usage of GIS maps, photographs, standard survey maps other artefacts

To find a comprehensive maps, photographs and documents to cover history of UGSs in Colombo, and to reveal changes and details in management.

Method and Institutions visited

In addition to the methods used above, visiting the following institutes and organisations allowed exploration of historical information in detail. Therefore this study used aerial photographs, GIS vector maps, standard city maps produced by the Department of Survey in Sri Lanka and other possible artefacts obtained from the national authorities such as the Urban Development Authority, National Archive of Sri Lanka, The National Library, Colombo Municipal Council, other civil and academic services and institutes in Sri Lanka as well as the British Library in London, UK and the Commonwealth Department of the National Archive in Kew, UK. Furthermore non-published artefacts such as previous researches and project

reports, historical maps of Colombo city planning, zoning data, historical street-scene photographs from private galleries were examined.

Issues observed

The researcher faced a great deal of difficulty in obtaining the aerial photograph of the city of Colombo. This was due to a high security zone within the Colombo municipal area, with permission required from the Ministry of Defence Sri Lanka and the Department of Surveys Sri Lanka. Other documents and reports were also often difficult to obtain.

Initially the author had an intention to use GIS materials as one of the primary data collection methods for this study. However due to inadequate GIS materials available for Sri Lanka, the author had no choice but to reject this as a main data collection method.

4.3. SELECTION OF SURVEY SITES

4.3.1. Intention

The initial objective was to obtain a sample of public parks to represent the full range of the UGSs in the City of Colombo. Variety within Colombo's UGSs is represented in various factors such as different landscape character, the location, amenities offered, the number of visitors and the social class of the visitors. The selection of study sites aimed to reflect this diversity.

4.3.2. Approach

The list of urban green spaces in the city, was obtained from the local council and studied how geographically distributed the sites were. An initial selection was drawn up and made few site visits. Then observed important points such as characters of each UGS, services offer, users' profiles, the size and the geographical location. Then selected, four public parks and a private club site for further investigation. The selected sites are shown on Figure 4.1.

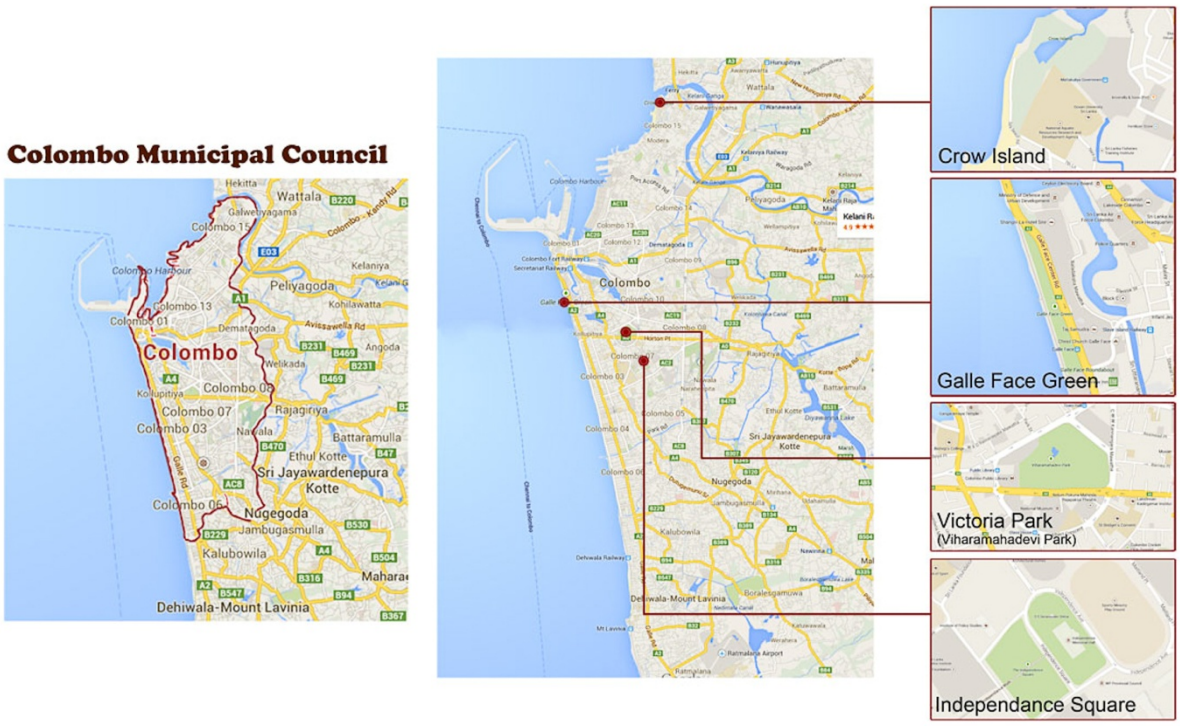


Figure 4.1 Map of the four main study sites in Colombo.

Source: created using Google Maps (2014).

4.3.3. Sites selected

4.3.3.1. Galle Face Green

Overview: This UGS stretches alongside the ocean and is a popular location for daytime and evening trips.

Location: Between Galle Road and the Indian Ocean, in the business district of Colombo.

Description of area: The area is mostly commercial with businesses and a few hotels.

Size: 5 hectares

Visual description: A long stretch of lawn edged with palm trees, with a panoramic view of the Indian Ocean and an elevated walking path. Roadside parking. No other amenities. The grass is worn to earth in some heavily used areas.

Typical users of the park: Families and other large multi-generational groups people, young couples, groups of teenagers playing football, flying kites, picnickers (from observations).

Management: Sri Lanka Ports Authority / Urban Development Authority / Colombo Municipal Council.

History of Galle Face Green

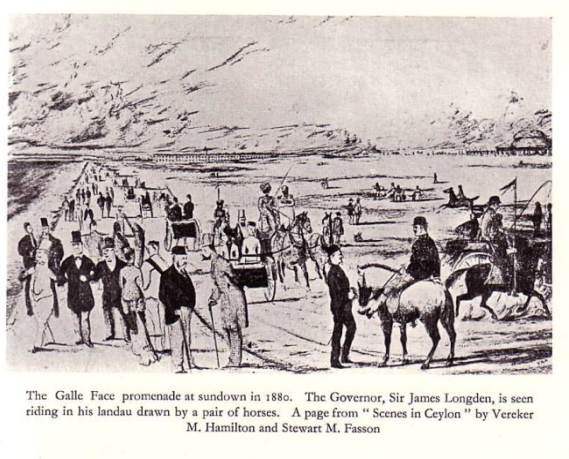
Galle Face Green, originally called 'Galle Face Walk', was constructed during the time of 19th century British Colonial Governor Sir Henry Ward (Governor from 1856 to 1859). The park is a linear strip of green and an elevated walking path (promenade) from which to enjoy the panoramic view of the Indian Ocean. The Green was initially used for horse racing and as a golf course (Figure 4.2). Horseracing began there in 1821, and necessitated the filling and levelling of the esplanade area in front of the fort, previously a marshy area. The Ceylon Turf and Sporting Club, founded in the early 1820s, moved the racecourse to land in cinnamon garden (the current race course) in 1893. After the departure of The Ceylon Turf Club, Galle Face became the home for the one of the most prestigious cricket clubs in the country, Colombo Cricket Club (C.C.C.). The C.C.C. has now moved back to Cinnamon Garden and Galle Face Green became solely a sea front green space (Hulugalle, 1965), Figure 4.3.

Around 1859, the promenade was laid out by the colonial Governor Sir Henry Ward. He recommended that it should be permanently dedicated to the 'Ladies and children of the city of Colombo' (Figure 4.4, Figure 4.5). During the British period of colonial rule and at a later period after gaining independence, many national, social, cultural and political events took

place at the Galle Face Green, including Independence Day parades, May Day Rallies, Swearing-in of the President, and visits of foreign dignitaries including Her Majesty the Queen (Urban Development Authority Sri Lanka, 2005).

The Galle Face Green site was originally much larger, stretching to Beira Lake and the city fort in the north. The Galle Face Hotel structure, built in 1864, effectively prevents the construction of any commercial buildings, roads, or rail tracks across the Green (Urban Development Authority Sri Lanka, 2005).

The integrity of Galle Face Green was threatened in 2004, when the Urban Development Authority leased out the site to a private entertainment company, to turn the Green in to a mega Fun Park. Following a court case, in 2005, the Sri Lankan Supreme Court declared that the seaside promenade should be maintained as a public utility in continuance of the dedication made by Sri Henry Ward, and necessary resources for this purpose should be made available by the government of Sri Lanka, being the successor to the Colonial Governor (UDA, 2008). Maintenance, however, is currently inadequate and the Green is in a poor state of repair (Figure 4.6). The grass itself is badly worn in many places (Figure 4.6a) and no facilities other than parking are provided for the thousands of users. Despite its condition, during field visits the researcher observed that this place is use by many local and foreign visitors.



The Galle Face promenade at sundown in 1880. The Governor, Sir James Longden, is seen riding in his landau drawn by a pair of horses. A page from " Scenes in Ceylon " by Vereker M. Hamilton and Stewart M. Fasson

Figure 4.2 The British Governor, Sir James Longden riding his horse at the Galle Face promenade in 1880.

Source: "Scenes of Ceylon" by Verecker, M. Hamilton and S. Fasson - Lankapura.com

Figure 4.3 Colonial rulers enjoying the sea breeze from waterfront – Galle Face Green ca. early 1900.

Source: Lankapura.com

Figure 4.4 Scene of recreational activity on the Galle Face Green ca. 1900.

Source: Lankapura.com

Figure 4.5 Cattle grazing on Galle Face Green ca. early 1900.

Source: Lankapura.com

(a) Poor grass coverage.

(b) Scene of a family gathering

(c) No shady trees

(d) Scene of children are flying kites

(e) Visitors enjoying the sea breeze

Figure 4.6 Scenes in Galle Face Green, 2012.

Sources: (a) Landscape Architecture Department, Colombo Municipal Council (2010); (b), (c), (d) and (e) The Author (2012).

4.3.3.2. The Viharamahadevi Park

Overview: Formerly known as Victoria Park, this park is one of the oldest public parks and one of the largest open recreational spaces in the city of Colombo. It has recently (2010 – 2014) been reconstructed.

Location: In front of the colonial-style Colombo Town Hall building and the National Museum of Colombo.

Description of area: This park is centrally located in the city. It used to be fenced, but though there are no longer any formal fences around it, the three main walk-in gateways are still popular access points. One walk-in is opposite Park Street, the other from next to the Public Library, and the third by the large Buddha statue opposite Town Hall (see map on Figure 4.8).

Size: 48 hectares

Visual description: The park features include a huge Buddha statue (Figure 4.9a), a series of water-fountains, seating areas, an open-air theatre and a children's play area with pony rides. While considered as a semi-natural landscaped urban park, it contains a diverse range of landscape types, with many formal long tree lines, formal rectangular water features, and also very informal natural wild areas (Figure 4.9 b-e). There are few more features noticeable since recent 'beautification' project. From the Town Hall end, passing the Buddha's statue there are now long symmetrical pools of water with fountains. There is also the rock aquarium, the lake, suspension bridge, small snake-corner and the World War memorial at the south among them.

Typical users of the park: Being the biggest park in Colombo city area, this park attracts more possible visitor categories (families to local and foreign tourists as well as visitors in all different age groups), than any other Urban Green space in the city.

Management: Colombo Municipal Council

History of Viharamahadevi Park (formerly known as Victoria Park)

This Park is one of the oldest public parks and one of the largest open recreational spaces in the city of Colombo, at approximately 80 acres. It is situated in front of the colonial-style Colombo Town Hall building and the National Museum of Colombo. The Park was built during the British colonial time, and was originally named 'Victoria Park', after Queen Victoria. However, post-independence this park was renamed as Viharamahadevi, after the mother of a Sinhala King of Sri Lanka.

The well known town planner Sir Patrick Geddes commented on Victoria Park in Ceylon in his journal in 1920s that *'The form of Victoria Park, with its minimum of circumference, bears witness to the old time origin parks, from private grounds, each within its ring-fence."* (Herath and Jayasunadara, 2007). Earlier in the century within the Victoria Park there were many playgrounds, more than in a formal park. Historical images show that there was an access to the Beira Lake from the park. These paths can still be easily reached. Hulugalle (1965) further described the Geddes's report written in 1920 that:

> "Many open recreational spaces were linked from the Victoria Park towards Torrington Place (currently known as Independence square), one side walking access to the sea, the Race Course and two adjacent cricket grounds and to the Ladies Golf links. All of which would thus easily have been co-adjusted to a second group of parks. The second park grouping was surrounded by the Victoria Golf links and canal landscape with rising ground beyond."

In more recent history, Viharamahadevi Park has particularly benefitted from the post-war urban beautification programme. It was revitalised by removing the existing walls and fences around the green spaces, and the wall around the playground was replaced with mesh nets that

do not impose on the landscape. Old roadside trees from the colonial period were cut down and replaced with new trees. This event had mixed opinions from the public as they used to love old and vigorous trees with a history.

Figure 4.7 Scene of the Viharamahadevi (Victoria) Park late 19th century.

Source; Lankapura.com (2013)

Figure 4.8 Orientation sign at Viharamahadevi Park entrance.

Source: The Author (2012)

(a) Large Buddha statue at the main entrance of the Viharamahadevi Park.

(b) Shade trees, formal water features, and families using the park.

(c) Formal flower beds.

(d) Formal planting areas.

(e) Scene of a familty gathering under a shady tree Scenes in Viharamahadevi Park.

Figure 4.9 Scenes in Viharamahadevi Park, 2012.

Source: The Author (2012)

4.3.3.3. Independence Square

Overview: Independence Square formally known, as Torrington Square is a historical landmark of the city of Colombo. Although this area is a significant heritage site of the city and a tourist attraction, recently it has become a more practical and accessible large patch of green for the community living in the city of Colombo, due to recent (post war) renovations. The Square and its surroundings are currently considered to be one of the most prestigious locations in Colombo for cultural activities and recreation.

Location: Cinnamon Garden region of city.

Description of area: Independence Square is one of the most attractive places in the prestigious part of the city (Colombo 7). The green space is used regularly by joggers from this exclusive neighbourhood, especially in the evening. Next to the park is the memorial museum and the newly established the Arcade shopping mall – one of the upper-class attractions in the area.

Size: 0.99 hectares (Cultural Affairs, 2015)

Visual description: The focal point is the independence memorial building – a large open-sided hall. Includes lawns, water features and tree lined avenues benches and many jogging tracks. All features radiate out from the very traditional architectural Commemoration Hall located in the square. The surrounding green area is almost equally spread in all directions from the memorial hall without any hard landscape-boundaries or entrances. The green therefore blends harmoniously with nearby streets and more free space for walks and exercise (Figure 4.10).

Typical users of the park: The majority of visitors come for jogging and exercise. As the park is unbounded people use it as a short cut and access route (from observation).

Management: Urban Development Authority

History of the Independence Square

Independence Square, formally known as Torrington Square, is a historical landmark of the city of Colombo, located within the Cinnamon Gardens area. The focal point of the park is the Independence Memorial Hall – a national monument built in traditional style for commemoration of the independence of Sri Lanka from the British rule in 1948.

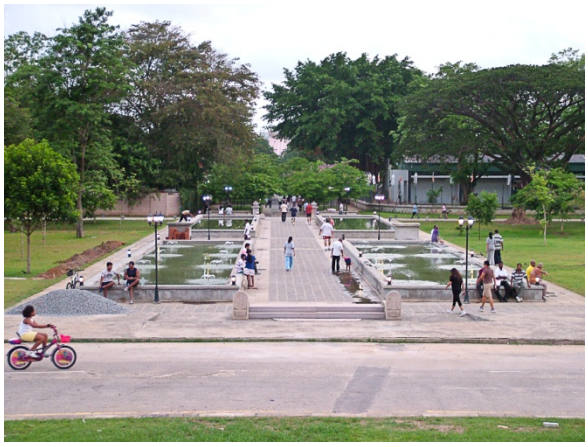
This formal park includes water features and tree lined avenues.

(a) One of the entrances to Independence Square

(b) Visitors using shade trees and walls for seating

(c) Jogging path with evening lighting

(d) Memorial Hall, showing open sides



(e) Water features

(f) Lawn in front of Memorial Hall. Note the irrigation hosepipe.

Figure 4.10 Scenes in Independence Square, 2012.

Source: Author (photos a,b,c and f) and Landscape Architecture Department, Colombo Municipal Council (photo d and e) – (2012)

4.3.3.4. Crow Island

Overview: Crow Island is a tiny islet connected to the mainland as a result of reclamation activities on the eastern and southern borders of the island. The biological environment on and around Crow land is rich due to the Kelani River flood plains. This island consists of three types of landscape settings; natural, semi-natural and man-made. However there is very little vegetation coverage. The vegetation ranges from sea-shore vegetation, to low forest, and mangroves (Municipal Council Urban Development Program – (MCUDP) -2014). The public park area is neglected and under-maintained. Due to previous anti-social activities this area is considered as dangerous to visit or visit with care.

Location: On the mouth of the Kelani River, on the northern border of the Colombo Municipal Council.

Description of area: The urban area located around Crow Island is very congested and the inhabitants are predominately lower income residents.

Size: 29 hectares (Survey Department, 1989) or 7.8 hectares (MCUDP, 2014)]

Visual description: A patch of land by the seaside, brown-field, or an utterly neglected semi-natural urban park, with an uncared play area for children (Author's observation, 2011), Figure 4.11. Limited seashore vegetation of low forest and mangroves.

Typical users of the park: Public use is minimal and community activities happen very rarely within the park area.

Management: Urban Development Authority, Coast Conservation Department Authority.

Note: due to security concerns, permission was required from security personnel in order to visit the park for research purposes in years 2011-2012.

History of Crow Island

Crow Island is a tiny islet on the mouth of the Kelani River, which is located on the northern border of the Colombo Municipal Council. The island is approximately 29 hectares and is connected to the mainland as a result of reclamation activities on the eastern and southern borders of the island (Department of Survey Sri Lanka, 1989).

Due to the shifting nature of estuary and coastline, Crow Island has not existed for very long in a historical context. The first map showing an island in the Kelani estuary dates to 1796. That island could be a remnant of a former delta. A 1904 map shows Crow Island as an isolated land mass near the river mouth. The gap between the island and mainland has narrowed due to the deposition of river sediments, and more islands developed during the 1930s (Bandara, 1989). The area is now essentially a man-made environment, and the urban area located around Crow Island is very congested and the inhabitants are predominately lower income residents. The biological environment on and around Crow land is rich due to the Kelani River flood plains. The limited vegetation coverage ranges from sea-shore vegetation, low forest, and mangroves. However currently less than 10% of the area is covered with mangrove vegetation compared to nearly 40% in 1956 (Department of Survey Sri Lanka, 1996). Field observations in 2011 showed the seafront park to be a neglected semi-natural urban ‘brown field’ park, with an unkempt play area for children. Public use is minimal and the area is considered dangerous due to criminal activity.

(a) Poor grass coverage

(b) Most of the time no visitors

(c) Poorly maintained children play area

(d) View of the city from Crow Island

(e) Restricted entry signs

(d) Neglected children's play area.

Figure 4.11 Scenes in Crow Island, 2012.

Source: Author (2012)

4.3.3.5. A prestigious Sports Club and its grounds

Overview: This well known elite 'members only' sports club owns a fairly large amount of green space in the City of Colombo. Due to managers' concerns about privacy and confidentiality, the author agreed not to name the club.

Location: Located in busy and expensive part of the city.

Description of area: Mainly upper-class people live in this area however on the way to the club premises, noticed lower-income housing and community areas are nearby.

Visual description: Very much elite members only, highly maintained a very classic British style club environment. Most day-to-day management and activities follow the very colonial rules and regulations.

Typical users of the park: The member of the club appeared to be very upper class and wealthy. There is a noticeable gap between the way of spending time in leisure and recreational activities by club members and an average middle class person in city of Colombo.

Management: Club based management and trustees.

Note: This private club was used as a study site only for the Observation exercise and Focus Group, not the Survey Questionnaire, as the general public are not permitted.

The author was not given permission for photography.

4.4. ETHICAL ISSUES AND RESEARCH LIMITATIONS

As in other professional researches, ethics played an important role in this research too. Therefore this research has conducted according to the guidelines approved by the ethic committee of the university of Essex, UK. Which include the concerns, dilemmas and conflicts that have to be faced by the researcher. For example, the interviewees were never coerce into participating, participation was voluntary at all times. Also, obtained permission and explained what they are participating. Furthermore as is obligatory, the author obtained written consent from members of all the organisations and authorities involved.

However, when publishing the results of this research, the name or the exact job title of key governmental personnel must be withheld, due to the personal nature of the views and opinions expressed during the interviews. Where their personal views and opinions contradict those expected within the official role that they hold, the researcher also verbally agreed to maintain their anonymity in reporting their answers.

During the interviews, tape recordings were not permitted by the majority of the responders, despite assurances that their information would be treated anonymously and only used as data for academic work. As a consequence the records of the interviews consist solely of notes taken during the interview itself. Although this is not ideal in terms of the completion and accuracy of the data gathered, it respected the ethical rights of the participants.

A high level of personal risk was identified at the survey location in Crow Island, due to anti-social activities and high levels of crime (including a murder). However, the Crow Island site was considered an important component in the spectrum of types of UGS, and to ensure representative coverage of as broad a social range as possible. The researcher therefore carried out surveys here, with permission of local police. There was a temporary fixed police/security booth and every person entering to the park must present a valid ID (National ID, Passport or

Driver's licenses). For the researcher's personal security, the survey was not conducted alone, but with four male survey assistants. The group didn't spread out and but worked as a team in close proximity. Security personnel were within the park premises all the time.

Due to the political and social situation in Sri Lanka, the researcher had to make some amendments during her data collection in city of Colombo. The key-personnel interviews and observation were carried out by the researcher, however due to large sample size of public survey as well use of three different languages and four different sites there was a need of extra assistance. Therefore six local university students were employed as temporary research assistants. They were briefed well enough to conduct the survey within the context, but not have any bias, which may effecting on final results.

Permission to conduct the public survey in each park was sought. However attempts to obtain official authorisation revealed that in the Sri Lankan context, it is not necessary to obtain permission to conduct a public survey in a public park. During the public interviews in the parks, anyone appear to be under 12 not been interviewed. Only interviewed anyone between 12-16 years old, when they were with their parents or guardians. All in all, the methods employed in this study were greatly enabled to investigate the expected issues and areas of the UGSs in Colombo and provided a comprehensive abundant of useful data, in order to achieve the research aims. The found data and results from various methods employed will be presented in next three chapters as Chapters 5, 6 and 7, with special focus on different aspects of UGSs in the city of Colombo.

Chapter 5: The Environmental factors impacting on the city of Colombo's potential as a 'Haritha-City'

CHAPTER CONTENTS

5.1. OVERVIEW

Using the holistic 'three spheres' model (section 1.6) to plan an Urban Green Space, the first consideration is the Environmental factors. The geography of the space (the topography of the land, the layout of the roads and waterways), the climate, and existing ecology dictate what is physically possible. A holistic approach to UGS planning takes the whole cityscape into account, and sees individual UGSs as part of an urban green ecological network. Failure to do so can result in natural or constructed green structures within the internal city become isolated islands surrounded by man-made non-green constructions.

Especially from the ecological perspective, the UGSs moderate the impact of human activities, and can contribute to the maintenance of a healthy urban environment (De Groot, 1995). While improving the urban climate and balancing the natural environment of the city, they preserve the local natural and cultural heritage by providing habitats for a diversity of urban wildlife and conserve a variety of urban resource (Hough, 1994).

In this chapter the first section will summarise the physical environmental characters in the city of Colombo. The results from the field research will then be explored, covering the environmental topics revealed in the questionnaire survey, the focus groups and the interviews with key personnel. The subjects raised from this field research will then be discussed and linked to findings in the literature. Finally these findings will be brought together to form recommendations from an environmental perspective that will influence the city of Colombo to become as a Green 'Haritha City'.

In later chapters, the Social and Political aspects of greening the city will be discussed.

5.2. ENVIRONMENTAL ATTRIBUTES OF CITY OF COLOMBO

In summary of the key points from Chapter 2, Colombo is located in the coastal flood plains of the Kelani River. The land is flat, with the lowest areas, some of which are marshland, lying just below sea level and the highest points at just 18 m above sea level (Horen 2002). Most of the area now considered, as the 'city' was once marshland, reclaimed for urban development over a period of nearly 500 years. An unprecedented acceleration of urbanisation has taken place in Sri Lanka in the recent past, most of which was centred around the Colombo Metropolitan Region (CMR). The climate in Colombo is constantly hot and humid, with rainy seasons, which yield abundant rain, allowing vegetation to grow quickly.

Colombo is to a large extent a very green city (van Horen 2002). Travellers who arrive by air encounter a city view that from above is a patchwork of tree canopies. Most of these trees are large street trees or in private gardens.

Despite the high number of trees and visible greenery in Colombo, it is evident that the accelerated urbanization and commercial development have taken place in an unplanned manner, with little or no attention played to ecological aspects. Generally lack of research available literature and lack of consideration of urban planning being the main contributing factors. As a result the ecosystem in and around Colombo city is degraded and will continue to degrade if current trends continue. Another serious problem faced by the city is the high risk of frequent flooding. Even a slightly heavy rainfall will result in flooding of low-lying areas. Many of these ecological issues were explored in surveys and interviews conducted in Colombo city as part of this research. The findings are discussed below.

5.3. RESULTS FROM THE QUESTIONNAIRE SURVEY THAT RELATE TO ENVIRONMENTAL ASPECTS

During the questionnaire survey the author investigated the visitors' response to a range of aspects and association with UGSs in city of Colombo. A total of 295 people were interviewed in four Urban Green sites within the Colombo Municipal Council (CMC) area of the city.

The main relevant environmental related questions from the public questionnaire were:

- What are the two main purposes of your visit here?
- How far away from this site do you live?
- How would you normally travel to this green space?
- Approximately how long does your normal journey here take?
- Which type of urban parks do you prefer mostly?
- Which living feature (none- artificial landscape features- trees, lawns, wildlife etc.) do you most enjoy, when you visit a park?
- How would you rate the representation of living features of this urban green space?

5.3.1. Reasons for visiting UGSs

What are the two main purposes of your visit here?

UGS users were given list of options and been asked to indicate their main motives to used the UGS. The options were; To keep fit/ exercise, To relax and get fresh air, Enjoy the nature (plants); See the wildlife, Picnic/family outing; Walk the dog, Visiting the play area, Take a short cut with a final the of 'Other' if they had any points to be added, for example participating a cultural activity, flower show etc. The question was asked in two parts: primary reason and secondary reason. For ease of analysis, the two answers were pooled

together (to give 590 responses in total). These are summarised in Table 5.1 below. The most common response was ‘To relax and get fresh air’, with 176 respondents citing this reason.

	Nature	Wild-life	Relax Air	Family Picnic	Play Area	Dog	Fitness	Short Cut	Other	Total
IS	26	0	58	7	0	0	47	6	12	**156**
VP	41	4	25	48	14	1	15	0	16	**164**
GF	15	3	62	53	11	3	14	0	9	**170**
CI	15	0	31	13	8	0	10	0	23	**100**
Total	**97**	**7**	**176**	**121**	**33**	**4**	**86**	**6**	**60**	**590**

Table 5.1 Counts for 'purpose of visit' responses.

IS=Independence Square, VP= Viharamahadevi Park, GF=Galle Face Green CI=Crow Island

Note: primary and secondary purposes are pooled.

The responses were grouped according to type of purpose, displayed in Table 5.2. The counts of all the responses, grouped by nature of motivation are given in Table 5.3, and displayed graphically in Figure 5.1.

Note that ‘to relax and get fresh air’ was included as an ‘environmental’ response as the emphasis was on fresh air (there are other ways of relaxing that do not include this environmental element).

Response	Categorisation	Notes
Enjoy the nature (plants)	Environmental	Response mostly about the nature of the space
See the wildlife		
To relax and get fresh air		
Picnic/family outing	Social	Response primarily about those who the time is spent with (including children and pets as well as family members)
Visiting the play area		
Walk the dog		
To keep fit/ exercise	Personal	Response primarily about the individual's needs
Take a short cut		
Other	Other	Responders primarily participating cultural or trade (flower) shows.

Table 5.2 Categorisation of 'Purpose of visit' response.

Site	Env'mental	Social	Personal	Other	Total
IS	84 (54%)	7 (4%)	53 (34%)	12 (8%)	**156** (100%)
VP	70 (43%)	63 (38%)	15 (9%)	16 (10%)	**164** (100%)
GF	80 (47%)	67 (39%)	14 (8%)	9 (5%)	**170** (100%)
CI	46 (46%)	21 (21%)	10 (10%)	23 (23%)	**100** (100%)
	280 (47%)	**158** (27%)	**92** (16%)	**60** (10%)	**590** (100%)

Table 5.3 Summary of 'Reason for visit' responses, grouped by nature of the motive.

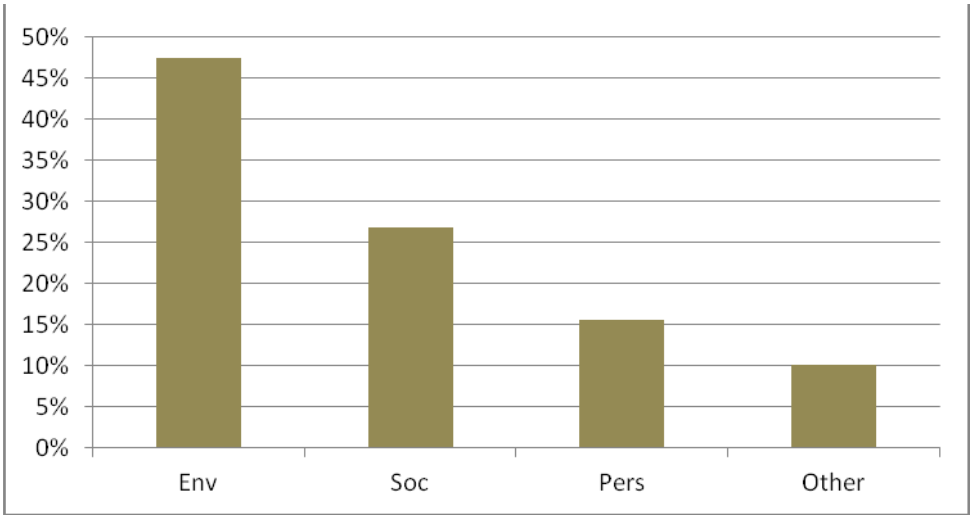


Figure 5.1 Purpose of Visit (all UGSs).

Table 5.3 shows that when grouped in this way, almost 50% of people have an 'environmental' reason for visiting. The motivations for visits are not consistent for each park though, rather to some extent they reflect the character of the park (Figure 5.2).

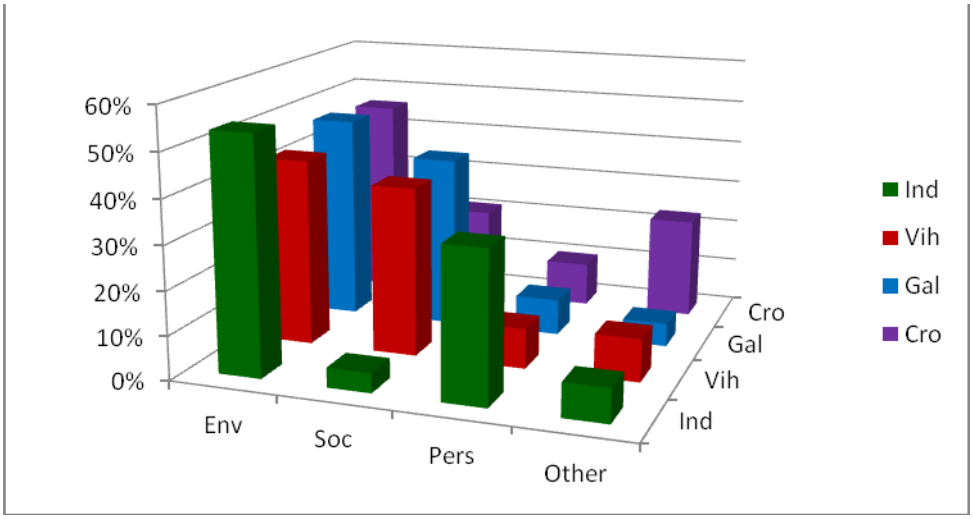


Figure 5.2 Purpose of Visit (by UGSs).

According to Figure 5.2, the users of all four selected sites have higher interest in 'Environmental' related reason as purpose of visit. Independence Square has a high

proportion of users for 'Personal- exercise' reasons. Most of these are joggers, and this reflects the installation of jogging paths at the site. This park has a very formal layout and is mainly composed of paths and rows of path-side trees, with very little lawn area. This makes the space unsuitable for picnics and other social activities. This is reflected in the very low (4%) of people who used this park for social purposes.

Viharamahadevi and Galle Face Green are much more social spaces, with extensive lawn areas for sitting. These sites are predominantly used by families for social outings (picnics and games).

Crow Island is used less as a social and personal space (21% and 10% respectively). This is likely to be due to the security risks at the site that deter families and lone visitors. Even though there is a play area there, only 8 of 50 people cited this as a reason for visiting. At 4% of visitors, this was the same proportion as for Viharamahadevi Park. However, as a local community park the proportion of people using the slides, swings and other play facilities would be expected to be much higher here. For those that do visit, the nature of the environment for this sea-front site is important. People also come for other reasons.

5.3.2. Travel and transport

To gain an understanding of how visits to UGSs currently fit into visitors' lives, questions were asked about how far away they lived and their journey to the site. The questions were as follows:

- **How far away from this site do you live?**

  Options were given; <1/2 Km, ½-1Km, 1-5Km, >5Km and Outside Colombo.

- **How would you normally travel to this green space?**

  The travel and transport options were Foot, Car, Bicycle, Bus and Other. The responses to 'Other' included motorbikes, tuk–tuk and taxis (all motorised modes).

- **Approximately how long does your normal journey here take?**

  Answer options were; Less than 5 minutes, 5-10 minutes, 10-20 minutes, 10-20 and More than 20 minutes.

Visitors travelled both locally and from outside the city to visit the sites. The data is summarised in Figure 5.3 and Table 5.4. The distance people travelled to visit the parks was surprisingly high, with 66% travelling over 5km. Almost half of park visitors were from outside the city. Only 7% of visitors are coming from less than 0.5km distance. Significantly among the interviewed public from Viharamahadevi and Galle Face Green, there were no visitors from the under <0.5.km category (Table 5.4).

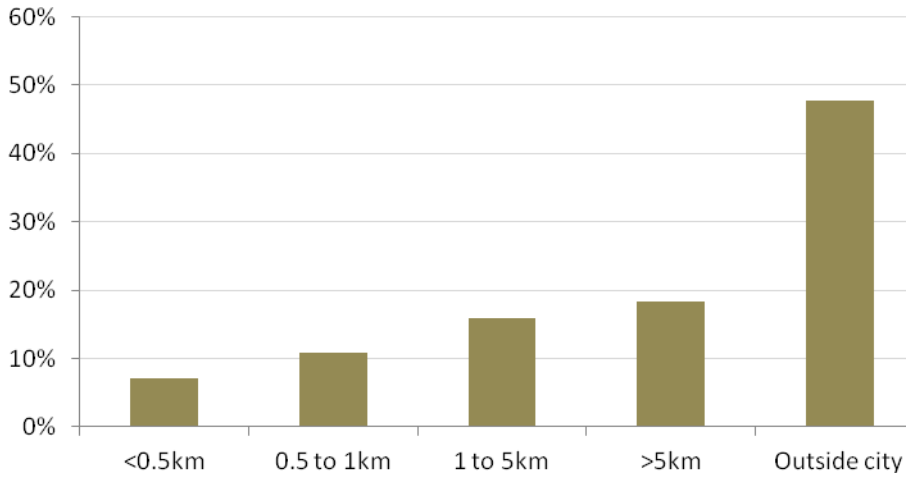


Figure 5.3 Distance from home (all UGSs).

	IS	VP	GF	CI	Total
<0.5km	6 (8%)	0 (0%)	0 (0%)	15 (30%)	21 (7%)
0.5 to 1km	2 (3%)	5 (6%)	7 (8%)	18 (36%)	32 (11%)
1 to 5km	17 (22%)	12 (15%)	6 (7%)	12 (24%)	47 (16%)
>5km	14 (18%)	10 (12%)	25 (29%)	5 (10%)	54 (18%)
Outside	39 (50%)	55 (67%)	47 (55%)	0 (0%)	141 (48%)
	78 (100%)	82 (100%)	85 (100%)	50 (100%)	295 (100%)

Table 5.4 Distance visitors live from the surveyed UGSs.

The distance each park from their residences is shown in Figure 5.4. The only park that had no visitors from outside the city was Crow Island. However, even this local community park served visitors from some distance away: 10% of visitors lived over 5 km away.

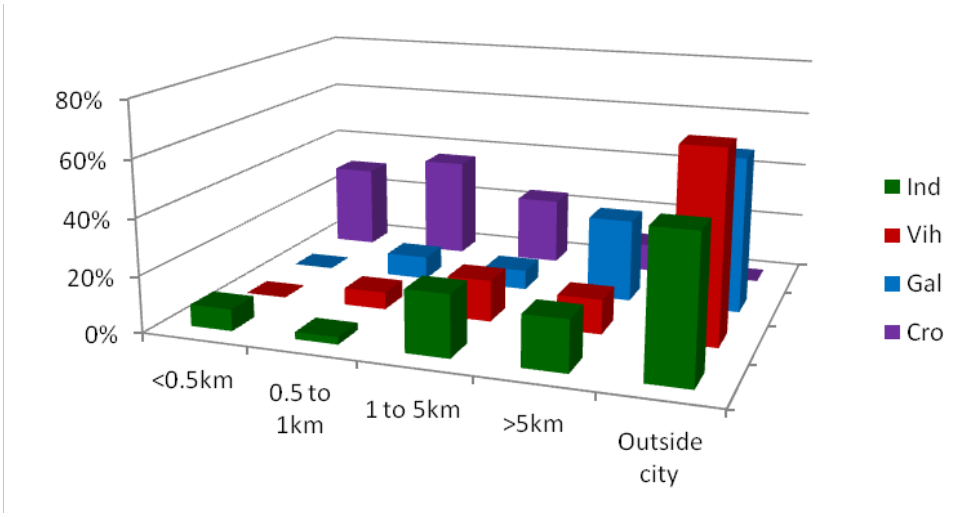


Figure 5.4 Distance from home (by UGSs).

As Table 5.5 and Figure 5.7 below show, these travel distances were reflected in journey times.

	IS	VP	GF	CI	Total
<5min	6 (8%)	7 (9%)	3 (4%)	14 (28%)	30 (10%)
5-10min	10 (13%)	3 (4%)	11 (13%)	5 (10%)	29 (10%)
10-20min	17 (22%)	21 (26%)	24 (28%)	16 (32%)	78 (26%)
>20min	45 (58%)	51 (62%)	47 (55%)	15 (30%)	158 (54%)
Total	78 (100%)	82 (100%)	85 (100%)	50 (100%)	295 (100%)

Table 5.5 Respondents' journey time to the surveyed UGS.

Figure 5.5 Journey time (all UGSs).

As expected, there was a strong correlation between journey time and distance. However even relatively short distances can take a long time in Colombo due to the very bad traffic conditions.

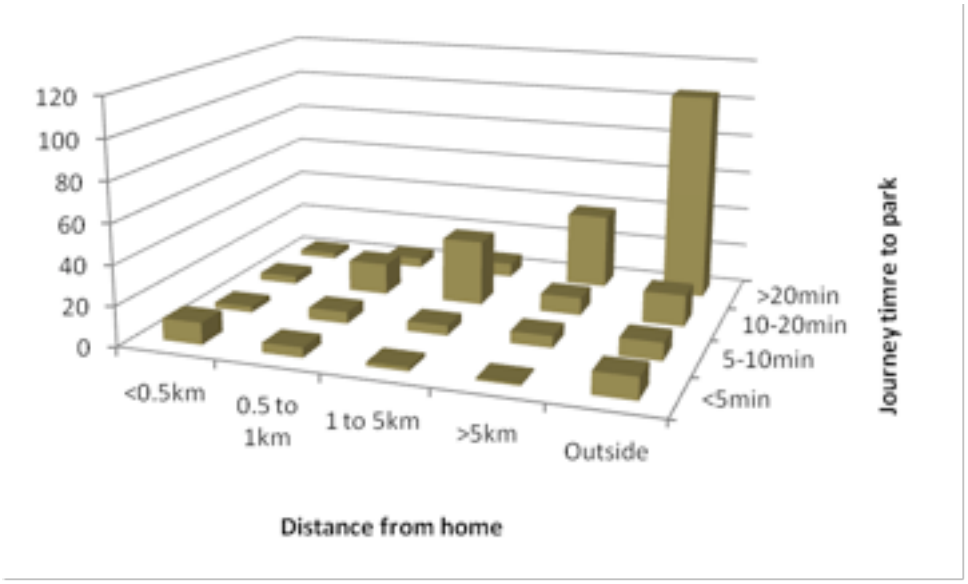


Figure 5.6 Journey time compared to distance from home.

When these travel times are compared for each park individually, the three 'high profile' parks all have high journey times to reach them, while for the local community park at Crow Island 38% of visitors travelled less than 10 minutes to visit (Figure 5.7).

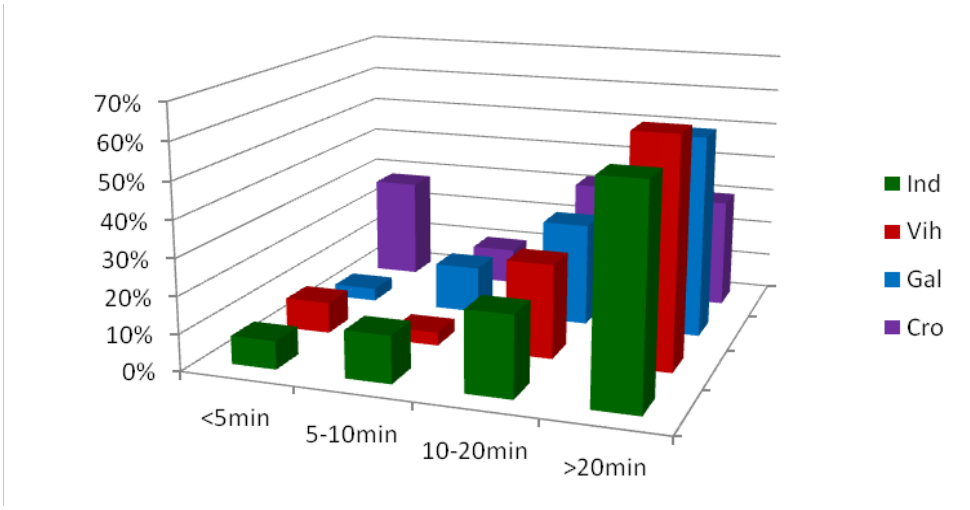


Figure 5.7 Journey time to travel to each UGS.

Table 5.6 shows the link between duration of journey and modes of travel they used to visit the surveyed UGSs. Over 50% of visitors had to make more than 20 minutes journey, and nearly 90% of them used a bus as their mode of transport.

	Method of travel to this green space					**Total**
Duration of journey	**On foot**	**Car**	**Motorbike**	**Bus**	**Other**	
Less than 5 minutes	35.6%	12.5%	3.0%			10.2%
5-10 minutes	8.5%	21.9%	18.2%	4.2%		9.8%
10-20 minutes	30.5%	35.9%	54.5%	6.3%	29.5%	26.4%
More than 20 minutes	25.4%	29.7%	24.2%	89.5%	70.5%	53.6%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 5.6 Journey time and mode of travel (visitors from all four sites).

Park visitors use a range of modes of transport. Overall, 31% use cost-free walking or cycling. The majority use motorised transport, which will incur a cost either in fuel or ticket prices (Table 5.7).

	Free (walking/cycling)	**Cost (motorised)**	**Total**
IS	15 (19%)	63 (81%)	78 (100%)
VP	19 (23%)	63 (77%)	82 (100%)
GF	22 (26%)	63 (74%)	85 (100%)
CI	36 (72%)	14 (28%)	50 (100%)
	92 (31%)	**203** (69%)	**295** (100%)

Table 5.7 Modes of transport used to visit site (motorised and non-motorised).

Figure 5.8 illustrates that the pattern for transport mode is very different between the three high profile parks, where around 80% of people use costly (motorised) modes of transport, and the community park (Crow Island) where 72% reach it by walking or cycling.

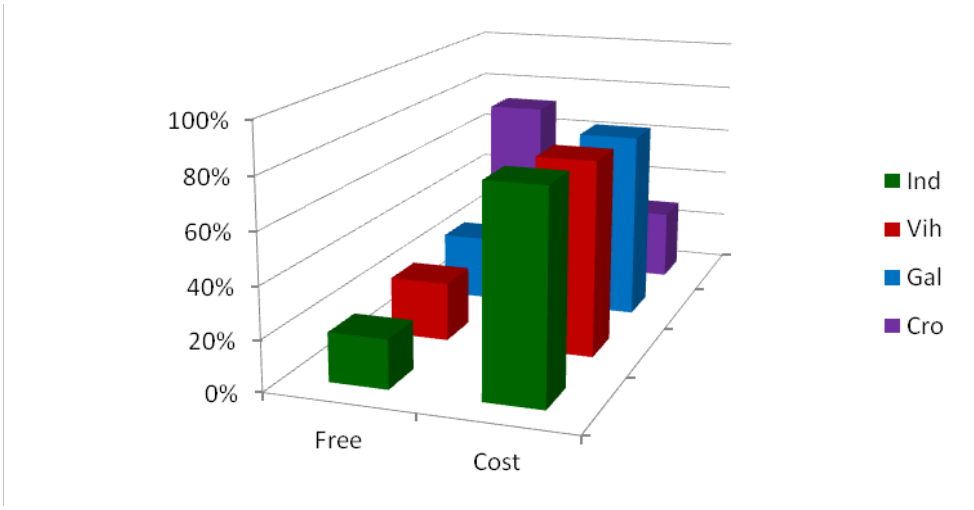


Figure 5.8 Transport mode by UGS.

5.3.3. Vegetation and appearance of UGSs

Visitors were asked a range of questions that related to the visual appearance and plantings in the UGSs. These included:

- **Which type of urban UGSs do you prefer mostly?**

  Answer options: Formal, Natural, Mixed, No preference, Don't know.

- **Which living feature do you most enjoy, when you visit a UGS?**

  Options: Trees/woodlands, Wild animals-birds etc., Flower Beds/Bushes, Neat Lawns, Natural streams/pond and Natural Paths.

In terms of style of landscape preference, only 13% liked formal gardens, with the majority preferring natural or mixed styles (Table 5.8, Figure 5.9).

	Formal	Natural	Mixed	No pref.	Total
IS	16 (21%)	24 (31%)	34 (44%)	4 (5%)	78 (100%)
VP	3 (4%)	46 (56%)	33 (40%)	0 (0%)	82 (100%)
GF	15 (18%)	39 (46%)	29 (34%)	2 (2%)	85 (100%)
CI	5 (10%)	15 (30%)	30 (60%)	0 (0%)	50 (100%)
All	**39 (13%)**	**124 (42%)**	**126 (43%)**	**6 (2%)**	**295 (100%)**

Table 5.8 Landscape style preferences of UGS visitors.

Only 13% or 39 out of 295 responders preferred 'Formal' landscape style in Urban Green Spaces in Colombo. However different between preferences over 'Natural' and 'Mixed' was 1% only.

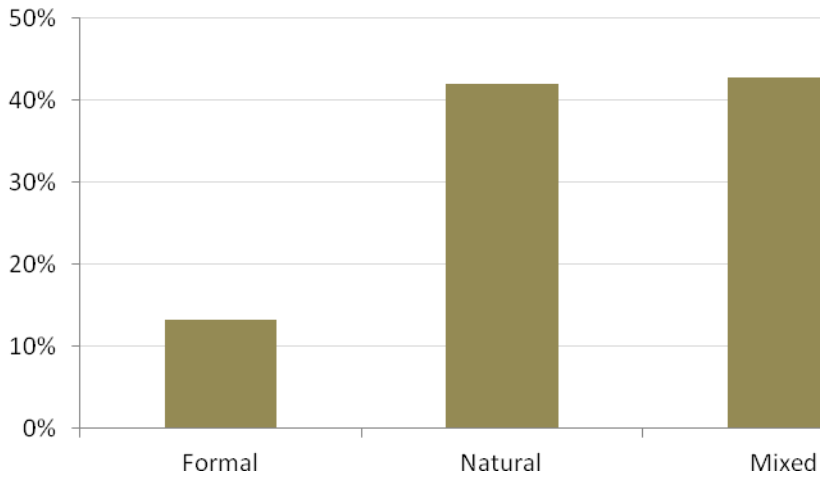


Figure 5.9 Landscape style preference (all UGSs).

Although Figure 5.9 shows similar percentages in 'Natural' and 'Mixed', there were some differences between visitors in different UGSs.

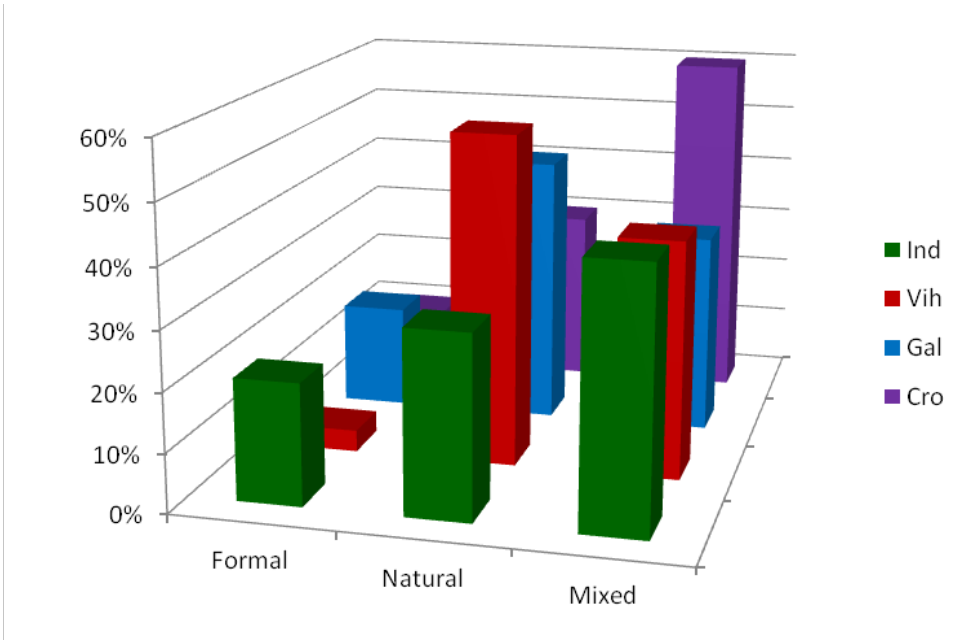


Figure 5.10 Landscape style preference (by UGS).

Those who liked formal the most and natural the least were in Independence Square, which is the most formally structured park of those visited. At Viharamahadevi and Crow Island, only a very tiny percentage of people expressed a preference for a fully formal style.

In terms of the natural features that people liked to see in a UGS, trees and woodlands were the most important, mentioned by 40% of people. The net most preferred feature was 'neat lawns', at 30% (Figure 5.11).

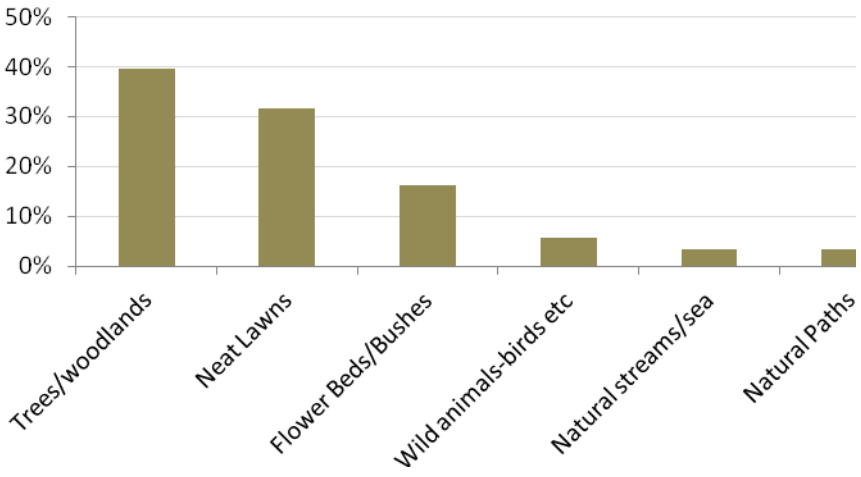


Figure 5.11 Preferred living features (all UGSs).

As Figure 5.12 shows, there were some differences in preferred living features between the parks. A low preference for 'neat lawns' in Viharamahadevi Park could be because this park has more other facilities (including seating) than the other parks. A lower mention of trees (27% compared to the average of 40%) at Galle Face reflects the nature of this site – which is seafront with very few trees.

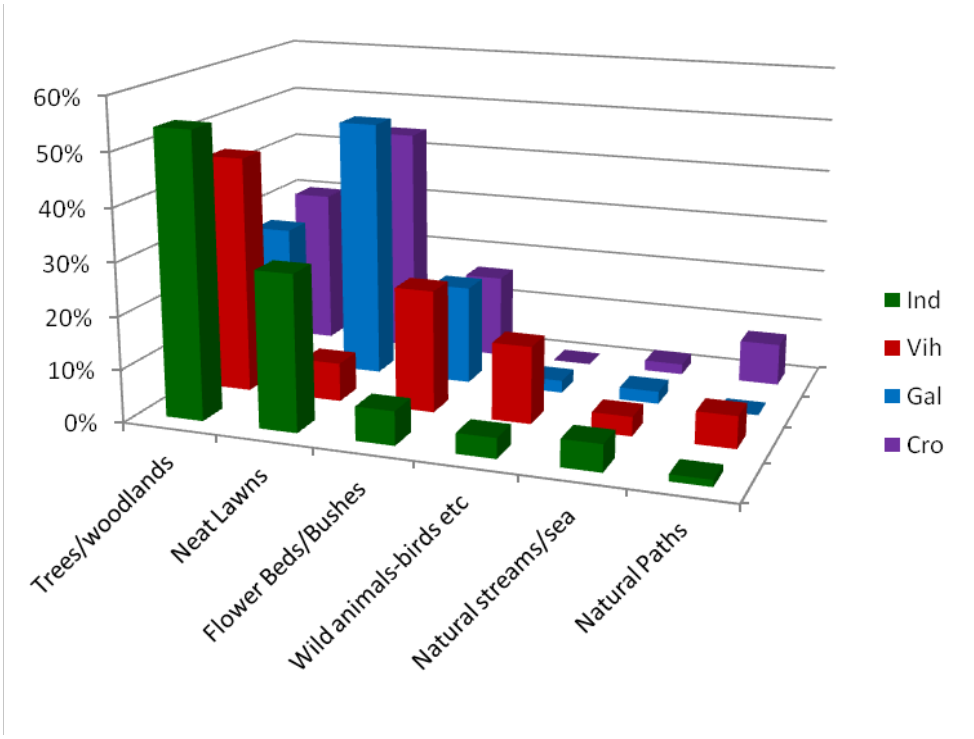


Figure 5.12 Preferred living feature (by UGS).

5.3.4. Satisfaction with living features in the UGSs

Visitors were asked, "How would you rate the representation of living features of this Urban Green Space?". Reponses were on a given scale from Very Good, Good, Fair, Poor, to Very Poor, with the additional options of 'Don't know' and 'No Comment'.

Satisfaction rating was medium (Table 5.9 and Figure 5.13). Overall, only 3% of people rated the natural features of their park as 'very good'. Most of these were in Independence Square. Twice as many people rated the living features of their park as 'very poor' than 'very good'.

	IS	VP	GF	CI	Total
Very Good	7 (9%)	2 (2%)	0 (0%)	0 (0%)	**9** (3%)
Good	39 (50%)	31 (38%)	8 (9%)	3 (6%)	**81** (27%)
Fair	13 (17%)	43 (52%)	26 (31%)	21 (42%)	**103** (35%)
Poor	15 (19%)	5 (6%)	37 (44%)	26 (52%)	**83** (28%)
Very Poor	4 (5%)	0 (0%)	14 (16%)	0 (0%)	**18** (6%)
No comm.	0 (0%)	1 (1%)	0 (0%)	0 (0%)	**1** (0%)
Total	**78** (100%)	**82** (100%)	**85** (100%)	**50** (100%)	**295** (100%)

Table 5.9 Users' rating of living features of UGSs.

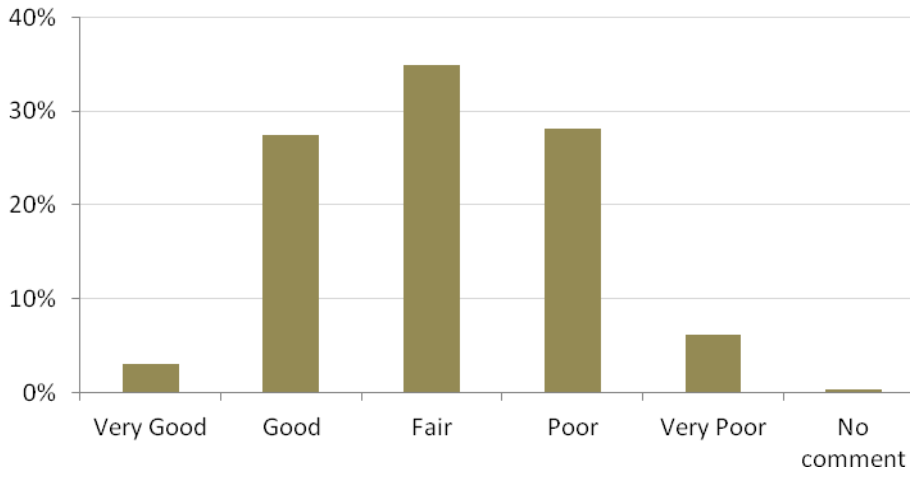


Figure 5.13 Ratings for living features (all UGSs).

Parks differed in their ratings on living features. Overall, people were most satisfied with the living features at Independence Square. This is likely to be because recent post-war developments have included much new tree planting. Tree avenues over jogging tracks are one of the main features of this site. Galle Face and Crow Island scored a lower rating for their natural features. Of people at Galle Face 16% rated the living features as 'very poor' (Figure 5.14).

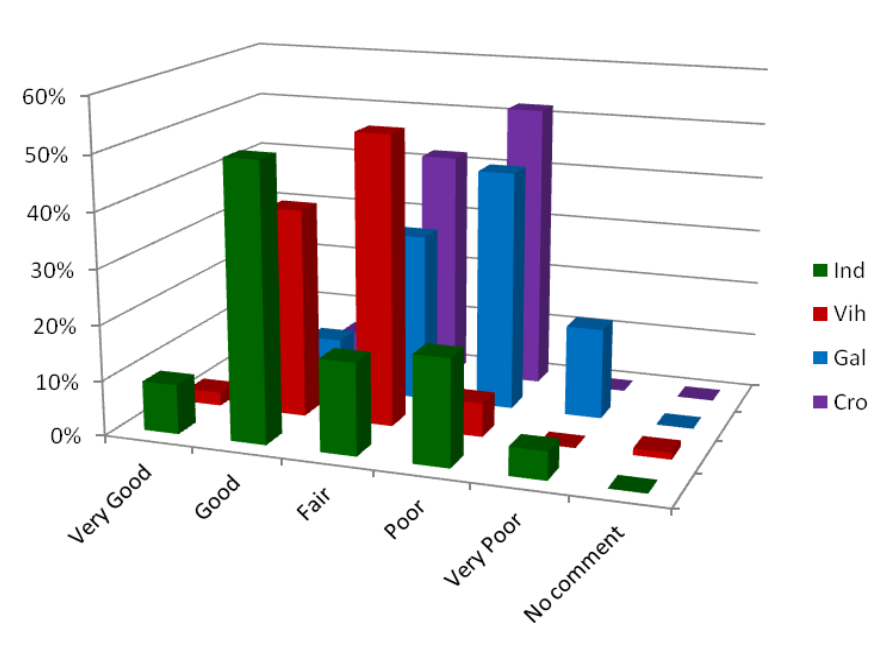


Figure 5.14 Rating of living features (by UGS).

5.4. COMMENTS FROM QUESTIONNAIRE SURVEY THAT RELATE TO ENVIRONMENTAL ASPECTS

Other than multiple choice questions each interviewee had an opportunity to give their further comments on specific questions. Some interviewees also gave more information and insights in informal conversations following the structured survey. Some of the more informative comments are summarised below. The respondent number is given with the code for the park they were interviewed in.

5.4.1. Reasons for visiting UGSs

Comments were given in response to the question "What does the phrase 'public urban green spaces' mean to you?". Out of 295 completed surveys, 247 people responded to this question. These have been grouped under their main themes:

	Site				Total
Statement theme	**IS**	**VP**	**GF**	**CI**	
It is a common area with trees	17	12	7	8	**44**
Leisure and green in one place	4	8	8	6	**26**
Place for kids to play	3	6	11	4	**24**
Place for freedom and mind to relax	3	3	10	6	**22**
A park	3	12	2	4	**21**
A place must have for urban life and health	4	5	6	4	**19**
Place for all		7	9	1	**17**
More concentrated tree area and fresh air	3	5	1	1	**10**
Beauty of the town	2	5	3		**10**
A quality place and a quality time	2	2	3	2	**9**
Meeting point/gathering place in a city	2	2		5	**9**
Place for community-meeting and activities		3	1	3	**7**
Escape from traffic		3	1	1	**5**
Best way to get away from urbanism	1			4	**5**
Important place	3	1			**4**
Place to take care of	1	2	1		**4**
The best place of the city centre	1	3			**4**
Green combined and mental freedom	2				**2**
Lovely place to be	1		1		**2**
Something positive	1				**1**
A pleasant scene for an eye			1		**1**
A place shows the cleanliness of the city			1		**1**
	53	79	66	49	**247**

Table 5.10 Statements on the meaning of an Urban Green Space.

The significance of trees as definers of UGS comes through very clearly. Many people expect a UGS to have trees. The social role, including the role for children, also features highly. Many people also recognise the value of UGSs for physical and mental health, using phrases like “allowing the mind to relax”.

> A couple said. “We enjoy the greenery and the beauty of the park, my most favourite reason to come is flowers.” (VP 25).
>
> “What else I can ask for… jogging under shady trees is brilliant.” (IS 14).
>
> “Endless horizon, sun down and beach… What a beautiful place.” (GF 2).
>
> “Walking along the beach is the only thing to do around here as a hobby.” (CI 2).

5.4.2. Travel, transport and location

> “I would come daily if I could ‘nip in’ at any time. I strongly believe travelling by bus to get into a park is a NOT real recreation” (VP 2).
>
> “Bringing my kids here is a big task that we have to organise in advance. As we can’t walk here it’s just a stressful activity” (GF 5).
>
> “Traffic around here is horrible, I was sitting on a bus over 45 minutes to get here.” (IS 3).
>
> “I walked here to escape from my family. I live around the corner, I can even see my house from here” (CI 1).

5.4.3. Vegetation and appearance of UGS

> A senior citizen said “This smell of the newly cut grass bring me closer to nature.” (VP 7).
>
> “If I have a chance to choose the plant for this park I would use more shady but plants with light coloured leaves. That new tree planting over there got dark leaves, of course we get shade but it could be too dark when they are matured as well as dark leave absorb more sunlight. That means less cooling affect too” (IS 7).
>
> “Vegetation with more wild/natural feeling is a ‘must’ thing for a city like Colombo” (CI 17).
>
> “I think neat lawns are a must-have feature in any park. Because of the climate in Colombo, I always have a fear over insects and snakes.” (VP3).

5.4.4. Need of combination of 'Blue and Green Concept' in UGS planning

A total of 12 park users between the two sea-front parks (Galle Face Green and Crow Island) mentioned something about having a safe sea swimming place or at least safe area to 'catch waves', basically direct contact with water while they are enjoying the green area.

> "We would like to have a sea bath, but looks dangerous here. At least if my kids can 'catch waves' would bring more fun on this family day out today" (GF 29).
>
> "We would love to walk down the beach, if somebody can make it safer and by building raised platform or so would be perfect." (GF 57).

Six users from VP and three from IS raised the need for a swimming pool;

> "Having paddling pool would be a cool idea." (VP 67).
>
> "Having a public open swimming pools next to a park would be nice." (VP 62).
>
> "Even though I can't swim, still like to sit by water's edge in the park. That brings so much to me before I head home after a long working day in my office." (VP 9).
>
> "Since we have many water streams around the city, to see and to hear water in and around the parks will be cool." (VP 12).

5.4.5. Heat and shade

> "We need more plants in Colombo with cooling affect." (GF1).
>
> "I avoid using the park middle of the day at least wait till 4-4.30 to come here, because can't bear the heat. Some cooling plants or more shady trees, canopy trees above the sides of the paths would push me to come here any time of the day." (GF 49).
>
> "To find a place in the summer pavilion is difficult. Most of the time we have to sit on grass, but sun is too strong here. I think, where ever possible to build we need more summer pavilions. Could cover with beautiful climbers would be more appreciated." (VP 32).
>
> "We are simply burning in this sun. We need shades from the scorching sun. I don't like to see my children running around more than 30 minutes in this condition." (GF 49).

5.4.6. Other Comments

"Would be nice to see more wildlife. I mean few ducks, rabbits and squirrels" (CI 17).

"I come here with my family, the first thing my family like to see is deer and then to the Aquarium. So kind of a 'mini Zoo' with a few domestic type animals make my family happy, for sure… and if they able to feed them and pat them even better." (VP 39).

A teacher from a school group; "I would like to use a park as a educational tool to teach my students get to know about nature through exploration. If they would be able see some simple wildlife stuff, for example a lifecycle of a frog, in a park pond… will increase the awareness of the nature among the school kids in the city". (VP 56).

"A quiet zone where people can shut down for awhile with lots of nature and water. Increase the awareness of surrounding nature e.g.; Crow Island." (CI 19).

"Organised- events on special flowering seasons bring more benefits to all." (IS 2).

5.5. SUMMARY OF ENVIRONMENTAL ASPECTS OF FOCUS GROUP DISCUSSIONS

5.5.1. Overview of discussions

During the three focus group meetings the author tried to obtain insight and information about the group members' opinion and the usage of UGSs in Colombo.

Since this was a very informal type of meeting the discussions did not follow a strict order of question and answers. The topics covered included whether participants use UGSs in Colombo, if yes in which capacity, which particular parks or places, how and how often. What is their perception of UGSs? Do they have any recommendations for future and how they would like to visualise UGSs in Colombo in 10 years? If the focus group participants were non-users, then why, any comments and suggestions to encourage them to use UGSs in Colombo.

5.5.2. Group summary

The three focus groups comprised the following:

Group A: six members from a private sports club. Age between 28 -54. Upper class.

Group B: seven members from a voluntary environmental group. Age between 22- 48, represented students middle working class.

Group C: Expatriate community. Age between 28 – 57 diplomatic services or professionally employed. The group was consisted of British x3, Australian x1, Indian x1, Chinese x1, and American x1.

5.5.3. Reasons for visiting UGSs

> "Simply to catch some fresh air." (Group A- number 3).
>
> "I'm on a medical recovering period and should walk 2km per day required. By walking one time back and forth on Galle Face Green path is exactly 2km. Meantime enjoying sea breeze may help for a speedy recovery." (Group A- 4).
>
> "Although I drive a car to come to Independence Square, still better than jogging on the busy roadside." (Group B-3).
>
> "Because of my age difficult to walk properly, but I love watching, children playing in the park" (Group A- 2).
>
> "Going to a park is kind of a routine activity for me. Back home (Australia) I used to do this almost daily basis. Never-the-less parks are not the same here in Colombo and so much to be improved I still preferred to walk around, watching people, learning some bizarre cultural stuff too here in the city." (Group C- 1).

5.5.4. Travel and transport

> "I'm not visiting green spaces in Colombo, as I can't reach by foot, and I don't want to use my car to visit a park". (Group C- 2).
>
> "I wish if I can use my foot-bicycle to visit the nearest park, still too far to cycle, so no choice but to use my motorbike." (Group A-1).
>
> "We are using a tuk-tuk, otherwise no way I can take my young family to Viharamahadevi Park." (Group A -6).

"Park is just two minutes walk. So no complaint over traffic as well as no excuse not to visit my local park." (Group B- 3).

5.5.5. Vegetation and appearance of UGSs

"My work place is very close to the Galle Face Green. In fact it is not green, hardly any trees there. My view is visiting Galle Face Green does not count as visiting an urban green space" (Group B- 2).

"If I see enough green and flowers on and from my way to work I don't really need to visit a park. For example I would like to see more flowering plants on roundabouts, central reservations and road sides". (Group A- 2).

"I travel around for business, I think it's time for busy cities in Sri Lanka to consider roof gardens and wall gardens." (Group C-2).

"Introducing more flowering trees for streets will make my city more beautiful." (Group B- 1).

5.5.6. Water in UGSs (Blue-Green concept)

One of the discussion topics of the focus group was, what is missing in terms of Green recreation and what do you think any potential that Colombo has but not yet used in full capacity? The ex-pat group (Group C) had many opinions on this topic, based on their experiences elsewhere in the world.

Responses included:

"Colombo has an awesome sea view covering a long stretch of the town.. and then big lake in the middle of the city and of course the half malfunctioning waterway. If we would a have this setting in my city in England, we would do a lot with it. I mean I can imagine myself taking a nice little canoe trip down the canal, sunbathing on grass in a narrow (linear) park by water… that would be my weekend - much fun!" (Group C-1).

"Best place to read a book would be sitting under a tree at the beach, waiting the to see the sundown in the horizon of Indian Ocean." (Group C-3).

"This scorching weather in Colombo, I wish if I could sit on grass by Beira while drinking a cold beer.. for sure best way to cool me down.. but still a dream in Colombo." (Group C-4).

5.5.7. Heat and shade

> "Heat is too much in Colombo. Greening every possible corner would be the answer." (Group A-1).

> "Almost impossible to live without an air-conditioner in Colombo. Roofs and walls should be covered with plants." (Group B-2).

5.6. ENVIRONMENTAL RELATED TOPICS RAISED DURING PROFESSIONAL PERSONNEL INTERVIEWS

As described on Chapter 4 methodology (Table 4.3), twelve key personnel were interviewed representing the Urban Development Authority, Sri Lanka, Colombo Municipal Council and Central Environmental Authority. The following detailed answers were obtained for the questions associated with the environmental aspect of UGSs in Colombo. Insights and information that were revealed are below under appropriate headings.

5.6.1. Overview of Interviews

The interviews were based on the topics (full list questions in Appendix 2), which were associated with the environmental aspect of UGSs in Colombo. In terms of Environmental support in UGSs planning and designing in CMB, for example how designs were integrated into surrounding plantings /ecology, their view on the local environment: accessibility, traffic generation, what kind of landscape styles (traditional Sri Lankan, historical, colonial, mixed or any other), what environmental and landscape theories adapted and why. Furthermore, the professionals' view on Colombo in 10, 20 and 50 years time in terms of the 'Green City' concept and how they dealing with possible future issues on massive population growth, nature disasters, lack of space etc. were explored.

5.6.2. Environmental requirements of the population of Colombo

Responses that covered the needs of Colombo citizens included:

> "Of course it's obvious that we need to provide more parks, having many different environmental zones in and around Colombo. We have to satisfied many ecological demands other than just parks for amenity purpose. For example ;Biodiversity" (CEA-12).

> "The city's population density is increasing. Previous methods were not systematically organised to cope up with it properly as well as in terms of city development has other priorities above the need of a park. Therefore environment is suffering in Colombo". (UDA -1).

5.6.3. Geographic location of urban green spaces

> "Geographical location of Colombo is great, but geographical distribution of UGSs is not adequate at all" (UDA – 4).

> "Issues over land ownerships and finding empty lands to design new green spaces are not very straight forward task here in Colombo". (UDA- 3).

5.6.4. Travel and transport

> "Despite the recently introduced 'one-way' system, still the city has some issues with traffic flow. It's better than before. Although not efficient enough." (CMB- 11).

> "One of main complains we receiving in the Colombo Council is parking problems near main urban parks." (CMB – 9).

> "Providing a reasonable Green Space Ratio and access to a green space within a shorter travel distance are mammoth tasks for us." (CMB- 10).

5.6.5. Vegetation and appearance of UGSs

> "Clearly we understand the need of more tree planting projects in Colombo, despite the high primary cost associated with tree planting, from selection of right plant materials and planting onward, regular maintenances such a pruning, irrigation, pest and disease control." (UDA -1).

When asked if there was a specific management plan for street trees, managers said,

> "no, work was done as and when needed" (UDA- 1).

5.6.6. Water in UGSs (Blue-Green concept)

"Recently we recognised the potential of maximising the usage of waterways in Colombo in our development plans. As a first step we are currently (2010-11), clearing up long rundown canal system and Beira Lake. We have received some foreign donation too. Example, from World bank and Japan." (CMB- 9).

"As you can see its obvious that more people are happily walking around the Beira lake, for leisure as well as to get from point A to B instead of using a 'tuk-tuk' or a bus. You know Beira Lake used to be the one of the smelliest place in Colombo city." (CEA- 12).

"Look at the contraction work around 'Diyawanna Oya' [one of the biggest water bodies situated in Batteramulla, Kotte - this is one of the adjacent municipal councils]. The Proposed park 'Diyatha Uyana"[1] will be a classic example of water and green nature coming together. Of course it has added benefits other than social and recreation. Things such as urban greening plans and projects could be integrated with the environmental demands and possible future issues in terms of Ecological friendly practices in city of Colombo". (UDA- 3).

5.6.7. Brown field sites

"There are few neglected lands or under-utilised small corners are scattered around the city. We need more plans and budget to develop these places, hopefully to redevelop them to be a part of urban green network." (CEA-12).

5.6.8. Urban Heat Island effect

"One of the priorities in urban planning is to find solution for the Urban Heat Island issues in Colombo". (CEA -12).

"We are aware of the main locations in Colombo, where we need more cooling plants" (UDA -7).

5.7. DISCUSSION OF ENVIRONMENTAL FINDINGS

The survey questionnaire, focus groups and personnel interviews revealed a wide range of insights, issues and problems associated with environmental aspects of UGSs in Colombo. These issues, and their wider implications, are discussed below.

[1] This park has being opened since 2012. It is basically a linear park by the water front with many food and other recreational stalls, ornamental plantings etc.

5.7.1. Environmental requirements for the population of the city of Colombo

Colombo is a multicultural multi-ethnic city with a huge work force of both men and women. Un-built lands are rare, especially in the highly industrialised areas of the city. Public transport is considerably good compared to other parts of the country. However, the workforce has little time to commute long distances when going to parks on working days for exercise or relaxation. Non-urban 'countryside' is a drive of at least an hour away for most city residents, so the UGSs are vital for relaxation and 'natural therapy'. This role was recognised by many people in the survey, and reflected in statements made about how they value the parks (Table 5.10).

5.7.2. Geographical location of the chosen/available park and travel distance

The data in section 5.3.2 reveals that people are travelling extensive distances, with long journey times and expensive and polluting modes of transport to visit parks. Together all park visitors surveyed, 66% had travelled over 5km, 54% travelled more than 20 minutes and 69% used motorised transport to reach the park. They used modes of transport ranging from by foot to private cars and minibuses to public transport such as tuk-tuks and public buses.

A rough calculation for all those using motorised transport, using the mid-point of the journey time banding (i.e. 7.5 minutes for the 5-10 minute category) and a conservative 30 minutes for 'over 20 minutes' category, shows that just the 295 individuals surveyed spent a total of over 82 hours on the road to visit the parks. If this is multiplied by all park users, then the additional traffic on roads from people having to travel long distances to parks is considerable. As the city managers are trying to reduce and manage traffic flow, this is a strong argument for having more green leisure spaces that people could walk or cycle to.

The spatial distribution of green spaces in Colombo city is very uneven. While in some areas there are multiple parks and playgrounds within easy reach, in the highly industrialized areas the need for UGSs is immense (Figure 2.27). Areas beyond the central Colombo Municipal Council were outside of this study. However, as so many people surveyed came from beyond this central district it suggested that the suburbs of Colombo are also very short of suitable UGSs for recreation.

In this research, Crow Island showed a different pattern of use to the other more high profile parks. It had a higher proportion of neighbourhood visitors, as it is located in edge of the city and central to one social class of community. Although this park has many other problems (security, low maintenance etc.) the pattern of use was much more sustainable, with fewer polluting journeys to reach it.

In summary, people currently have to use costly, time-consuming and polluting forms of transport to access green spaces. There is a very urgent need for more local community parks like Crow Island that serve the leisure needs of local people within their walking distance.

5.7.3. Urban Heat Island effect in the city of Colombo

Many people mentioned the restrictive heat within Colombo city. The focus group of expatriates was particularly aware of this issue, but heat and shade was mentioned by many survey-participants (section 5.4.5). The Urban Heat island effect is a well-recognised phenomenon that was mentioned by two of the city managers. They also recognised the value of trees and other vegetation in mitigating this issue. A study about Urban Heat Islands (UHIs) with vegetation cover in Colombo carried out by Senanayake, Welivitiya and Nadeeka (2013), also identified the environmentally critical areas in Colombo city based on the satellite image analysis of land surface temperature and availability of vegetation cover.

Accordingly, Colombo harbour and surrounding areas were identified as the most critical areas where the heat is not adequately mitigated by vegetation. Through extensive tours of the CMC area (during the field work), current research also found, no reasonable green patches around the harbour area to conduct the questionnaire survey.

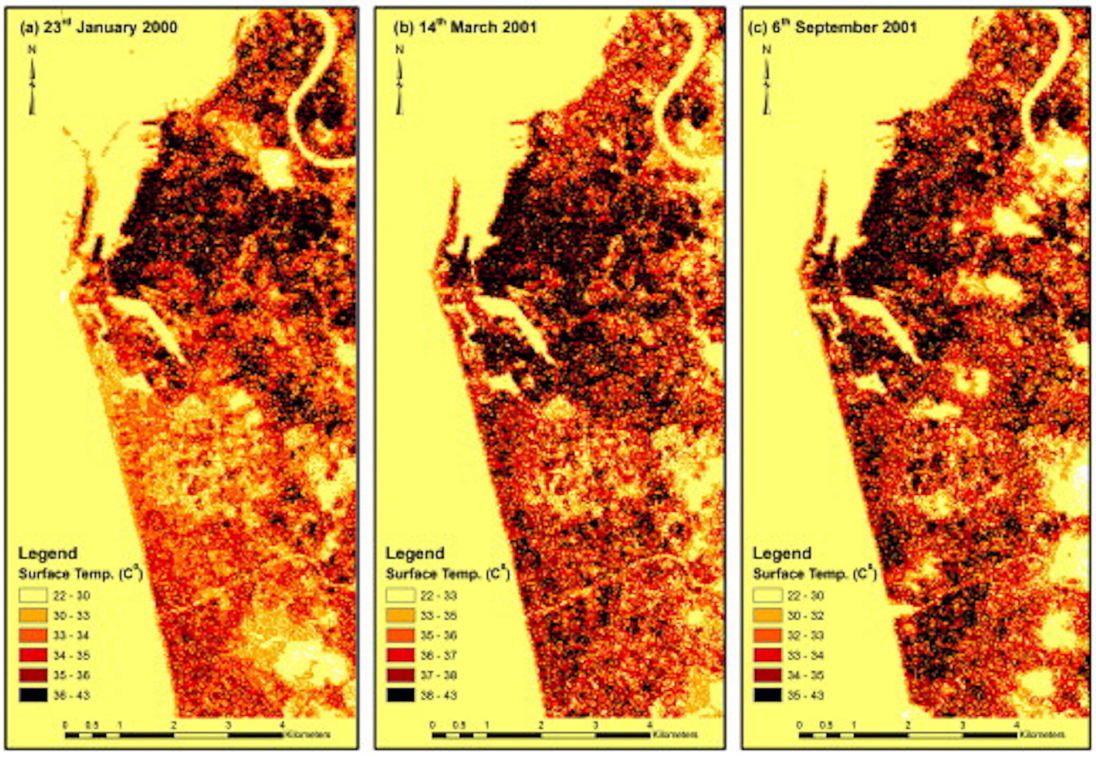


Figure 5.15 Distribution of land surface temperature in Colombo city.

(a) 23rd January 2000 (b) 14th March and (c) 6th September 2001

Source: (Senanayake, Welivitiya and Nadeeka, 2013)

Figure 5.15 shows that although the temperature varies through the year, some areas of the city are consistently uncomfortably warm (dark areas on the maps). The rise in temperature is most extreme in locations without significant vegetation cover.

Crow Island is the only extensive un-built area in the north part of the Colombo municipal area. But even that 'natural space' does not have a great deal of green cover. During the field study in this area the author also observed a lack of any healthy roadside vegetation.

5.7.4. Blue and Green urban structures (combining plants and water in urban landscape)

It is clear from on-the-ground observations and from interviews with managers, that any water bodies within the area under consideration that form the Blue and Green network of the city. The questionnaire survey showed only 3% of people who mentioned water (streams or sea) as their preferred natural feature in a park. However, this apparent low preference may be due to the design of the question. As people were only allowed to choose one feature, the importance of trees negated other expressions of preference. The relevance of water in UGSs came over more strongly in the open discussions of the Focus Groups, particularly among the expatriate group where members were familiar with the use of lakes, rivers and other water features in cities in other parts of the world.

Colombo already has an extensive water-based network, benefitting from a natural sea border on one side, a large lake in the centre (Beira Lake) and an extensive canal system providing a ready framework for green extensions into crowded residential areas within the city. In Colombo, water and green spaces have a common long running history. The seafront park Galle Face Green, the canal system and Beira Lake were established during colonial times. However in recent years they have been neglected. At present the Beira Lake and most of the canal system are of poor aesthetic and ecological quality. In the colonial periods, Colombo's canals had been very vibrant, as their counterparts in Bangkok. However, they have become very dormant since roads grew in importance in serving transport needs as well as canals are now used primarily to drain storm water and for dumping of waste.

Qualitative data gathered from the open–ended questions as well as the few focus group participants namely mentioned above two linear parks by water edge is somewhat they prefer

to use on daily basis. As historical canals are already present within the urban fabric, providing a ready framework for green extensions into crowded residential areas.

The findings from this research together with scientific studies found in literature shows that it is vital to re-develop the lake and canal system of Colombo. Therefore cleaning up and maintenance of the Beira Lake and canal system would be huge contribution to the environment and concept of blue and green urban spaces within the city. In addition it can serve as a tourist attraction and a transport system as it once did giving a partial solution to the heavy traffic within the city.

However adjacent to Colombo Municipal council area, the process of incorporating the 'blue-green' concept into city planning has already begun. As an example for functional 'blue-green' concept in local context are recently developed (not completed at the time of the survey) in *Diyatha Uyana* and the Urban Wetland Park (at Kotte, Nugegoda). There are located within Colombo district, but outside the Colombo Municipal Council (CMC) area covered by this study. They have taken into account this natural wealth of water bodies within the city premises and these newly developed parks fully capitalise on canals or water bodies. Both parks include trees, walk-ways and lawns intermingled with the inland water ways of the area.

Many visitors use for those UGSs daily for exercise (walking and jogging). A large number of people come mainly to *Diyatha Uyana* during weekends, as a place for relaxation and family outing (personal observation). These are some of the prime needs stressed by interviewees (Table 5.3). These new parks are home to numerous water birds; several stork species, pelicans, fish and garden lizards ('Thalagoya') are found to roam happily and freely in these parks. Restaurants both floating (in boats) and stationary around the water banks have been developed. And as these waterways are not as heavily polluted as Beira Lake and canals in the centre of the city, here the waterside restaurants are a success. This concepts initiated in

the new parks discussed above should be encouraged and further developed in the centre of the city, with community participation and pride in their environment. The cleaning and maintenance of the canal system should be encouraged as much as possible. Strips of green with trees could accompany these canals forming a green-network within the city, which contribute the biodiversity of the city too.

This concept needs further work and involvement at a higher governing level. However, when considering the city of Colombo, the blue and green concept seems ideal and can be implemented if sufficient attention is given to this issue.

5.7.5. Vegetation in City Of Colombo

The questionnaire survey found that the highest preference in living features was for trees/woodlands followed by neat lawns (Figure 5.11). Many people also mentioned the importance of trees for shade in comments and also in the Focus Groups. Tree shade is an important factor in mitigation of the Urban Heat Island effect, discussed in section 5.7.2.

When considering trees in Colombo, there is a considerable amount of ‘green’ in the form of large trees inherited from British colonial times. Most of the highly shaded roads in Colombo, with interlocking canopies of *Albezia saman* (*Samanea saman*) originate from this era.

In addition to their aesthetic aspect urban trees are considered a major factor in providing cooling, through shade and evapotranspiration. This would be a huge benefit to a warm, humid tropical city such as Colombo, where almost every room in any kind of building use cooling devices. Similarly, Senanayake, Welivitiya and Nadeeka (2013) suggested green roofs as an excellent alternative for low albedo roofing materials, noting that vegetation promotes evaporative cooling, consequently regulating the temperature of buildings and surrounding areas.

Selection and management of tree species for Colombo.

None of the environmental managers interviewed were aware of any specific tree management strategies in the city. As stated by Maco et al., (2005) it is essential to have database for cities on tree distribution including species composition, size and age structure etc., for more effective long-term management of street trees. Such information must be taken into consideration, when urban managers seeking to maximize the environmental benefits provided by street trees in Colombo.

In terms of climate, as a tropical city, Colombo has good temperature and rain fall to allow for lush vegetation and also a diversity of trees and shrubs to select from. However selection of tree species best suited for tropical urban conditions will depend on above- and below-ground space and the actual climate of the city (Jim and Liu 2000). Furthermore there is considerable debate on the types of vegetation, which are most suitable in as roadside plants in urban areas. As Hough (1994) has identified three main types of plant communities in the city. Those being **native plants** -found in natural forests and wetlands in and around the city; **cultivated plants** - which are products of horticultural science, and **naturalised plants** - which have adapted to city conditions with human assistance.

The city of Colombo has inherited a wealth of healthy large trees from colonial times there is no record or inventory of these. Further, it is very often the trees that are sacrificed to pave way for widening of streets and for constructions, as was the same case in Bangalore formerly known as India's Garden city (Nair, 2005; Sudhira, Ramachandra and Subrahmanya 2007). Although in the recent past (2007 till 2014), this kind of incident took place in many streets in Colombo, this sort of action should be discouraged. Cutting down of existing vegetation should not happen unless as a last resort.

Lawns

Lawns are also a high in demand feature of urban greens in city of Colombo. According to the public questionnaire the second most in-demand feature out of living and non-living entities was for neat lawns (Figure 5.11), second only to trees. It was expected that park users prefer to see manicured lawn areas in Sri Lanka. As well as the aesthetic value of a neat lawn it also offers relative sterility. Park visitors are nervous of wildlife that abounds in this tropical country (as verbalised by respondent VP3, section 5.4.3). They like to sit on grass without having extra fear over snakes, insects, and leeches so forth.

In terms of composition, native grasses are often used (rather than traditional lawn grasses, such as rye and fescue), because they are more tolerant of regional climate extremes and require less maintenance and therefore less money.

The researcher's visual observations conclude that the quality of lawns in the parks studied is very poor. For instance Galle Face Green doesn't have the appropriate robust grass varieties to cope with heavy human traffic. In such a situation considering non-native foreign cultivated grass varieties would be a good solution.

Celebrating Sri Lanka's biodiversity

Sri Lanka is a very bio-diverse country, which could a draw for tourists, but is currently not capitalised on within the city's green spaces. In the interviews, UGSs visitors mentioned that they liked to see animals and birds. There is scope for landscape design and plantings that help to support wildlife (e.g. lizards) and allow people to get closer to nature.

There is a very wide range of plants and flowers in Sri Lanka that are inherently suitable to the climate. These could be researched to find more beautiful species to adorn the parks that would also help with pride in Sri Lankan culture. Introducing special flowering seasons as an

event could be encourage people to actively and passively involve many people with urban trees. As a suggestion, something equivalent to 'Cherry Blossom Festivals' in Japan, in Colombo possible to have such an event with Robarosiya (common name as ''Local Sakura"), which may attract local and foreign tourists too.

5.7.6. Private and domestic Gardens in city of Colombo

Some residents have the ability to own a considerable private garden in a highly urbanized area such as Colombo city. However, in accordance to the Sri Lankan culture, the wish to own or have access to a private 'green' land is inbuilt to their mentalities and interwoven with the culture. Here in cultural context regardless the size of the home garden, people would like to have at least a few flowering plants, this is mainly due to passive recreation as well as religiously and culturally offering flowers are a custom of the society. Other than having flowering plants typical characteristic of an average Sri Lankan domestic/home 0garden (in cities like Colombo too) are a patch of grass, some herbal plants, one or two fruit plants/trees, in some cases when they have enough space, a small vegetable plot. However wild style gardening or wild meadows are not popular, due to concerns about animal and insect attacks.

The contribution of private or domestic gardens in urban areas cannot be overlooked when considering urban greens. As Gaston et al., (2007) described, altogether private gardens have added largest single percentage of green spaces in most urban areas around the world. For example London Biodiversity Partnership (2006) stated that in 1992, approximately 20% of the greater London land was covered by domestic gardens. However there is no scientific estimation for domestic gardens in Colombo, other than visual estimation by the author. Never the less domestic gardens in urban areas are significant in urbanised cities, including Colombo, where provision of extensive space or land for standard 'urban green spaces' is problematic.

The domestic garden can be seen as an extension of the household (Alexander, 2002), and therefore a forum for family, friends to spend leisure and quality time in. With busy and hectic life styles of urban city dwellers including those in Colombo, this is another important reason to promote private home gardens. Domestic gardens also provide storm and flood risk-reducing mechanisms in the urban matrix (Xiao and McPherson, 2002).

Although the benefits of domestic gardens and their contribution to urban green spaces is fairly clear, long term sustainability is questionable due to the scarcity of land within city limits and rapid increase in land prices. Despite all the advantages from domestic gardens there are some downsides to it too. Elton (1966) explained, in the early and mid 20th century it was believed that domestic gardens highly dominated by non-native foreign species of plants, which could be result in provision of little resource for native animals.

5.7.7. Recommendations for sites for Greening

Even though Colombo is not in a critical situation in terms of overall 'Urban Greening' issues like other similar Asian cities discussed in the example study (section 3.6), forward planning is very important. Enforcing laws on using or maximising the roofs and vertical walls combined with planning permissions would be beneficial. For example, in France new laws have just been passed stating that roofs of new commercial buildings must be either covered with vegetation or solar panels (Shan, 2012). A similar regulation in Colombo would stimulate rapid greening in the Environmentally Critical areas identified by Senanayake, Welivitiya and Nadeeka (2013), (section 5.7.2), which are predominantly commercial. The vegetation could have multiple benefits such as garden for aesthetic reasons, or growing food crops.

Although urbanisation is rapid within Colombo and land availability is at a premium, there are many sites that could be used for new greening projects. The author has observed and gathered information from the key personnel interviews, that there are under-utilized brown

field sites located in prime areas within the Colombo municipal limit. Many of the brownfield sites are located in areas of previous landfilling and waste disposal activities. Soil here could be highly contaminated, as former industrial land (factories and warehouses), canal banks and former railway corridors. Creating UGSs on this type of 'brown field' land has been successful in other parts of the world and deserves more research in the Colombo context.

Connecting green spaces is important. In Colombo recent removal of solid boundary walls built in response to the civil war threats has opened up views and increased continuity of greenery in the busy city. During the data collection period, the author noticed a massive transformation within a short time due to this type of activity. Local newspaper (11.8.11 Sunday times) polls demonstrate that the general public in Colombo are over 80% in favour of removing these walls. Rather than having solid concrete walls to mark boundaries, having green nets/fences and vegetation boundaries gives softer look to a harsh streetscape in Colombo.

5.8. CONCLUSION

For an urbanised, industrialised, and populated city like Colombo, the provision of maximum urban green spaces in a variety of capacities will benefit the well-being of both the city and its people. Currently there is a shortage in UGSs, both in terms of leisure space and functional (shade and UHI mitigation) green space. Gaps in leisure green space provision, have been identified by the visitors: 54 % of the total visitors take over 20 minutes travel to get to an UGS in Colombo. The gap in functional green space was also identified by interviewees, who commented on needing more shade and cooling vegetation. The same point has previously been identified in the study by Senanayake, Welivitiya and Nadeeka (2013) in their study of Urban Heat Islands in Colombo.

5.8.1. Colombo's environmental resources

When planning new urban green spaces, adopting an ecological approach is vital. Further, one needs to consider the limitations in land area and also the available wealth of resources. Colombo as a city is having an advantage of access to the sea on one side, a lake and an extensive canal system. These resources are currently either completely neglected or very much under-utilised.

The range of environmental resources explored in this study and recommendations to take forward are detailed in Table 5.11.

Resource	Status	Recommendations
Canal network, around the Beira Lake and Seafront	Extensive, and form a useful network into crowded residential neighbourhoods. Polluted, underutilized.	Clean up, make green canal-side linear pathways. Design as tourist attraction with attractive green promenades. Avoid rebuilding of informal settlements along canal side and seafront.
Water-side vegetation	Currently very minimal.	Landscape designers and horticulturalists to research and source appropriate species and layouts for linear park plantings.
Mature street trees	Lots, but at risk of being cut down due to uninformed policies.	Inventory of street trees with species composition, size and age structure, condition etc. to enable long-term planning and protection.
New tree plantings, emphasis the special local trees.	Some being undertaken, possibly inappropriate species.	Research to be carried out on which species will survive best in the tropical conditions and cope with the city's pollution. Research to compare native species (good for biodiversity) with exotic species whose cultivation characteristics are better known. Seasonal events initiated to connect people to special trees such as Robarosiya, equivalent to Japanese Cherry Blossom festivals.
Herbaceous plantings	Formal flowerbeds in the colonial style are common.	Research to find suitable Sri Lankan plant species that look beautiful and promote pride in Sri Lankan biodiversity.
Private gardens	There are private front or backyard green patches or communal gardens within private residential complexes.	Need to emphasis the contribution of private gardens in urban green network and collaborate with UGSs planning.

Resource	Status	Recommendations
Verges, walls and other incidental spaces	Currently very limited incidental green spaces.	Verges, side streets, pedestrian areas, shopping areas, office blocks and other institutional grounds could be easily and relatively quickly 'greened' for high positive impact. Tree-planting on residential roads as well as high-profile roads and parks to be encouraged. Roof gardens and vertical gardens on walls also encouraged with legislation and planning advice.
Boundaries	Still many concrete walls around the green properties exist in the city.	Replace walls with green nets/fences and vegetation boundaries.
Brown field sites	Currently many 'empty' sites within the city that had waste dumps or industrial properties on them. Likely to be highly contaminated.	Research clean-up methods. If possible use these sites as new Green spaces.
Local and significant plants	Not currently celebrated.	Eg; Robarosiya (large pink flowering tree)

Table 5.11 Environmental resources and recommendations.

5.8.2. Potential for new and additional UGSs

New UGSs are urgently needed for Colombo. However, the main challenge in their creation is a lack of available land. Large spaces are needed to create traditional parks (in size and shape). An alternative is suggested that takes advantage of the ecological and geographical characteristics of Colombo.

Linear parks/ green corridors are the most appropriate solution as they can be squeezed into the existing urban situation, they capitalise on the existing network of roads and particularly the canals. Linear parks also maximise the number of people within accessible distance for the space taken up.

Creating new parks at the nodes of the drainage or street systems is also very effective as intersections facilitate a large visitor catchment, and provide more route choices to other destinations.

Even though Colombo is not a very anxious situation in term of overall 'Urban Greening' issue like other similar Asian cities discussed in the example study, forward planning is very important. Enforcing laws on using or maximising the roofs and vertical walls combine with planning permissions must implemented sooner rather than later. For instant, in France, recent laws state that roofs of new commercial buildings must be either covered with vegetation or solar panels. The vegetation could have multiple benefits such as garden for aesthetic reasons, or growing food crops. This kind of ideas will address many possible further urban issues, such as extending the opportunities to have much green contacts for urban residents, and decrease the Urban Heat Island effect.

Evidence for ‘Community Gardening’ in Colombo was not founded, however the author’s recommendation is a strategy for ‘Community Gardening’ for Colombo, needs to be somewhat more customised and with very local based approach. Understanding the cultural, social and the legislation over land, it is not an easy task to apply an existing community gardening model straight in Sri Lanka. In Colombo context this segment needs more future research.

In considering utilising Brown Fields in Colombo, like many other developing countries, there are not many redevelopment projects being implemented. However the author has observed and gathered information from the key personnel interviews (not scientifically proved) there are number of under-utilized brown field sites located in prime areas within the Colombo municipal limit. Most of the brownfield sites were located previous landfilling and waste disposal activities. Soils of these properties are highly contaminated as, former industrial lands, canal banks and former railway corridors. Therefore ‘Brown Field’ is also an area where more research and investments are needed in future.

5.8.3. Summary of key points

1. Great Geographical location and different Ecological features in Colombo give it strong potential to be a ‘Haritha City”. These features include a tropical environment, monsoon rain, cooling affect from sea breeze, and existing mature urban vegetation.

2. Using water as one of the major element of the landscape and park design would be appropriate and effective.

3. Creating ‘Linear Parks’ fulfil many required design demands:

- linear parks will contribute to the biodiversity and ecosystem by forming a network with water habitats and acting as a comprehensive green corridor in order to connect

large natural features at the border of CMB council area (marshy lands, mangroves, paddy fields natural woodlands).

4. Further studies are needed on:

- Utilising brown fields
- Roof gardening – must enforce laws on using roofs effectively in future needs towards eco-city.
- Domestic Gardens in Colombo
- Community Gardening

Environmental aspects of Urban Green Spaces in Colombo context became the most important out of the three-factor spheres framework. This chapter has concluded the current status and the gaps in environmental aspect. The main issues highlighted here will be addressed during the formation of the 'Urban Green Spaces Strategy For Colombo' and its action plans (in Chapter 8). In next two main chapters (6 & 7) the social and political aspect of UGSs in city of Colombo will be discussed.

Chapter 6: Social and Cultural factors in the City of Colombo that relate to how people use UGSs

CHAPTER CONTENTS

6.1. OVERVIEW

As UGSs play multiple roles in modern society, they have been recognised for their great contribution towards social and cultural part of the human life (Ward Thompson 2004). From this perspective the UGSs are greatly involved with the social and cultural environment where people want to live.

In terms of involvement, UGSs not only provide a place to engage with recreational activities and nature, but also a place for social and cultural integration. Urban green spaces offer a wide diversity of opportunities to residents, regardless of the social demographic parameters such as age, occupation, family circumstances and abilities of individual.

As people are getting more educated about their natural surroundings, the demand for contact with plants is increasing, especially among the urban communities as they have fewer opportunities to contact nature. In recent past globally the community involvement in urban green spaces has became popular as both local council and the local community gain benefits (Jim and Chen, 2006).

The social profile and cultural backgrounds of UGS users greatly influence differential effects on attitudes, perceptions and demands on urban green spaces (Jim, 2013). According to studies carried out by Lee Scott and Moore (2002), communities with distinct socio-demographic backgrounds have different needs and anticipations for Urban Green Spaces, and thus have varied motives for visiting. Similarly in Colombo as communities become more diverse and complex the expectations from urban green spaces also becoming more complex.

UGSs act not only as a hub for community activities, but also help to bond communities together, conserve local identity, culture and heritage. For instance UGSs in the developed world emphasise the diversity of urban area by reflecting the different communities they serve

and meeting their varying needs, by providing a venue for cultural or civic festivals which consolidating a community's heritage. As Colombo is also a very multi-cultural society, findings from this study can greatly contribute to meet what the community in Colombo is expecting from urban green spaces.

European studies have identified that cultural background is also important. A study carried out in Holland (Peters, Elands and Buijs 2010) and in Germany (Jay and Schraml 2009) found that for Turkish park visitors, group activities such as having a barbeque with family and friends or playing with them are more important role than for native visitors. The study conducted in Holland, further found that immigrants mainly visit parks in larger groups for social gatherings (Peters, Elands and Buijs 2010). In contrast the majority of native white visitors prefer to be alone and have a quite time. All this research shows that users have multiple motives associated with urban green spaces. Matsuoka and Kaplan (2008) have identified a set of main motives as to use UGS for contact with nature, feel the attractive environment, social contact and recreation and play. This research aims to compare how different communities in Colombo are associated with UGSs.

Ward Thomson (2005) found that people who had visited UGSs regularly as a child had a greater appreciation of them as adults. Therefore, one of the questions in public survey was "When was your first visit to this site?" Moreover responses were compared with primary motives to visit an urban green space.

Similarly urban green space accessibility is an important constraint (Brownlow, 2006). The geographical location of the green space and limited pedestrian access could deter park visitors. Scott and Munson (1994) have shown that people with limited personal mobility due to physical impairment or limited access to public transportation use parks less frequently. Not only access, limited services or facilities, but safety issues could be the main barriers to

use the parks. Furthermore Brownlow (2006) identified that lack of sport areas or facilities, faulty visitor facilities, lack of or non-maintained play equipment, unhygienic or no existing toilets and water fountains, overgrown lawns and bushes, graffiti and dog droppings may all deter potential visitors. Hayward (1989) emphasized that park use may be reduced or prevented where potential visitors lack information about parks within their neighbourhoods and are unaware of what facilities they offer to the community.

One key feature of social life in Colombo is the colonial influences. As a former colony of Great Britain, the different 'social class system' is still an undeclared theme in Sri Lankan society. Therefore the connection between social class and park usage will be investigated, as well as the link between recreational sports clubs and green spaces in Colombo society.

As described in Chapter 4, the results were based on answers from a questionnaire survey of park users, which provided both quantitative and qualitative data, focus groups of Colombo residents and interviews with key personnel.

The main denoted points from the visitor survey were the age, gender, ethnic representation, gradations in employment status or education in general, and the physical and social milieu with special emphasis on social class system of the community of Colombo.

Firstly, the Socio-demographic characteristics of green space users of the city of Colombo will be presented. This included different visitor groups and different social classes.

Secondly, the Motives and Visitor Patterns will be explored, followed by Perceptions of Colombo community towards UGSs. In this section is an evaluation of the research on 'what is leisure, recreation and quality of life?' in terms of usage of UGSs and how the Colombo community would like to be involved with UGSs.

In the next section the barriers that may restrict the usage of UGSs in Colombo are examined.

At the end all the results will be discussed and conclusions drawn in order to answer the relevant research questions of social and cultural aspect of UGSs in the City of Colombo.

6.2. QUANTITATIVE DATA FROM QUESTIONNAIRE

6.2.1. Socio-demographic factors and UGSs in Colombo: Who are the UGS users?

To understand who they are, a complete user profile of the UGSs users in Colombo context was necessary.

6.2.1.1. Gender, age categories and UGSs

For the segmentation of 'different user group' in the UGSs Colombo gender and age were used as main parameters.

Gender

Out of 295 responders 65% are male and 35% are female. The breakdown by park is shown in Table 6.1 and Figure 6.2 .

Park	Male	Female	Total
IS	51 (65%)	27 (35%)	**78 (100%)**
VP	53 (65%)	29 (35%)	**82 (100%)**
GF	49 (58%)	36 (42%)	**85 (100%)**
CI	39 (78%)	11 (22%)	**50 (100%)**
	192 (65%)	**124 (35%)**	**295 (100%)**

Table 6.1 Gender of UGS interviewees.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

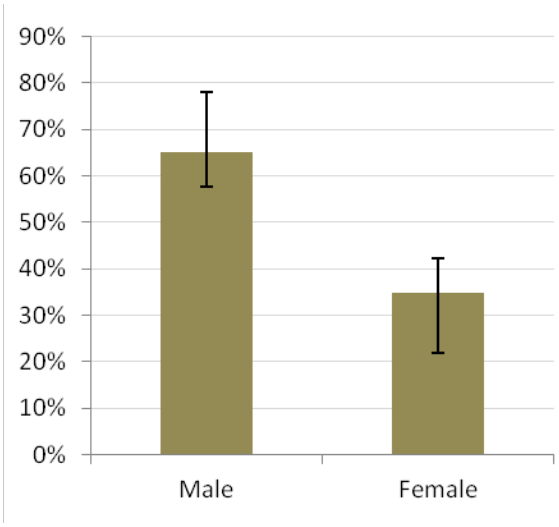


Figure 6.1 Gender of UGS interviewees.

IS = Independence Square VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

.

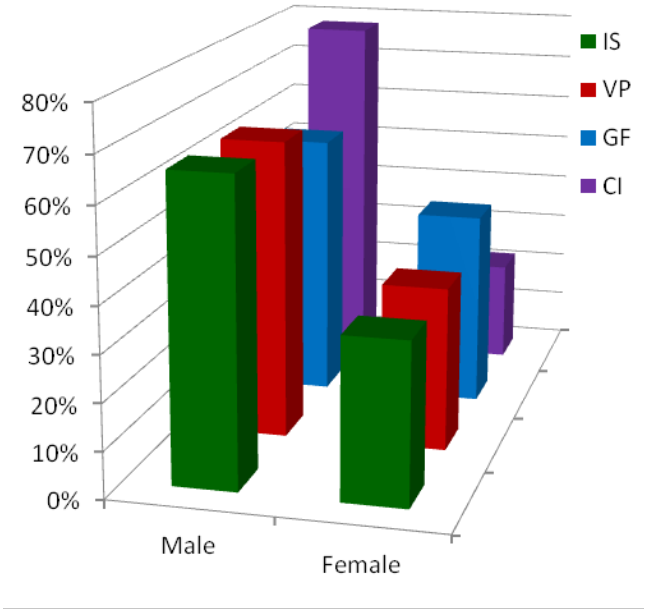


Figure 6.2 Gender of interviewees, by UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

The above Figure 6.1 shows the range of male responders as 58%-78% and Female as 22%-42%. According to Fiuger 6.2 Crow Island has higest male representation and lowerest female represention among the four UGSs.

Age groups

Age groupings of interviewees is displayed in Table 6.2 and Figure 6.3.

Age	IS	VP	GF	CI	All parks
12-18 yrs	0 (0%)	9 (11%)	6 (7%)	0 (0%)	**15 (5%)**
18-24yrs	22 (28%)	27 (33%)	32 (38%)	10 (20%)	**91 (31%)**
25-34yrs	17 (22%)	18 (22%)	19 (22%)	15 (30%)	**69 (23%)**
35-44yrs	9 (12%)	14 (17%)	11 (13%)	10 (20%)	**44 (15%)**
45-54yrs	21 (27%)	8 (10%)	11 (13%)	9 (18%)	**49 (17%)**
55-64yrs	2 (3%)	2 (2%)	2 (2%)	4 (8%)	**10 (3%)**
65-74yrs	6 (8%)	1 (1%)	4 (5%)	1 (2%)	**12 (4%)**
over75yrs	1 (1%)	3 (4%)	0 (0%)	1 (2%)	**5 (2%)**
	78 (100%)	**82 (100%)**	**85 (100%)**	**50 (100%)**	**295 (100%)**

Table 6.2 Age distribution of UGS interviewees.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

Representation of age group 12-18 years was generally low, especially in Independence Square and Crow Island where no responders were found under this category. The highest representation of age group 24-34 years (69%) had a fairly equal distribution among the four sites.

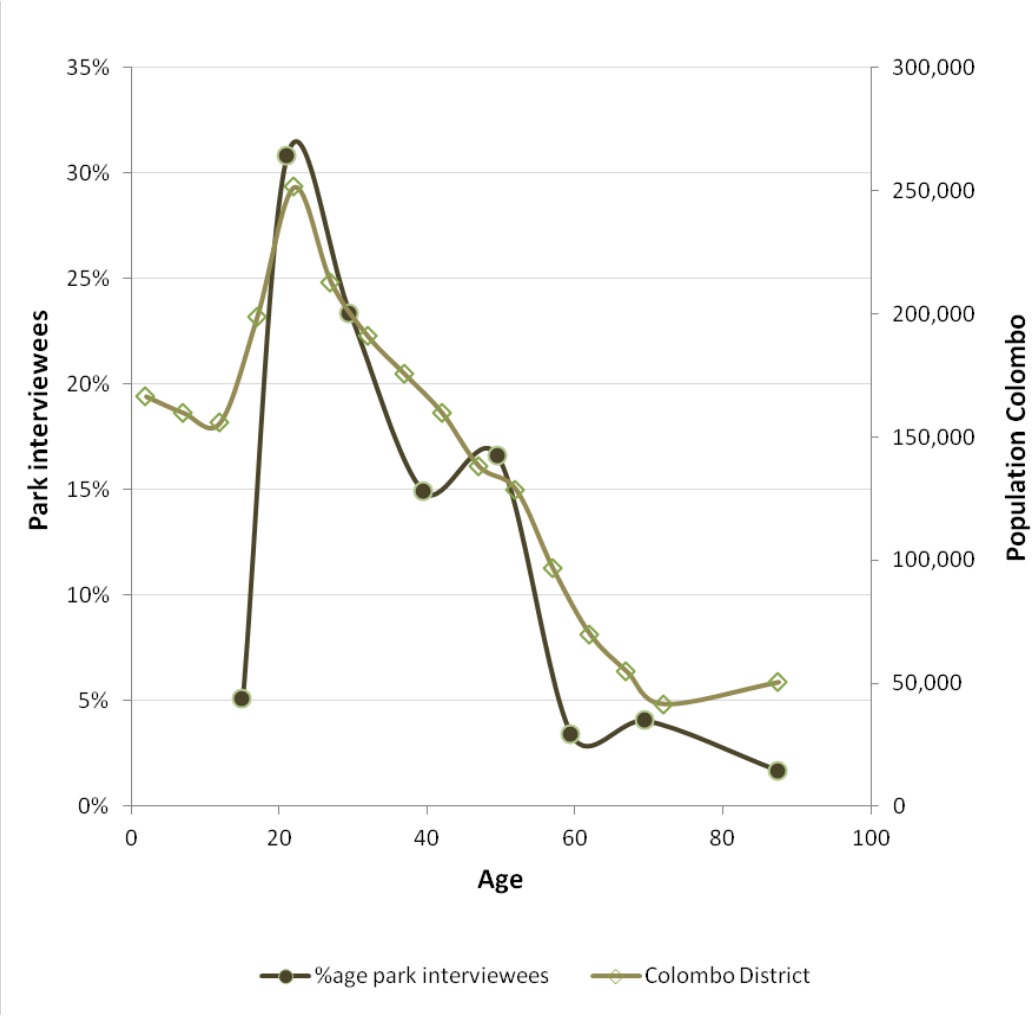


Figure 6.3 Age profile of UGS interviewees compared to general colombo population

Census data for Colombo district population from:
http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp-2014

Children were not a part of the targeted interview group. Anyone who appeared to be under 12 years was not interviewed. This was due to ethical reasons as well as under 12 were in a hurry to play or run around. At almost all sites there were many children present as part of the group either with parents or with a family member. Group composition is explored in section 6.2.2. The age profile follows the city's census data relatively closely (Figure 6.3), but some differences are apparent. Teenagers were poorly represented across all sites. Only 5% of the total interviewed population was under 18.

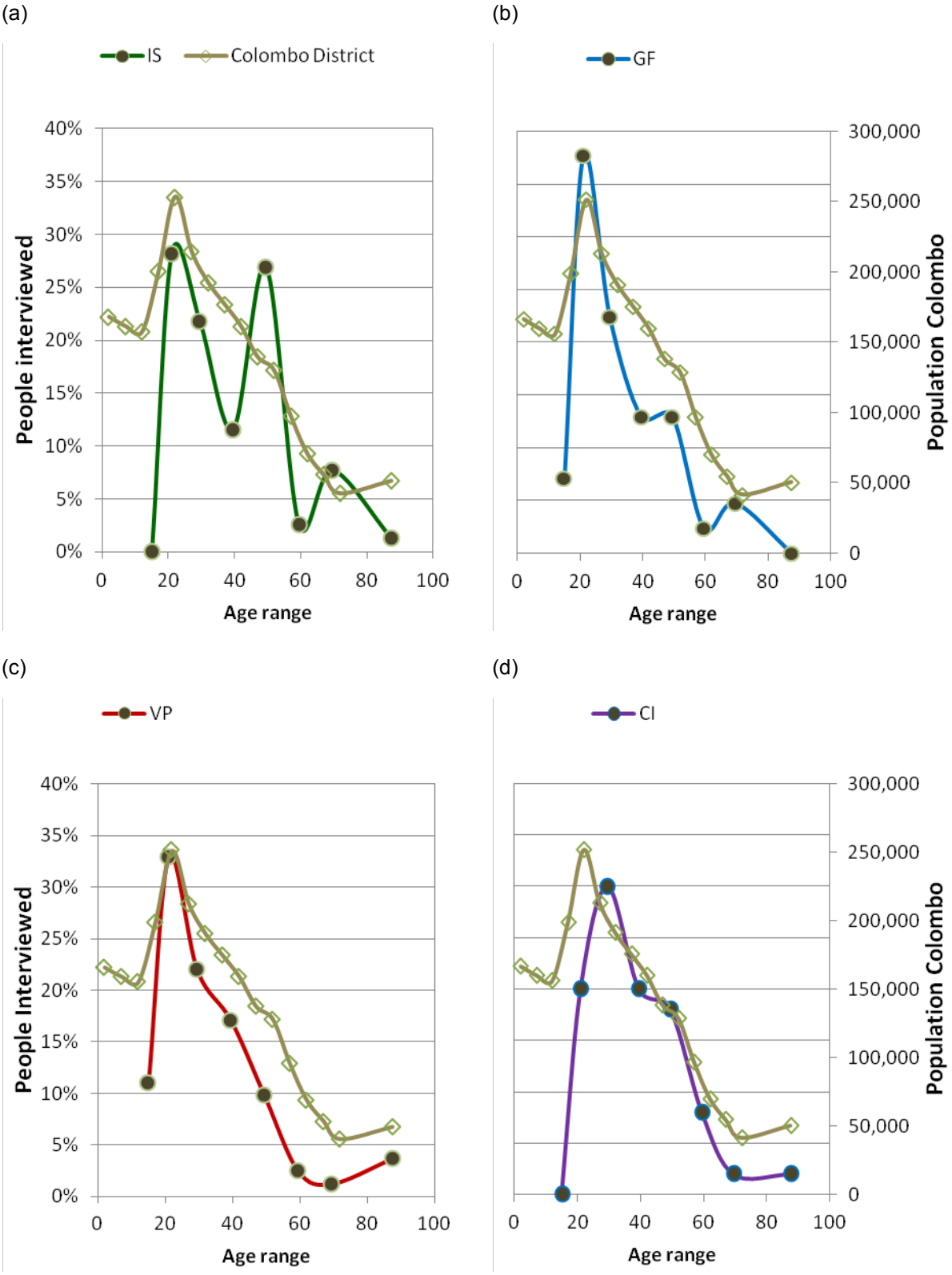


Figure 6.4 Age profile of park interviewees, by UGS, compared to Colombo census data.

Census data for Colombo district population from 2014:
http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp

Comparation below (Figure 6.5) shows that interesting pattern. All the age groups of four UGSs follow almost similar pattarn and follows the census line of the Clombo population. but Independence Square has a lower rate in 20-40 and higher user rate aged between 40-60.

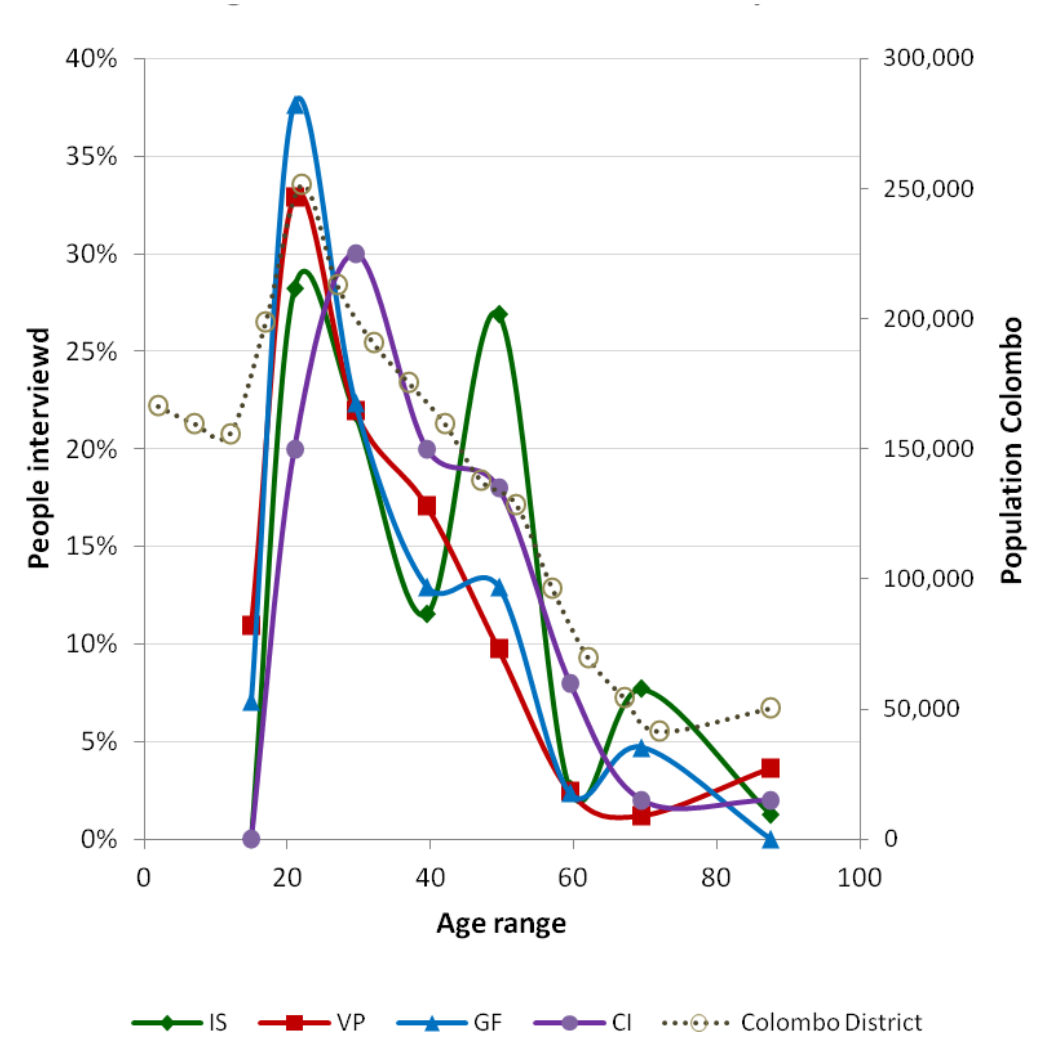


Figure 6.5 Age profile of park interviewees, by UGS, compared to Colombo census data (all data on same chart for comparison).

Census data for Colombo district population from 2014:
http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp

When parks are examined separately, some differences emerge. The age group 18-24 years of visitors was the majority (30%) of the interviewees. Over 35% of the Galle Face Green interviewees were in this age group.

Followed by 18-24 years, the age group 25-34 and 35-44 years became as second highest user groups, and show similar pattern in all four sites. In general, the majority of visitors were in the range of mature adults (45-54 and 55-65 years) categories. Age group 45-54 and 65-75 years were more represented in Independence Square.

Over 75 years group was 2%, which makes the older age group representation considerably less than other age categories, although population census also shows a very low proportion of over 75s in Colombo. Viharamahadevi Park, which caters relatively for all age categories, has under 18 and over 75 years users relatively more than any other park.

Age and gender

When age and gender are examined together, differences in the profiles emerge.

In the general Colombo District population there are slightly more males than females in the 20-24 years age group, this gap is only 8%. In the park visitors though, females in the 18-24 years group are very under-represented, at only 26% of that age group (would expect mu closer to 57 %). However males in the same age group represention in the UGSs, closely follow the Colombo male population line (Figure 6.6).

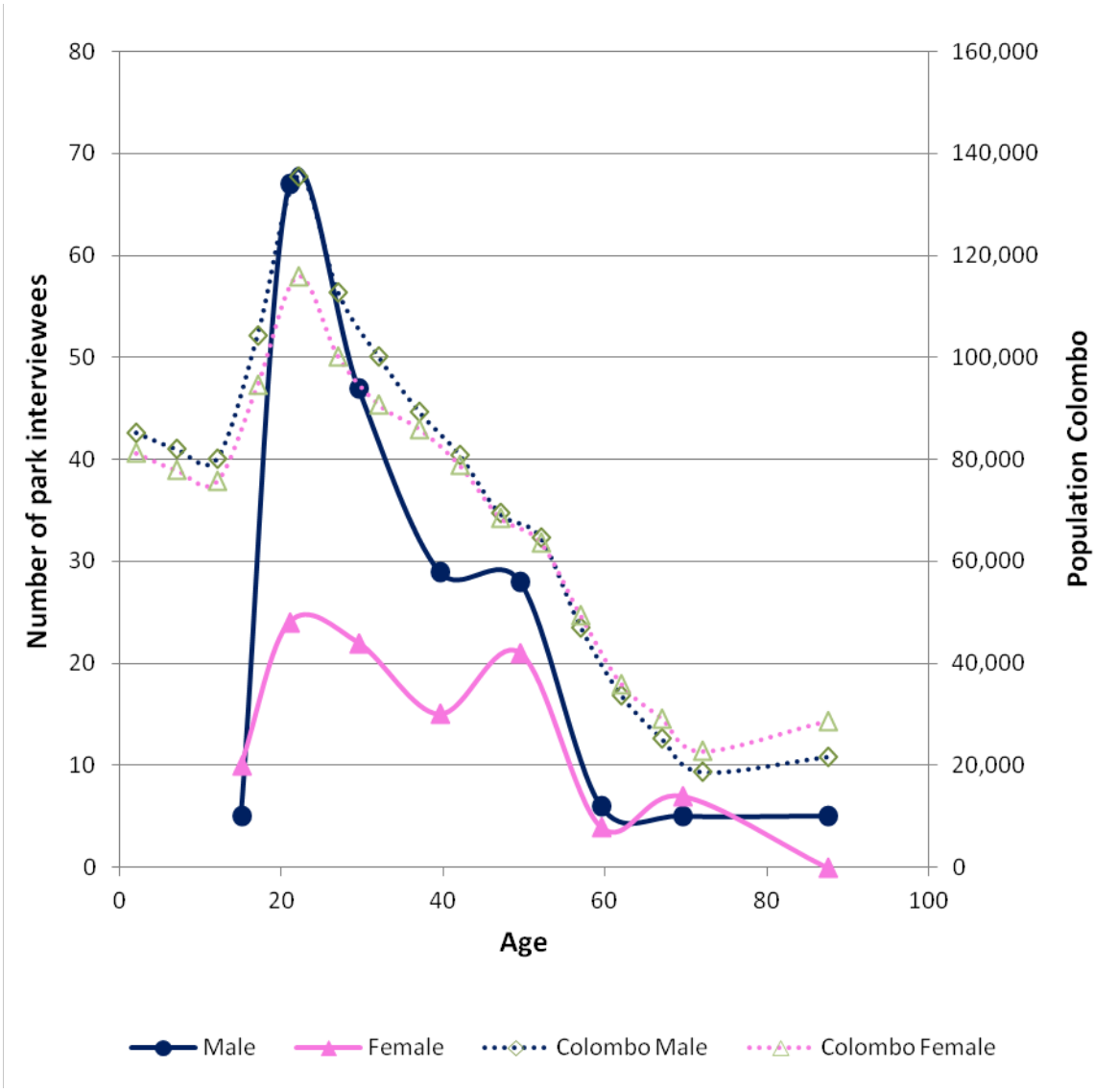


Figure 6.6 Age profile of UGS interviewees by gender, compared to general Colombo population.

Census data for Colombo district population from 2014:
http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp

6.2.1.2. Occupation, ethnicity and social class system in Colombo and UGSs

Other than gender and age there was a need to identify the full characteristics of the users of UGSs in Colombo. Therefore the following data was gathered and analysed, on occupation and ethnicity. Social class was inferred, as it was not culturally appropriate to ask this as a direct question. Also, the users' educational level was not asked due to cultural reasons.

Occupation Status

Visitors' occupation status is shown in Table 6.3 and Figure 6.7. More than half of the visitors were in full time employment (51.9%). Students (16.9%), Unemployed (12.5%), Part-time (3.1%), Parent and Guardian (8.1%), Retired (4.4%) and category 'other' who did not indicate or not fall into any categories above represented was 3.1% of the total interviewees.

Age	IS	VP	GF	CI	All parks
Full time employed	48 (62%)	34 (41%)	40 (47%)	31 (62%)	**153 (52%)**
Student	12 (15%)	25 (30%)	11 (13%)	2 (4%)	**50 (17%)**
Unemployed	7 (9%)	5 (6%)	17 (20%)	8 (16%)	**37 (13%)**
Parent/Guardian	8 (10%)	4 (5%)	10 (12%)	2 (4%)	**24 (8%)**
Part time employed	0 (0%)	6 (7%)	3 (4%)	0 (0%)	**9 (3%)**
Retired	2 (3%)	5 (6%)	4 (5%)	2 (4%)	**13 (4%)**
Other	1 (1%)	3 (4%)	0 (0%)	5 (10%)	**9 (3%)**
	78 (100%)	82 (100%)	85 (100%)	50 (100%)	**295 (100%)**

Table 6.3 Occupation of UGS interviewees.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

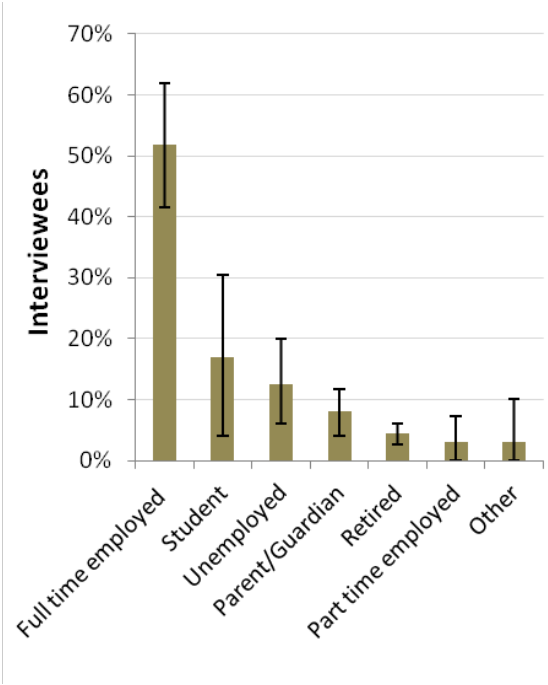


Figure 6.7 Occupation – visitors to all parks.

Thin bars show range of responses within the four UGSs.

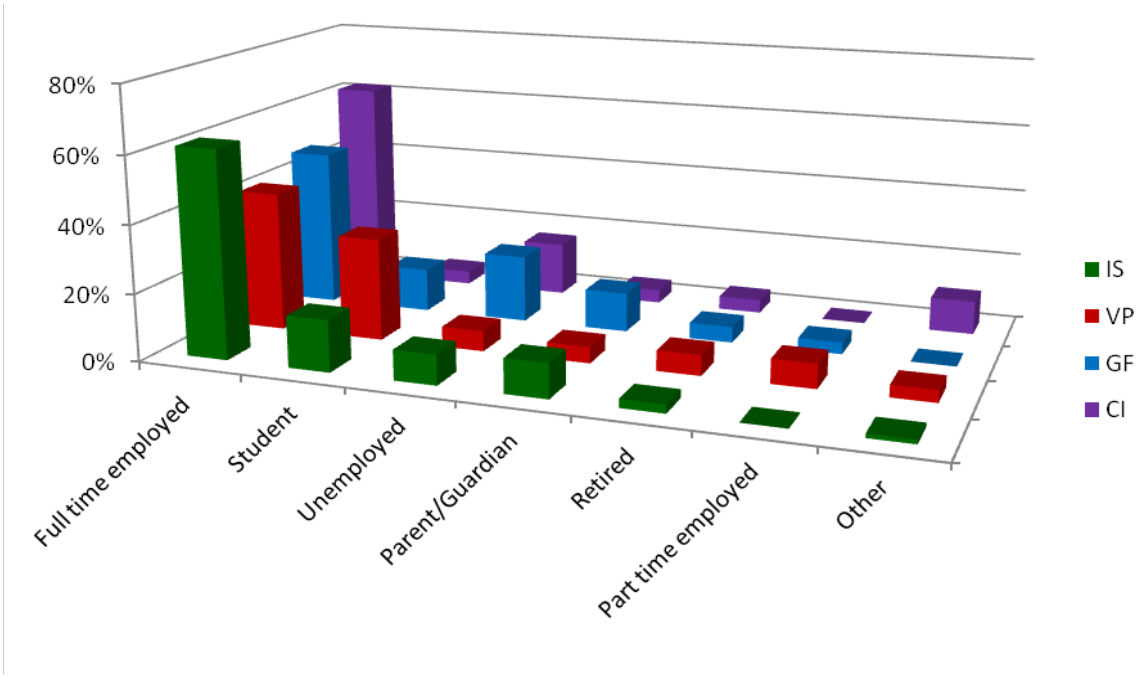


Figure 6.8 Occupation of park interviewees, by UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

The visitors who are full-time employed were the highest in each UGS. A slightly higher student representation was recorded in Viharamahadevi Park.

Ethnicity

Interviewees were asked to which of the main ethnic groups they belonged. The data is displayed in Table 6.4 and compared with Colombo census data in Figure 6.9.

Ethnicity	IS	VP	GF	CI	All parks
Sinhalese	70 (90%)	57 (70%)	56 (66%)	12 (24%)	195 (66%)
Tamil	4 (5%)	14 (17%)	5 (6%)	30 (60%)	53 (18%)
Muslim	1 (1%)	11 (13%)	21 (25%)	8 (16%)	41 (14%)
Other	3 (4%)	0 (0%)	3 (4%)	0 (0%)	6 (2%)
Total	**78 (100%)**	**82 (100%)**	**85 (100%)**	**50 (100%)**	**295 (100%)**

Table 6.4 Ethnic group of UGS interviewees.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

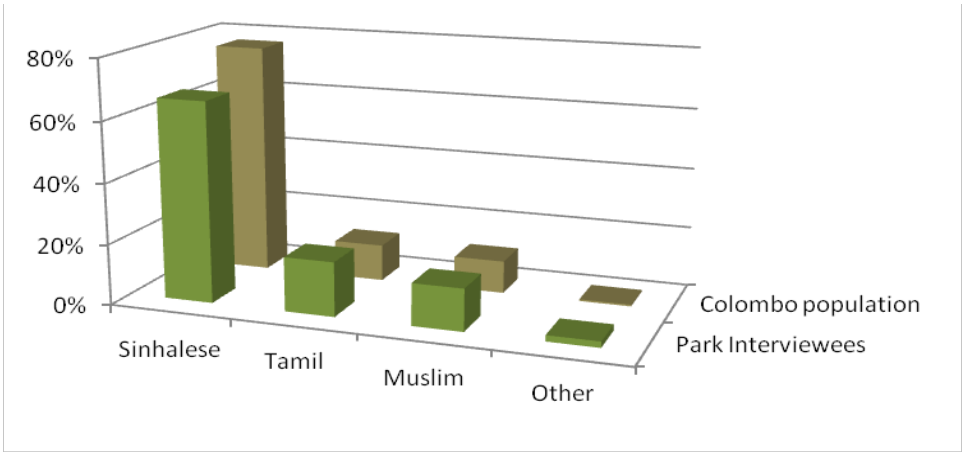


Figure 6.9 Ethnicity of UGS interviewees compared to Colombo District. Census data for Colombo district population from 2014: http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp

In comparison with park interviewees from different ethnic groups and the population of different ethnic groups in Colombo, shows relatively equal percentage of representation in all Tamil, Muslim and Other. But proportion of the Sinhalese is slightly less using park facilities in Colombo.

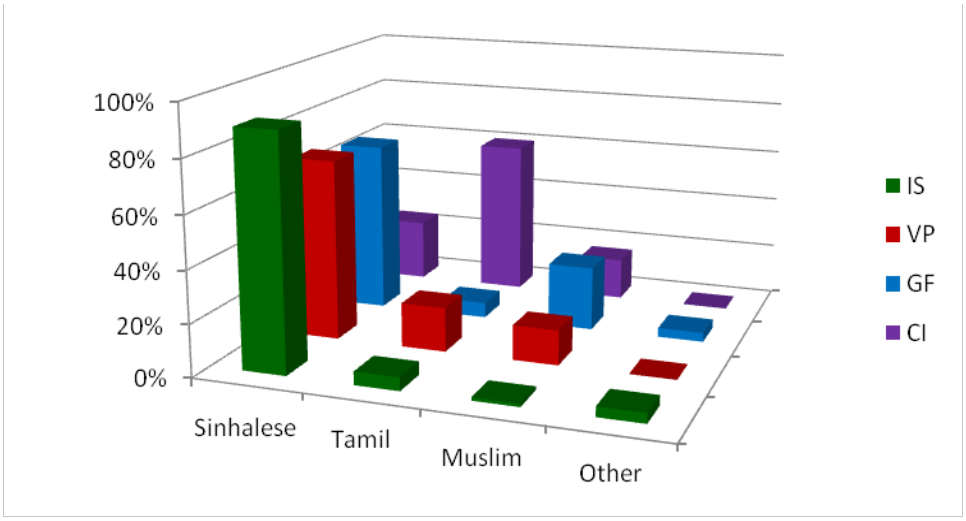


Figure 6.10 Ethnic origin of park interviewees, by UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

Among the Sinhalese, Independence Square and Viharamahadevi Park were mostly used respectively 90% and 70% of the total users of each parks. 60% of the Crow Island visitors were Tamil, while Galle Face Green had a higher percentage of Muslim users than the other parks.

Table 6.5 (below) shows population figures according to religion. This census data (2011) show how multi-religious the city of Colombo is.

Religion	Population	Percentage
Buddhist	1,578,246	70.1%
Hindu	194,743	8.7%
Islam	241,944	10.7%
Roman Catholic	181,920	8.1%
Other Christian	51,334	2.3%
Other	3,087	0.1%

Table 6.5 Population distribution in Colombo according to Religion 2014.

Source: http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp

6.2.2. Logistics of visit and motives for visiting UGSs: how and why they visit

In order to understand the complete process of a 'logistics of visit', which includes from leaving home till reach an UGS, has few main points to be considered, such as all the possible decision making; time and the day, mode of transport, travelling alone or in group so forth. In many UGS related literatures referred this as 'Visitor Pattern'.

Familiarity with site

The first question asked was 'when was the first time the users had visited the selected site'. Their responses are displayed in Table 6.6 and Figure 6.11, with data for each UGS displayed in Figure 6.12.

	IS	VP	GF	CI	All parks
Today/ in last month	2 (3%)	6 (7%)	0 (0%)	5 (10%)	**13 (4%)**
Since 6 months	13 (17%)	1 (1%)	6 (7%)	5 (10%)	**25 (8%)**
More than 1 year	13 (17%)	10 (12%)	6 (7%)	15 (30%)	**44 (15%)**
Since post war (2009)	14 (18%)	6 (7%)	4 (5%)	0 (0%)	**24 (8%)**
Before the war	10 (13%)	7 (9%)	11 (13%)	6 (12%)	**34 (12%)**
Since childhood	13 (17%)	46 (56%)	58 (68%)	14 (28%)	**131 (44%)**
(No response)	13 (17%)	6 (7%)	0 (0%)	5 (10%)	**24 (8%)**
	78 (100%)	**82 (100%)**	**85 (100%)**	**50 (100%)**	**295 (100%)**

Table 6.6 First visit to this UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

The category 'Since childhood' was significantly higher than any other categories, however Independence Square claimed the category 'Since post war (2009)' as highest. This is likely

to be due to high demand since security measures have been removed and reflect the recent renovation projects that have taken place in the green area.

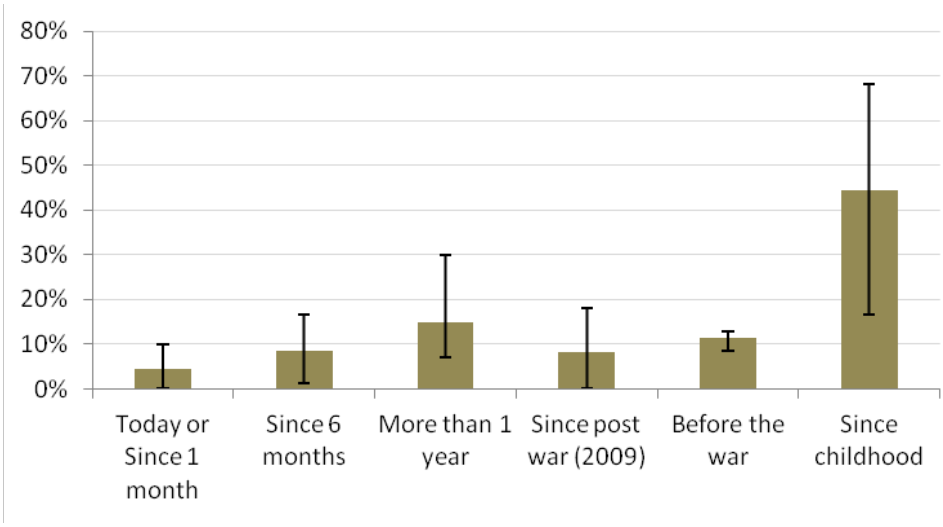


Figure 6.11 First visit to UGS – interviewees from all UGSs.

Thin bars show range of responses within the four parks.

Almost half the interviewees (44%) have been visiting that park since childhood.

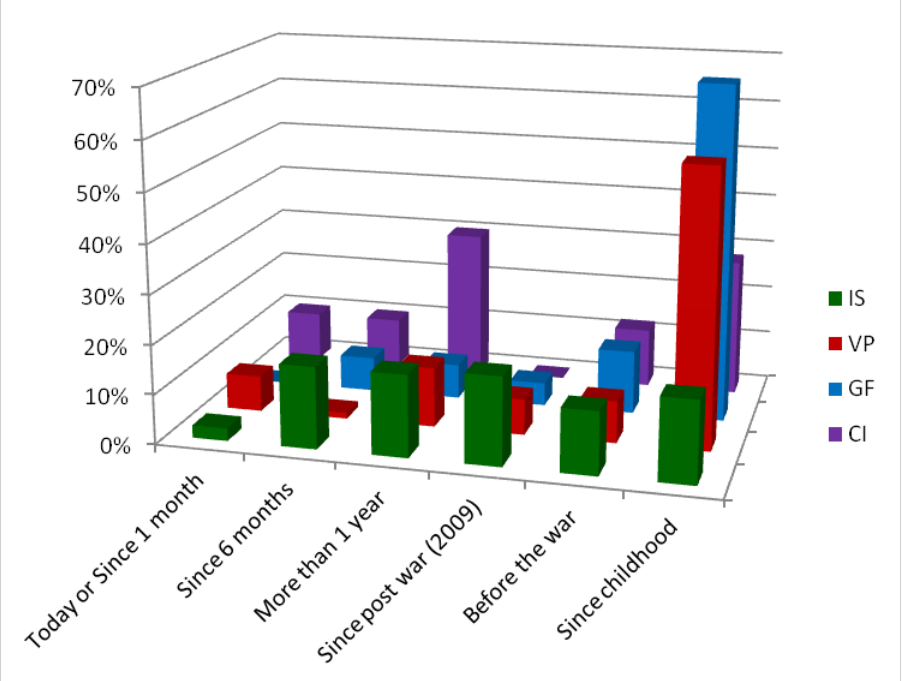


Figure 6.12 First visit, by park.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

The interviewees from Viharamahadevi Park and Galle Face Green and Crow Island have reported 'Since childhood' as highest. However Crow Island shows 'More than 1 year' category slightly higher than that as 28% to 30%. This was due increased security in the park.

Frequency of visit and distance travelled to get there

Question B2 asked "How often do you visit this Green Space?". Answer options ranged from 'more than once a week' to 'this is first visit'. Results are displayed in Table 6.7 and Figure 6.14. 'Daily Users' category was not included, due to parking restrictions around the parks on certain days of the week (most visitors use private motorised transport).

	IS	VP	GF	CI	All parks
> once a week	22 (28%)	16 (20%)	23 (27%)	14 (28%)	**75 (25%)**
> once a month	12 (15%)	10 (12%)	18 (21%)	30 (60%)	**70 (24%)**
Monthly	7 (9%)	30 (37%)	30 (35%)	1 (2%)	**68 (23%)**
Annually	24 (31%)	20 (24%)	14 (16%)	0 (0%)	**58 (20%)**
1st visit	13 (17%)	6 (7%)	0 (0%)	5 (10%)	**24 (8%)**
	78 (100%)	**82 (100%)**	**85 (100%)**	**50 (100%)**	**295 (100%)**

Table 6.7 Frequency of visits to UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

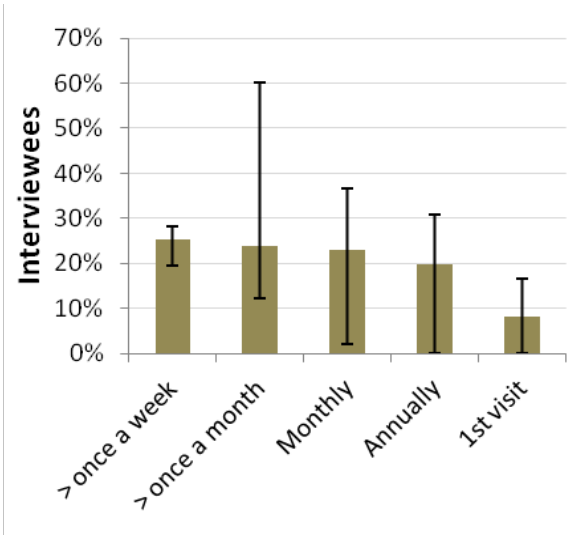


Figure 6.13 Visit frequency – visitors to all parks.

Thin bars show range of responses within the four parks.

All parks have a core of regular users (more than once a week) of about 25% of total visitors. Beyond this the visitor patterns vary widely depending on the park (Figure 6.14). The visitors who come to CI visit more frequent than visitors to other three UGSs. Out of total CI visitors, 88% (‘more than once a week’ + ‘more than once a month’) use the park on a regular basis.

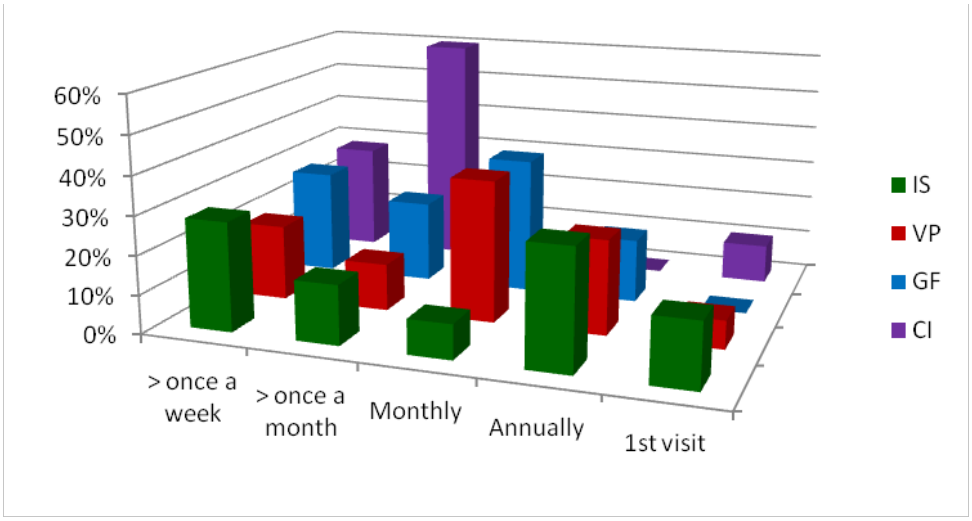


Figure 6.14 Visit frequency, by park.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

Table 6.8 shows how frequently user make a visit and the distance needed to be traveled to get to the preferred urban green space, and the data is summarised for all parks in Table 6.9.

	1st visit	Annually	Monthly	> Once a month	> Once a week	Total
<0.5km	5 (2%)	0 (0%)	0 (0%)	8 (3%)	8 (3%)	**21 (8%)**
0.5 to 1km	1 (0%)	5 (2%)	4 (1%)	19 (6%)	3 (1%)	**32 (10%)**
1 to 5km	1 (0%)	9 (3%)	3 (1%)	9 (3%)	25 (8%)	**47 (15%)**
>5km	4 (1%)	7 (2%)	5 (2%)	19 (6%)	19 (6%)	**54 (17%)**
Outside	13 (4%)	37 (13%)	56 (19%)	15 (5%)	20 (7%)	**141 (48%)**
	24 (8%)	**58 (20%)**	**68 (23%)**	**70 (23%)**	**75 (25%)**	**295 (100%)**

Table 6.8 Frequency of visit and distance travelled, all UGSs.

	Once a year or first time	'Regulars' - at least monthly	Total
<0.5km	5 (2%)	16 (5%)	**21 (8%)**
0.5 to 1km	6 (2%)	26 (9%)	**32 (10%)**
1 to 5km	10 (3%)	37 (13%)	**47 (15%)**
>5km	11 (4%)	43 (15%)	**54 (17%)**
Outside	50 (17%)	91 (31%)	**141 (48%)**
	82 (28%)	213 (72%)	**295 (100%)**

Table 6.9 Summary of frequency of visit and distance travelled, all UGSs.

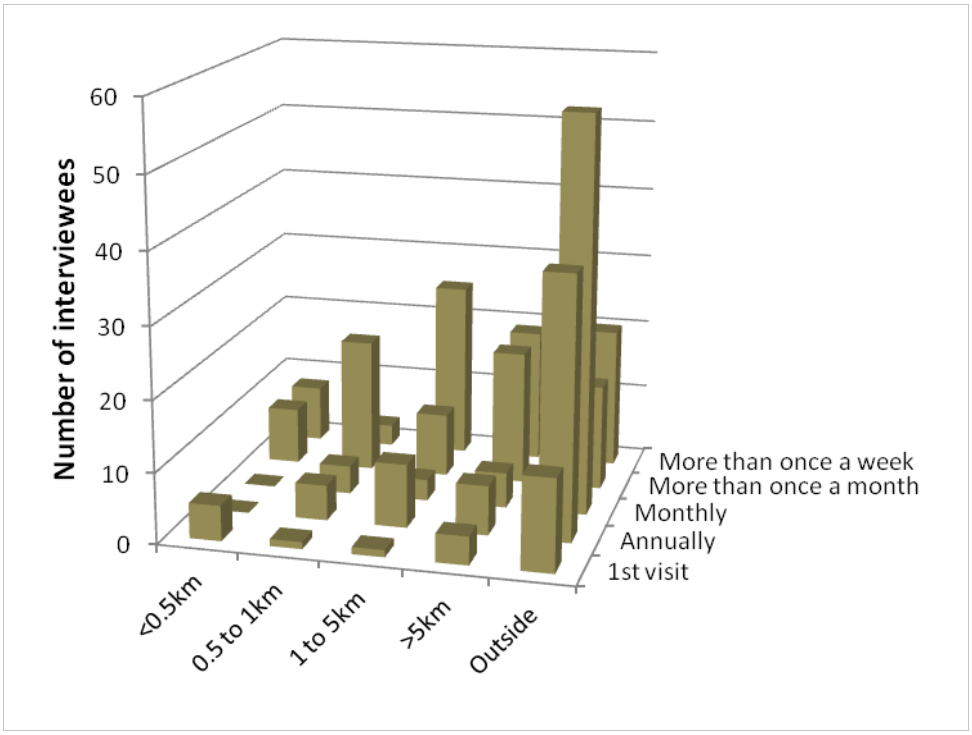


Figure 6.15 Frequency of visit and distance travelled, all parks

The above Table 6.9 and Figure 6.15 show that, total of 72% counted as 'Regulars' (visit at least monthly). Particularly 31% out of 'Regulars' come from 'out side of Colombo'.

With whom do visitors come to the UGSs?

When groups are analysed for their composition (including the interviewee) the pattern looks like this (Table 6.10): In group composition, the children are under 12 years, teen-ages are between 12-18 years, adult are between18-64 years and Senior Citizen are 64 years and over.

Loner or group - age bands	Frequency	Percentage
T alone	2	(1%)
A alone	55	(19%)
S alone	7	(2%)
With others (group composition):		
A	72	(24%)
TA	59	(20%)
CA	58	(20%)
CTA	19	(6%)
CAS	6	(2%)
T	5	(2%)
AS	4	(1%)
CTAS	3	(1%)
CS	3	(1%)
TAS	2	(1%)
C	0	(0%)
CT	0	(0%)
CTS	0	(0%)
TS	0	(0%)
S	0	(0%)
Totals	**295**	**(100%)**

Table 6.10 Composition of groups and lone visitors to all UGSs.

C=Children T = Teenager(s), A = Adult(s), S = Senior citizen(s)

Note: 'Groups' includes couples.

In IS and CI all most no 'under 18s' were available for interviewing. No groups of children without adults or teens were recorded. Seniors were recorded in 25 (8%) of groups/individuals. Children were recorded in 90 (31%) of groups. Teenagers were recorded in 90 (31%) of

groups/individuals. Seniors were only came either on their own or in multi-generational groups.

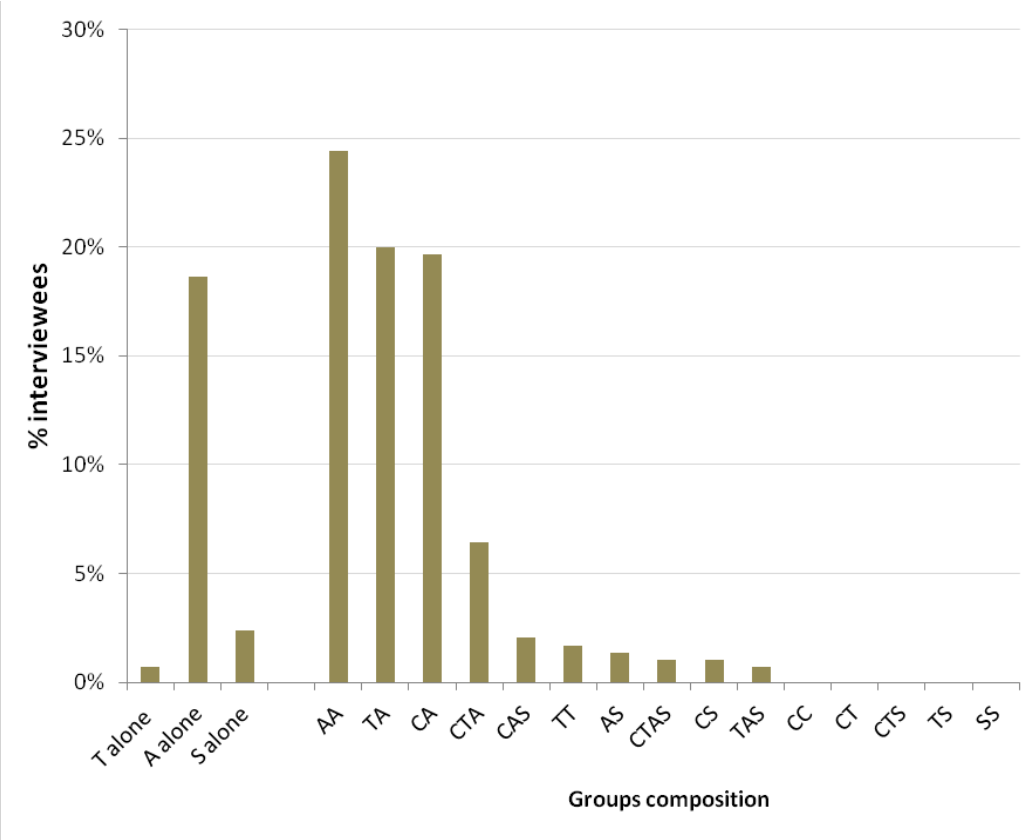


Figure 6.16 Composition of groups and lone visitors to all USSs.

C=Children T = Teenager(s), A = Adult(s), S = Senior citizen(s)

Note: 'Groups' includes couples.

In group composition, the most commonly adult (between18-64 years) coming with another adult(s) as a group (24%). Compositions of first three groups have an adult always as a group member. Interestingly either teenage (between 12-18 years) with a teenager(s), Senior Citizen (64 years and over) with a Senior citizen(s) were not recorded.

Does the group composition vary depending on gender of the interviewee?

Data for gender is summarised in Table 6.11:

	Male	Female	Total
Alone	37 (13%)	27 (9%)	**64 (22%)**
In a Group	126 (43%)	58 (20%)	**184 (62%)**
Both	29 (10%)	18 (6%)	**47 (16%)**
	192 (65%)	**103 (35%)**	**295 (100%)**

Table 6.11 Summary of frequency of visit and distance travelled, all UGSs.

$Chi^2=2.659$, p=0.265

A high p-value suggests that proportion of male/female and groups/loners was as expected according to the proportions of each. The same pattern occurred for the distribution of Adults, Teens and Senior citizens coming either alone or in a group. Both genders prefer to visit UGSs as a part of a group. However males have much higher (43%) tendency then females (28%) to be a part of a group.

Group size and transport

In order to identify the whole process involve with logistics of visits, the author compared the mode of transport and visiting alone or as a part of a group.

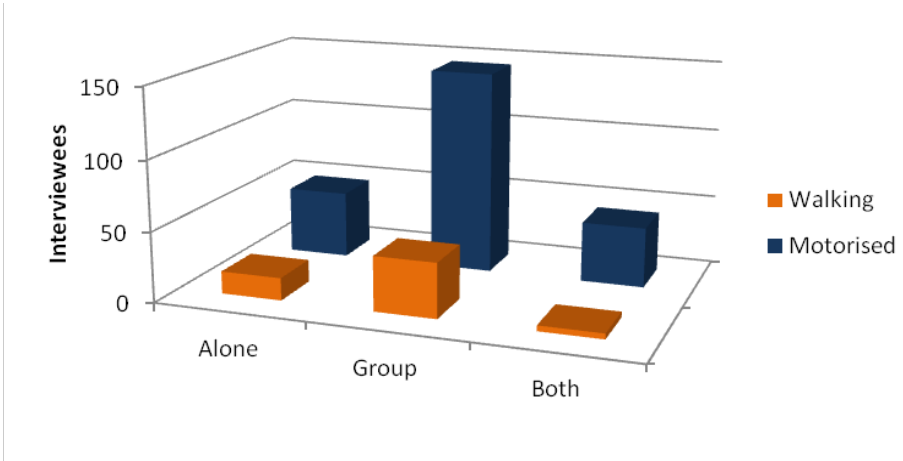


Figure 6.17 Transport mode vs visitor alone or in a group.

6.2.2.1. Duration of visit

To explore whether visitor patters differ between weekdays and weekends, interviewees were asked how long they usually stay for (if they visit at all) during weekdays and weekends.

Table 6.12 and Figure 6.18 display the visitor pattern (visit duration, on weekdays and weekends). The way question was designed (Appendix; A- question number B6), each user had an opportunity to answer for both weekday and weekend situations. Therefore the total number of answers was 590. Weekend visits are much more higher than weekday visits. Nearly half of the weekend visitors (45%) stay more than 2 hours while of the weekday visitors only 8% stay more than 2 hours.

	IS	VP	GF	CI	All parks
Weekdays					
Do not visit	34 (44%)	64 (78%)	73 (86%)	42 (84%)	**213 (72%)**
Less than 30 minutes	10 (13%)	6 (7%)	4 (5%)	0 (0%)	**20 (7%)**
30 minutes- 1hour	19 (24%)	0 (0%)	2 (2%)	7 (14%)	**28 (9%)**
1 - 2 hours	8 (10%)	0 (0%)	2 (2%)	1 (2%)	**11 (4%)**
More than 2 hours	7 (9%)	12 (15%)	4 (5%)	0 (0%)	**23 (8%)**
	78 (100%)	82 (100%)	85 (100%)	50 (100%)	**295 (100%)**
Weekends					
Do not visit	23 (29%)	8 (10%)	2 (2%)	1 (2%)	**34 (12%)**
Less than 30 minutes	12 (15%)	3 (4%)	4 (5%)	2 (4%)	**21 (7%)**
30 minutes- 1hour	12 (15%)	4 (5%)	7 (8%)	8 (16%)	**31 (11%)**
1 - 2 hours	11 (14%)	24 (29%)	21 (25%)	19 (38%)	**75 (25%)**
More than 2 hours	20 (26%)	43 (52%)	51 (60%)	20 (40%)	**134 (45%)**
	78 (100%)	**82 (100%)**	**85 (100%)**	**50 (100%)**	**295 (100%)**

Table 6.12 Duration of visits to UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

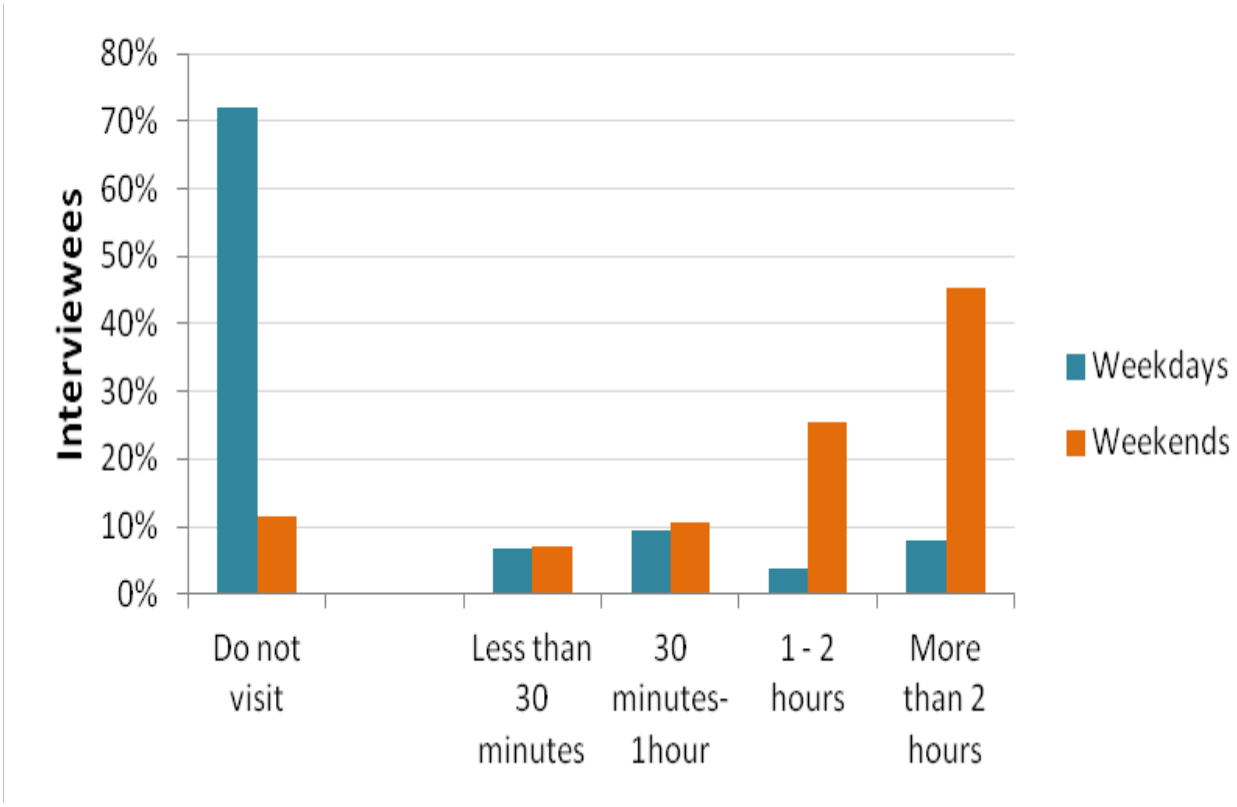
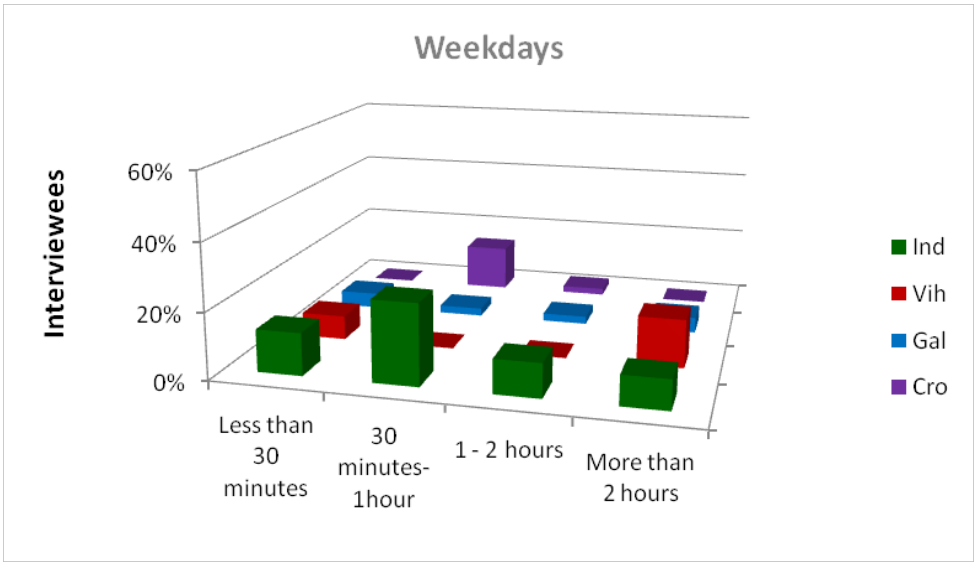


Figure 6.18 visit duration, weekdays and weekends – all UGSs.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island



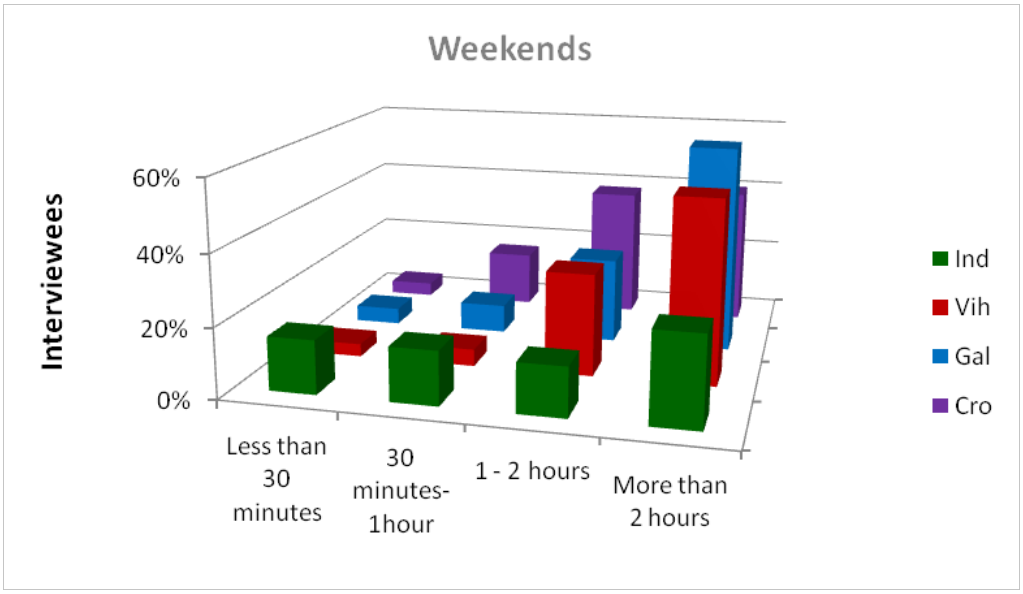


Figure 6.19 visit duration, weekdays and weekends, by park.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

Among the weekday visitors to Independence Square, the 30 minutes to 1 hour category is relatively high compared to the other weekday visit durations. Independence Square is mainly use for exercise or jogging, which fits this time frame. By contrast, at weekends relatively few users stay for only a short duration of less than one hour.

When this data is divided by gender, clear differences can be seen (Table 6.13):

	Male	Female	Total
Weekdays			
Do not visit	139 (47%)	74 (25%)	**213 (72%)**
Less than 30 mints	5 (2%)	15 (5%)	**20 (7%)**
30 minutes- 1hour	20 (7%)	8 (3%)	**28 (9%)**
1 - 2 hours	11 (4%)	0 (0%)	**11 (4%)**
More than 2 hours	17 (6%)	6 (2%)	**23 (8%)**
Total	**192 (65%)**	**103 (35%)**	**295 (100%)**
Weekends			
Do not visit	21 (7%)	13 (4%)	**34 (12%)**
Less than 30 mints	8 (3%)	13 (4%)	**21 (7%)**
30 minutes- 1hour	28 (9%)	3 (1%)	**31 (11%)**
1 - 2 hours	38 (13%)	37 (13%)	**75 (25%)**
More than 2 hours	97 (33%)	37 (13%)	**134 (45%)**
Total	**192 (65%)**	**103 (35%)**	**295 (100%)**

Table 6.13 Summary of frequency of visit and distance travelled, all parks.

Weekday: Chi^2=21.330, p=0.000

Weekend: Chi^2=25.592, p=0.000

- The Chi^2-Test suggests that there is a difference between visiting hours depending on the gender of the respondent. The tendency goes for men, staying longer, significance tests (Chi^2-Test) show that these differences are valid. Men significantly visit parks for longer time during the week.
- 72% of male respondents do not come to visit any site during the week. 28% actually do come to visit and of these 28%, most stay either between 30 minutes and 1 hour or more than 2 hours.

- Similarly with Females: 72% say they do not come during the week, and most of them stay only less than 30 minutes.

Figure 6.20 visit duration weekends, by gender.

- 11% males and 13% females report that they do not come to visit any park during the weekend.
- Most of the males who do come either stay more than two hours (50.5%) or 1-2 hours (20%). This makes 70.5% males who stay at least 1-2 hours or more.
- Most of the females also stay this long, 36% of females of either category stay 1-2 hours or more than 2 hours. This makes 72% females who stay at least 1-2 hours.

6.2.2.2. Motives of visit

In the study all interviewees were asked to provide two main reasons for their visit to the UGS. The table below (Table 6.14) shows the 'Primary' purposes of visits.

	IS	VP	GF	CI	All Parks
Relax/ Fresh Air	20	19	50	26	115 (39%)
Fitness	47	15	14	10	86 (29%)
Nature	9	35	8	0	52 (18%)
Family Picnic	0	11	11	11	33 (11%)
Play Area	0	2	0	3	5 (2%)
Wildlife	0	0	2	0	2 (1%)
Short-Cut	2	0	0	0	2 (1%)
Dog	0	0	0	0	0 (0%)
Other	0	0	0	0	0 (0%)
	78	**82**	**85**	**26**	**295 (100%)**

Table 6.14 Primary purpose of visits to UGSs.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

Fitness is the most common reason in Independence Square, due to the presence of jogging tracks. The first three reasons are mostly personal benefit and involving alone. Fourth and fifth are in a group to have a social benefit. Motives such as ‘dog walking’ recorded very low number of responses.

Among the secondary purposes (Table 6.15), ‘Family Picnic’ became the highest. However individually IS and CI recorded less percentage for ‘Family Picnic’. The category ‘Other’ (which include trade-fairs, cultural shows etc.) recorded relatively higher (20%), as a secondary purpose of visit to an UGS compared to primary purpose.

	IS	VP	GF	CI	All parks
Relax/ Fresh Air	38	6	12	5	61 (21%)
Fitness	0	0	0	0	0 (0%)
Nature	17	6	7	15	45 (15%)
Family Picnic	7	37	42	2	88 (30%)
Play Area	0	12	11	5	28 (9%)
Wildlife	0	4	1	0	5 (2%)
Short-Cut	4	0	0	0	4 (1%)
Dog	0	1	3	0	4 (1%)
Other	12	16	9	23	60 (20%)
	78	**82**	**85**	**50**	**295 (100%)**

Table 6.15 Secondary purpose of visits to UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island

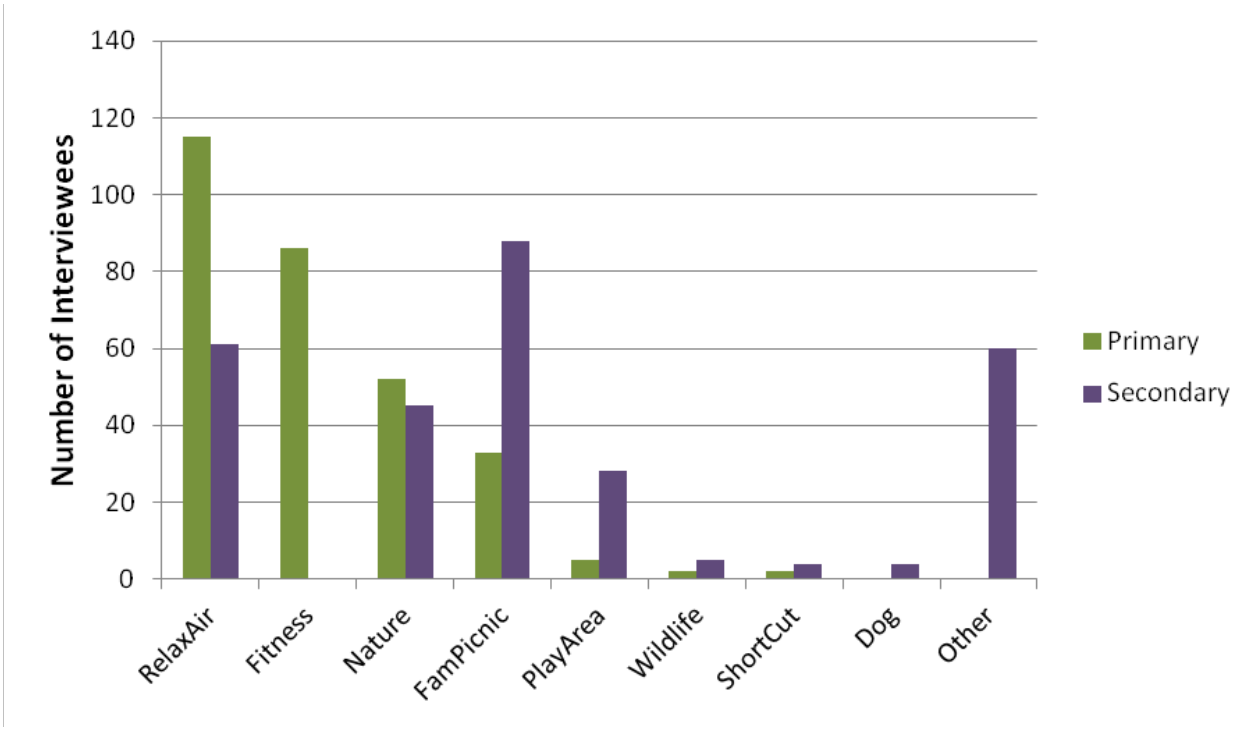


Figure 6.21 Purpose of visit (all UGSs).

Of the 88 people (30%) who stated “Family picnic" as their secondary reason for visiting, their primary reason for visiting was either "Relax and fresh air" (45) or "Nature" (42), plus one person with "Fitness" as primary reason. This shows that even for social activities like a family picnic, the nature of the space is the most important factor to people (as discussed in Chapter 5).

Of the 28 people (9%) who stated “Play area" as their secondary reason for visiting, their primary reason for visiting was most commonly “Family picnic" (14 people), emphasising the social and child-centred nature of the visit.

6.3. QUALITATIVE (COMMENTS) DATA FROM QUESTIONNAIRE

Further to multiple-choice questions, the interviewees had an opportunity extend their opinions over certain selected questions. All the statements had opinions over more than one targeted subtopics of this chapter. Therefore Statements have not been divided but presented in a free format as below according to question and answer:

The Selected question 1- ‘Does every citizen in Colombo get same benefits from Urban Green Spaces regardless of the part of the city wealth social class?

Total responses – 103 and answers summarised to nearest statements as follows;

> “Yes, All four sites have access to all”. But over 50% responders, mentioned ‘only can see higher/ upper class people using Independence square. Some people specifically said, during weekdays just upper class people are in Independence Square” – Number of responses - **53**
>
> “Yes, but people are not aware of free access” - Number of responses - **9**
>
> “Yes, but mental barrier to mix up with different social classes” - Number of responses - **7**

"No, colonial social class system and recreational club culture still act as barriers'" - Number of responses - **34**

The selected question 2: Are there any comments, you would like to make, which encourage other people to use UGSs more often, such as facilities, activities, management and maintenance?

Total responses and answers summarised to nearest statements as follows;

More improved services and parking facilities - Number of responses - **36**

Allow to bring sport equipment - Number of responses - **28**

Disable access - Number of responses -**18**

Increase transport and access to UGSs - Number of responses - **14**

Adjacent to library or shopping areas - Number of responses - **3**

A quiet zone where people can shut down for awhile with lots of nature and water- Number of responses - **14**

Capacity for party/ festivals – Number of responses -**12**

More family oriented activities - Number of responses -**34**

Separate place for each sports/games - Number of responses - **29**

More jogging paths - Number of responses - **8**

Outdoor fitness facilities - Number of responses - **6**

Safe bicycle tracks for kids within the park - Number of responses -**5**

Mobile outdoor gym-instructors as in Independence Square has few outdoor-fitness equipment - Number of responses -**2**

As you entered into UGSs, psychologically should feel 'WOW' factor - Number of responses - **8**

Increase the awareness of surrounding nature e.g.; Crow Island - Number of responses - **6**

One off organised adults' activities; flower shows, food fairs or regular Zumba classes- Number of responses - **6**

Giant TV screen for sports and special events - Number of responses - **5**

Vegetable Gardening (community gardening/urban agriculture) - Number of responses - **4**

Organised Kids activities at least once a week - Number of responses -**17**

The selected question 3; How would like to comment on the safety of the UGSs

Total responses and answers summarised to nearest statements as follows ;

'Present of security guards are very important' - Number of responses -**17**

'Improved safety in children areas' - Number of responses - **14**

'Introducing natural fencing/ hedges e.g.; Bougainvillea' - Number of responses - **8**

'A Park office' - Number of responses - **7**

'No security needed as war has ended '- Number of responses - **5**

'Public should be educated and aware of their own safety' - Number of responses - **4**

'Emergency telephone and access to first-aid' - Number of responses - **2**

6.4. FOCUS GROUPS SUMMARY AND QUOTATIONS

The data recorded from the three different focus groups and divided all the statements into subtopics as below:

6.4.1. Socio-demographics

"Being a full time worker, I would appreciate a park or patch of green near my office to have a quick break while I'm at my work."- (Group A-3).

"With my full time studies, only get a chance to visit a park just on the weekend." (Group B- 1).

"Even though I am a Sinhalese I hang out mostly with my Muslim Friends, due our parents issues regarding our cultures only neutral place for us is meeting in a park." (Group B- 3).

"Being an Englishman here in Colombo, I leant lot about Sri Lankans and their culture, while I'm taking my dog for a walk in the park." (Group C- 5).

6.4.2. Logistics of visit

"It would be lovely to bring our grand-parents here. it's a difficult task to bring them to a park, because of their age and the mobility issues." (Group A-3).

"Too crowed and chaotic on weekends." (Group C- 4).

"To visit a park, is a major event to be organised and involve lot of stress." (Group B- 6).

6.4.3. Motives

"I would like to 'be feel free'." (Group C- 4).

"Our Family gathering in Viharamahadevi Park is always a fun for kids." (Group B-3).

"Our sport club introducing a kiddies club, so I can bring my family while I can engaging with my sports in the club." (Group A- 5).

6.4.4. Perceptions and preferences

Comment from focus groups over 'what does the term *Urban Green Space* mean to you?';

"Space within the city mainly covered by vegetation." (Group C- 3).

"Place where citizen can enjoy a lot of recreational activates". (Group C -5).

"A space where the community can enjoy the nature." (Group B -2).

"A Green oasis in middle of a busy, humid, stressful city." (Group B- 1).

"A green park, with many free leisure actives offer by the city authorities." (Group A- 1).

"In my opinion what we call here an urban park is not, what I seen in other western countries. Although, people seem to be enjoying in Colombo. To visit a park, is a major event to be organised and involve lot of stress." (Group C- 6)

"My opinion over 'role of nature for social well-being in Colombo', is much far away from the fulfilling the need". (Group C -4).

"Security is good in the parks, as army personnel are around. Still so much to be improved in parks, especially sanitary facilities, visitor facilities such as sitting, shelters from sun and rain". (Group B- 4).

6.4.5. Barriers

The below comments are from the focus group discussion over safety of the UGSs in Colombo.

> "As much as possible, new UGSs must build in a city like Colombo. I can see how much Colombo lacking nature, even a so-called Park in Colombo, for example; Galle Face Green, no trees or green. At same time it's obvious how desperately people wanted to be with nature, when you pass by Galle Face Green on a weekend "If 'to be quite' or 'Feel free' is the purpose of visiting UGSs, the UGSs in Colombo are the wrong places to be." (Group C- 4).
>
> "I love nature, but with my disabilities no chance to be in a park". (Group B- 2).
>
> "Being a teenager I hardly use any parks. Something is not really for us. I mean there is not any special things for teenagers. Things like area for skate boarding, cycling or at least just a place to hung out with friends". (Group A-4).
>
> "My teenage children wouldn't visit a park with us, as they prefer indoor-based activities or out-door but something just for their age group." (Group C- 3).
>
> "No matter how many parks you build in the city, when there is no play or children to play cricket or football". (Group B- 3).
>
> "Since no ball games are allowed in the parks, I don't use them. I would rather play cricket on the street though it's not the best way to play". (Group B-2).
>
> "We would love to be involved with greening activities in the city, as a member of an environmental group, but there are no known possibilities". (Group B- 1).

6.5. DISCUSSION OF SOCIAL FINDINGS

6.5.1. Socio-demographics and UGSs in Colombo

6.5.1.1. Gender, age categories and UGSs

In terms of gender, adult males more represented than female users when compared with the local population distribution. Data obtained from all selected parks showed that women tend be less frequent users than men.

Earlier studies such as Sanesi and Chiarello (2006) show that the motives for visiting parks are associated with gender; males are more involved with physical activities such as sports and females are more likely to accompany children. However in Colombo this was not possible to test due lack or no sports facilities and lack of children play areas within the UGSs.

Berglund and Jergeby (1989) extended their study to demonstrate that females are more socialising in parks or green spaces, when their child can play next to them. They themselves could socialise with other adults at the play areas. Therefore in Colombo context improving the play and sport areas in UGSs can bring extra benefits too, such as encouraging the low number of female users in to a higher proportion of user groups as currently female representation is low.

Children were not a part of targeted interview group. For ethical reasons anyone who appeared under 12 years was not interviewed. However, as Figure 6.16 shows, in all sites many children were present as part of the group either with parents or with a family member. But no groups were represented just with children. Children were highly concentrated where the ground was suitable for playing or simply sitting down, as well as where any kind of wildlife existed (e.g. feeding birds near the pond at the Viharamahadevi Park). During the focus groups, discussions raised the issue that certain sport activities such as ball games and

some other play activities were not allowed on lawn areas, therefore a few focus group participants claimed themselves as non-UGS users in Colombo. But activities such as kite flying or informal games (like children chasing each other) took place everywhere.

Teenagers (in this research age 13-18) were poorly represented across all sites (Table 6.2). Only 5% of the total interviewed population was under 18 and more or less they were a part of a mixed age group or a family. In Independence Square and Crow Island there were almost no under-18s available for interviews. This age group was very rarely seen using the park facilities. As an earlier study by Bell, Thompson and Travlou (2003), emphasised that one of the possible causes is that what urban teenagers frequently consider "outdoor" places to visit are in fact indoor spaces such as arcades and malls. Korpela, Kyttä and Hartig (2002) demonstrated that this group of users tend to use 'invisible green spaces' to hang out with friends. In Colombo such places do not exist. This indirectly affected the lower representation of teenagers in UGSs in city of Colombo.

Over 30% of the total user represented 'Young adults (18-24)'. This was the highest visitor group among the eight categorised age groups interviewed, hence the most frequent user group of UGSs in city of Colombo. This closely follows the census population line in Colombo. Possible reasons were not investigated here, however the significant job market in Colombo attract a lots of young people age between 18-24 years, which could be an interesting point be studied in future.

The age group 35-44 years was also fairly evenly distributed and no remarkable points to be discussed. Age group 45-54yrs and 65-75 years are more represented in Independence Square than other three UGSs. Interviewed percentage of the senior citizens, (over 75 as well as age group 65-74), was 1%, which is relatively low than other age categories, although compared with population census of Colombo this is not an under-representation. In broader context there

are many other possible reasons for to have less aged population, yet one of the reasons been identified, as low quality of life of senior citizens in Sri Lanka. In such situation UGSs could be a great contribution to increase the quality of life of Senior citizens in city of Colombo.

6.5.1.2. Ethnicity, religion and social class system in Colombo and UGSs

As Colombo consists of a multi-cultural, multi-racial society, public service providers should offer opportunities for people to practise a wide range of lifestyles to suit all types of ethnic communities. As the diversity of people using UGSs currently reflects the diversity of the city's population, then further research to uncover the needs of different ethnic groups is a lower priority, than, for example disabled and other minority groups. Nevertheless, a few years into ending of the civil war in Sri Lanka, it is essential to discover all possibilities to integrate the ethnic minorities into the existing society. For this cause, increasing the social, cultural and community activities taking place in Urban Green Spaces can play a great role in integration.

The census data of Colombo shows the different religious groups in Colombo. From different religious aspects, the Buddhist community has much connection to holy trees such as *Ficus religiosa* commonly known as 'Bo' tree which can be seen anywhere in the country. Hindus also have a significant attachment to trees and there are many religious festivals to celebrate and honour trees, while cultural nature-related events help local people to celebrate their local identity and natural amenities.

6.5.1.3. Socio-economic class.

In this research level education not been asked directly, due to ethical and cultural reasons, but occupation status been questioned. The visitor group 'full–time employed' counted as 51.9% as the total users as well as group 'Students' counted as second highest users (16.9%). This finding could reflect two possible connections with lower number of visitors during the weekdays (due

to less time for recreation because of the full time work identified from the qualitative results) and most frequent users of the UGSs in Colombo (due to education having an impact on increasing the green awareness and the benefits of using UGSs). This suggestion is supported by the previous studies (example Jim, 2013) that full-time workers or educated people have a higher tendency to appreciate urban green spaces than other visitor groups.

6.5.1.4. Sport/recreational club culture in Sri Lanka

During the British Colonial period, recreational and social clubs were introduced to Sri Lanka. The concept of club culture was considered as 'truly British' and was very popular and a characteristic of the western ruling community in Sri Lanka. Before this intense cultural concept spread out in cities like Colombo, early Sinhalese, the Portuguese or the Dutch, who inhabited the island before British, had other forms of gatherings for recreation and social interaction, which wasn't significant as sports or recreational clubs since British time till present day. The significant point is that large patches of Green in Colombo are still owned by these clubs established during that time and remained unchanged in many ways. Although changes happened after the independency in 1948, in social, political and commercial front, most sports clubs managed to maintain their policies, with the minor change that memberships gradually allowed from 'White British' to upper class Sinhalese gentlemen to use the facilities. Despite the fact that modern Colombo has restrictions and limitations for land to create green spaces or sport grounds, these clubs operate a 'member only' policy, which limits the access to a very low percentage of the Colombo community predominantly for the prestigious section of the Colombo society.

6.5.2. Do the Colonial influences still play a part in how the Colombo community relate to UGSs?

From the qualitative data from the questionnaire and the focus group discussion in this research reported that the Sri Lankan traditional culture with mainly conservative attitudes still strongly attached to and adapted from colonial behaviour and attitudes. Although over 65 years since independency, the behaviour and activities attached to social, recreational and the way the local community interaction with parks, gardens or open spaces very much show how Colombo has been influenced, positively and negatively, by colonialism. As outdoor leisure activities and parks activities were important for the quality of life of city occupants, in pre-colonial as well as Dutch and British times, Colombo had prestigious quarters where elites of Colombo society lived surrounded by many popular gardens and parks. For an example Brohier in 'Changing face of Colombo' (1978) described that the sport clubs like Pettah, a 'Racquet Court' was situated with one side a lake and the other side sea views, to provide the maximum quality of life. Another green space creation of colonial times is horse-racing tracks. Horse racing was introduced to Colombo in 1821 (Cave, 1912), with the first track at Galle Face Green. Then 'Ceylon Turf Club' was established in 1886. Finally 'The Grand Stand' was built and in 1893 it was moved to its present location at Cinnamon Gardens. All those areas are currently considered as of the high society areas in Colombo. This is also where many current city beautification projects are taking place too. This clearly indicates that in Colombo the tendency of improving or beautification starts in and around high society areas.

Facts and descriptions mentioned in historical books such as 'The book of Ceylon' by Cave (1912) have parallels in the findings from the present study; As many UGs visitors commented on their view about present day Colombo as 'the beauty of the town with avenue trees, flowering plants and lake and sea views', similar comments can be found on Colombo from over 100 years ago. Interestingly from the focus group discussion in the elite sport club

found that the daily routine of western people living in Colombo has changed very little. There are motives to use one of the green spaces in early morning for recreational activities, then participate in midday official or business work followed by a social related activity in a green spaces, such as riding, golf and cricket.

One of the notable facts found from the focus group participants was green spaces or club houses are a venue for members to exchanging the latest gossip or talking about political issues and current affairs. Furthermore, in most case simply that large patches of green belonging to clubs were not being used for sports, but to some extent for non-sport related business meetings within the club premises. This can be related to the history that clubs were a very British approach to the meeting and mixing of their own countrymen or social group for different purposes.

The qualitative data gathered from the focus group from the privately own sport club members showed that massive sport fields are only for a tiny number of the Colombo community. It is very clear that their perception and attitudes are heavy influenced by over two centuries of colonial class system and earlier cast system of old Sinhalese society.

However one of the major point that club members emphasised was ‘somebody has to maintain the quality of the Club’. In fact that statement has double values as quality as the prestigious status of the club and the actual quality in terms of day to day maintenance of the club.

6.5.3. Motives for visiting UGSs

Motives

In this research, data was gathered under primary and secondary motivation of each visitor. This gave the visitor wider chance to select when they have more than one reason to be in an UGS. In the present study the most popular motive to be in an UGS is 'relax and fresh air'. This finding is similar to a study by Schipperijn et al., in 2010. Moreover this motive could be explained up to certain extent on how much the Colombo community is suffering from air pollution and overall stress attached to urban life (Van den Berg, Hartig and Staats 2007).

The first three motives were all associated with 'Nature'. That indicates how much city dwellers appreciated nature in the city environment, which can be supported by similar studies (Chiesura, 2004; Home, Hunziker and Bauer 2012; Oguz, 2000; Sanesi and Chiarello 2006; Ward Thompson et al., 2005). Furthermore, this aspect can be related to biophilia concept by Wilson (1984), as 'nature is a fundamental human need'. As with the findings from Chiesura (2004); Lo and Jim (2010); Sanesi and Chiarello (2006), "to exercise" was among the most frequent two motives in this study. Also "fitness" became second most frequent motive followed by "relax and fresh air" in Colombo.

"Family picnic", which indicated the social-well being aspect of UGSs, scored the fourth most important reason to be in an UGS. The motive category "Other"(which represents motives such as cultural and historical events and activities), in this research reported one of the highest (60%) in "Second Preferred Motives of Visit'. This suggests that user would like to involve with such secondary activities, beside their main motive of visit. Offering more activities mentioned above as well as introducing 'wildlife' such as ducks, fish and deer in to UGSs, may encourage more visitors as currently there is very little wildlife in the UGSs in Colombo.

One of the interesting findings reflects on the motive ‘Walk the dog’. In the present study it shows zero as the primary motives and only four people out of 295 respondents as ‘second motive’. Dog walking is currently not popular in Colombo. Focus group discussions identified it was a problem, due to restricted land area in UGS and safety. As walk the dog in UGSs, brings health benefits to human (NHS-National Health System –UK (2011) ; Byrne and Wolch (2009) suggested that introducing designated dog-friendly areas in urban parks, as in the United States, could encourage more visitors to walk their dog, while the dog-owners themselves physically improve their health and well-being.

Childhood visits

One of the survey questions was ‘when was the first visit to this park?’ The results (Table 6.6) found an interesting discovery as a substantial proportion (44% of overall visitors) of the visitors, who are visiting UGSs in Colombo claimed that they had been visiting ‘since childhood. This particular scenario has been identified by the previous studies too. For example Ward Thompson (2002) found 63% of adults claimed during an interviews regarding the woodland visits too. Further in her study she suggested that the “preference for types of green space are affected by childhood memories and exposing children to natural places of good quality may lead to such places being preferred later on”- childhood visits will encourage life-long use of UGSs.

This present study identified a childhood visits and the their primary motive of visit. As Figure 6.21 shows ‘to get fresh air’ claimed 39% and all the first three motives are Nature related. In other words, as Wilson (1984) explained, ‘nature is a fundamental human need’.

Haq (2011) also mentioned differences in the frequency of use of green spaces among different social groups; People visit frequently regardless of the distance to the UGS. ‘Once a week’ was recorded 25% and ‘More than once a month’ as well as ‘Monthly’ respectively

recorded 24% and 23%. Despite the limitation and barriers such as accessibility these figures confirmed that the community are using the UGSs frequently as possible.

Moreover one of the noteworthy factors is 88% of the visitors to Crow Island visit once a week or at least more than once month. This high number of very regular visitors reflects that this UGS is situated in a community, therefore better accessibility allows for increased the visitor frequency.

6.5.4. Access and barriers

Together results from, both focus group discussions as well as the quantitative and the qualitative part of the questionnaire identified that there are few different constraints connected to usage of urban green spaces in Colombo. Referring back to literature (Chapter 3) all four distinctive constraints namely personal/ internal, social, structural and institutional have been identified in this present research (Byrne, 2010). Altogether lack of provision of sport facilities, including permission to play on grass areas, and play equipment for small children act as the main barrier. Additionally same as Sallis et. al. (1997) identified that safety with a few other basic facilities such as toilets, drinking water, shady areas and more lighting in the public play areas are also important.

One of the indirect findings from the qualitative parts of the survey and focus group discussion was that in Colombo parents or guardians have influence as well as restriction on whether their children play outside in a park or not, when and how. They are concerned about safety, availability, the quality of the play equipment in the playing area of the UGSs, time of the day, and day of the week. The surrounding social group that they have available to interact with while playing also very important. Previous studies such as Berglund and Jergeby (1989) also identified as in the Colombo context, similar factors that parents consider when choosing a play area for children in UGS.

6.6. CONCLUSION

As a vital part of the three-sphere structure of the present research, social and cultural aspects of urban green spaces in Colombo have been analysed. This work has identified its current status, gaps in socio-demographic, motives, perception, constraints and future recommendations. These are summarised below (Table 6.16).

Gap/issues	**Current status**	**Recommendations**
Gender	Female representation is lower than male.	Increase presence of security personnel in UGSs to encourage more females. As a suggestion Improved children's play area is likely to increase the number of accompanying mothers.
Different age groups	Under- representation in Children (under 12), Teenagers (13-18 years) and senior citizens (over 65).	Provision of child-friendly play areas, designated areas or zones for teenagers' activities and improved mobility and accessibility for less able people within the UGSs.
Ethnically and religiously different social groups	All main ethnic and religious groups are evenly using all four selected sites. Differences in proportions of different groups, i.e. higher Tamil representation in Crow Island, reflects the ethnic structure of the surrounding residential area.	Although no gap been identified, UGS are 'neutral spaces' that could use as a great integration zone among the different ethnic and religious groups.
Occupation status	Full time employed and students are the most common users of the UGSs.	Need to increase the awareness of environmental and other personal benefits from UGSs across the entire society.

Gap/issues	Current status	Recommendations
Social class system and use of UGSs	Up to certain extend, invisible but an active social class system still regulates the usage of green spaces in Colombo.	Changes needed in certain policies and regulations in order to increase access for more general public, and increase the knowledge on environmental justice, and confidence to use all available UGSs.
Logistic of visit	Due to long distance travel to reach a UGS, visits demand time, money and organisation of transport.	Walkable distance UGSs. Improved transport links and parking facilities by the major parks. Introducing small parks by the office buildings.
Motives for visits	First three most popular motives are nature related, but not completing 'human and nature' demands of all levels and the sections of the society. Social oriented motives are not popular yet as first social motive (family gathering/ picnic) only rated fourth place in overall motives rating. Motives such as to see 'wildlife' and 'walk the dog' were rarely recorded.	Possible activities could offer either active or passive. These must cater for all levels and groups all society. Introduction of the more social oriented activates in UGSs could contribute to overall social quality of life city Colombo Pay extra attention on other motives which are not yet very popular in Colombo. These could be encouraged by applying methods and policies from other countries.
Barriers to using UGSs in full capacity and to encourage more visitors	All four different classifications of constraint (Personal/internal, Social, Structural and Institutional) and their elements found in literature, been identified in Colombo.	Carrying out the above recommendations will reduce the possible barriers.

Table 6.16 Summary of recommendations.

As in Chapter 5 (Ecological and geographical impact on UGSs in Colombo), this chapter identified and concluded the current situation, with particular focus on the gaps in social and cultural aspects of the urban green spaces in Colombo context. The results found in Chapter 6 have informed the action plans to be included in the final 'Urban Green Space Strategy for Colombo', which will be found in Chapter 8 (Figure 8.1).

According to the three spheres framework, the next chapter (7) will investigate the political aspect of UGSs in the city of Colombo, which involve the governance, the decision-making and local political approaches related to planning and designing of UGSs.

Chapter 7: Political (governance and decision making)

CHAPTER CONTENTS

7.1. OVERVIEW

In addition to ecological, geographical, social and cultural perspectives from previous chapters (5 and 6), planning and designing, maintenance and management and decision making including participation of all stakeholders with better coordination is also critical for the success of Urban Green Spaces (Jim, 2004; Landelma, Salminen and Hokkanen 2000; Tahvanainena et al., 2001).

UGSs would be one of the modern ways to measure the quality of a city with its green coverage. As well as area of coverage, the condition and facilities of the green spaces could work as quality indicators. To achieve a recognisable quality in the Urban Green Space provision requires an integrated approach in many key areas. Research was required to assess the success of the city of Colombo in achieving these quality indicators, regarding the current status of UGSs, design and planning, maintenance and management, policies and local political approaches. Information on these areas was provided via the questionnaire survey of users, the Focus Groups and more importantly the key personnel interviews.

7.1.1. Design and planning

Many aspects need to be considered at the design and planning stages for an UGS. These include the landscape style, the features and amenities to be offered, and the range of users and their differing needs.

Different groups of people have different needs and preferences in terms of design. Colombo is a very diverse city with a multi-ethnic, multicultural society. As with all societies, it also encompasses people with special requirements due to age or impairment. The investigator aimed to explore whether there are gaps in provision for these different groups, and whether these differences would have significant impacts on design considerations.

Typologies of UGS

A significant aspect of designing and planning an UGS is to be able to classify and describe the UGS that exists, or the type of space that is desired.

The literature reviewed in Chapter 3 emphasised that for UGSs, the key to 'good' landscape design is to maintain their multifunctional character (e.g. CABE, UK 2006). Within this study, the design of UGSs has being evaluated via different dimensions, namely; suitability of the ecological and geographical requirements of Colombo, how to fulfil the social and recreational requirements of the Colombo society, and whether these designs are viable in terms of management, maintenance and long-term sustainability of UGSs in Colombo. Therefore comparing with other similar studies found in literature from around the world, assessing and evaluating the current designs of the UGSs in Colombo from public and professionals' point of view and preferences over landscape style were also important aims of this chapter. Identifying features for 'good' landscape-design that are appropriate for the particular local culture and circumstances are key to informing political decision-making.

There are various typologies of UGSs around the Globe. Most of them classify the UGS according to the aim and the intended function, size, location and how people use it and so forth. Chapter 2 explained that there is a kind of standard classification existing in Sri Lanka, however initial observations suggest that practically such categorisations are not functioning in Colombo. Survey questions and interview discussions included a focus on this matter, with the aim of developing a basic typology of UGSs for Colombo and to define what precisely is an UGS in the Colombo context.

7.1.2. Maintenance and management

The perception of UGSs maintenance for users is explored in the survey questionnaire of park users and in the focus groups (Chapter 6). The challenges presented to managers are addressed in the key-personnel interviews.

Perception of maintenance

Perception of the levels of maintenance (or lack of) are frequently discussed in both the literature and amongst interviewees in this research. Damage and vandalism are not a serious issue in Colombo. Although perception of safety, particularly for women in Crow Island raised certain concerns. These issues were addressed in the survey questionnaire of park users (section 7.2) and in the focus groups (section 7.3)

Cost and staffing implications

Current cost and staff implication were very much politically oriented and a currently debated topic. This was due to enormous political deals on the cost of maintenance together with usage of ex-war soldiers in maintenance work on UGSs. These issues are addressed in the key-personnel interviews.

7.1.3. Decision-making and policy implementation

High-level policy-making, and then the actions required to implement those decisions, is usually the role of those in some political power. The level to which those decision-makers understand the needs of UGS users, and the wider implications of their decisions, will dictate the success or in or any UGS planning initiatives. Some of these important decision-makers were interviewed as part of the key-personnel interviews.

Integrating users' views and involving the local community in decision-making. To design a successful UGS requires both the designer's view and the users' views to be integrated (Haq,

2011). Weiner (1992) stated from his study in Canada, that due to environmental awareness among the local communities, in some areas the residents have taken initiatives to involve themselves in a more pro-active role in urban greening. Now these initiatives have developed to involve local residents at management level with decision-making processes too. Therefore as an assumption, that community involvement at this high level of decision-making results in a higher quality UGS that is more successful at meeting local needs. Results from other two chapters show no evidence of community involvement in UGSs in Colombo. This chapter explores the opinions of the key personnel about this currently significant matter in Sri Lanka. These and other issues related to decision-making and policy are addressed in the key-personnel interviews.

7.2. SURVEY QUESTIONAIRRE RESULTS

7.2.1. Survey Questionnaire overview

Quantitative data was gathered from the interview survey of 295 users in the four surveyed parks (Chapter 6). The results are examined under two of the three main headings: 'Design and planning', and 'Maintenance and management'. However aspects of 'Decision-making and implementation' were not covered in this survey of visitors.

7.2.2. Design and planning of Urban Green Spaces in Colombo

7.2.2.1. Landscape style preferences

One of the primary divisions of landscape style for UGSs is whether the design is Formal or Natural, or a mixture. Visitors were asked: Which type of urban parks do you prefer mostly? They were given the response options of 'Formal', 'Natural', 'Mixed', 'No preference', 'Don't know'.

Overall preferences

As discussed in Chapter 5 (section 5.3.3), only a small percentage of people (13%) preferred a formal style, with the majority preferring natural or mixed styles (Figure 7.1).

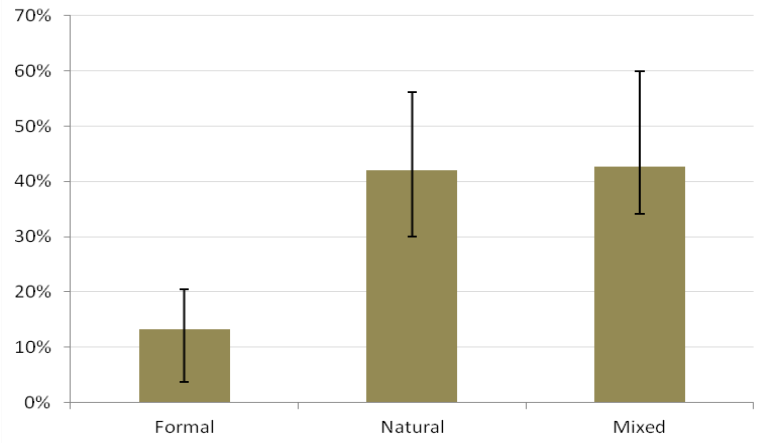


Figure 7.1 Landscape style preference (visitors to all UGSs).

'Error bars' show the range of responses between the four different parks.

Preferences by gender

The preferred landscape style: correlation with gender is summarised for all parks below (Table 7.1).

Men and women both like formal landscape style the least. Females prefer mixed over natural, men prefer natural over mixed landscape style. The differences are statistically significant ($p=0.004$).

	Formal	Natural	Mixed	No Pref	Total
Male	16 (5%)	89 (30%)	84 (28%)	3 (1%)	**192 (65%)**
Female	23 (8%)	35 (12%)	42 (14%)	3 (1%)	**103 (35%)**
Total	**39 (13%)**	**124 (42%)**	**126 (43%)**	**6 (2%)**	**295 (100%)**

Table 7.1 Cross-tabulation: Preference for urban landscape style of the UGSs by gender.

Note: Chi²=13.115 p=0.004.

Landscape style preferences within a diverse community

As Colombo is a multi-ethnic, multicultural society, the questionnaire also allowed investigation of the preferences of landscape style of urban green spaces by different ethnic origin in the city of Colombo. The categories considered were Sinhalese, Tamil, Muslim and other non-native.

Differences in landscape style preference between the different ethnic groups in Colombo are not statistically significant (Table 7.2).

Ethnicity	Formal	Natural	Mixed	No Pref	Total
Sinhala	28 (9%)	85 (29%)	79 (27%)	3 (1%)	195 **(66%)**
Tamil	3 (1%)	21 (7%)	26 (9%)	3 (1%)	53 **(18%)**
Muslim	8 (3%)	14 (5%)	19 (6%)	0 (0%)	41 **(14%)**
Other	0 (0%)	4 (1%)	2 (1%)	0 (0%)	6 **(2%)**
Total	**39 (13%)**	**124 (42%)**	**126 (43%)**	**295 (2%)**	**295 (100%)**

Table 7.2 Cross-tabulation: Preference for urban parks by ethnic origin.

Note: Chi²=11.751 p=0.228.

7.2.2.2. Features and amenities

Preferences for non-living features

Natural features have already been discussed in Ch5. As non-living features also form an important part of UGS design, visitors were also asked about their preferences for these.

Table 7.3 and Figure 7.2 below show that 'Benches /Seating is the most preferred non-living feature in the UGSs in Colombo.

Feature	IS	VP	GF	CI	Total
Benches/ seating	9	17	28	20	**74 (25%)**
Paved areas	16	20	13	5	**54 (18%)**
Artificial fountains	18	24	11	1	**54 (18%)**
Built up play areas	12	14	2	22	**50 (17%)**
Monuments	18	1	14	0	**33 (11%)**
Built up picnic areas	5	6	17	2	**30 (10%)**

Table 7.3 Preferred non-living features in UGSs.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

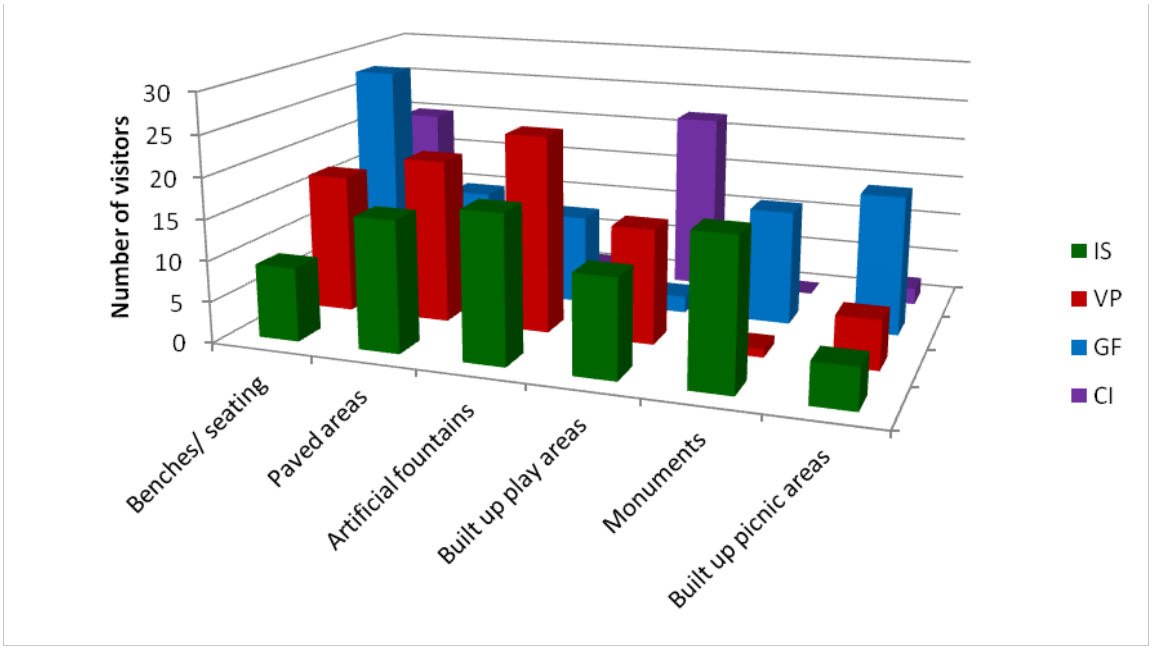


Figure 7.2 Preferred non-living feature, by park.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

Rating for sports and facilities of each park (Q. 26)

Visitors were asked: "How would you rate the sport/ visitor facilities and other services of this park?" Responses available were: Very Good, Good, Fair, Poor, Very Poor, Don't Know and No Comment.

Visitors were generally unsatisfied with sport and the other facilities offered, as recorded 42% as 'Poor' and 15% as 'Very poor' (Table 7.4 and Figure 7.3).

	IS	VP	GF	CI	Total
Very good	2 (1%)	0 (0%)	0 (0%)	0 (0%)	**2 (1%)**
Good	36 (12%)	3 (1%)	13 (4%)	0 (0%)	**52 (18%)**
Fair	11 (4%)	23 (8%)	33 (11%)	0 (0%)	**67 (23%)**
Poor	19 (6%)	45 (15%)	37 (13%)	23 (8%)	**124 (42%)**
Very poor	6 (2%)	10 (3%)	2 (1%)	27 (9%)	**45 (15%)**
Don't Know/ No Comment	4 (1%)	1 (0%)	0 (0%)	0 (0%)	**5 (2%)**
Total	**78 (26%)**	**82 (28%)**	**85 (29%)**	**50 (17%)**	**295 (100%)**

Table 7.4 Ratings for sports and other facilities of UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

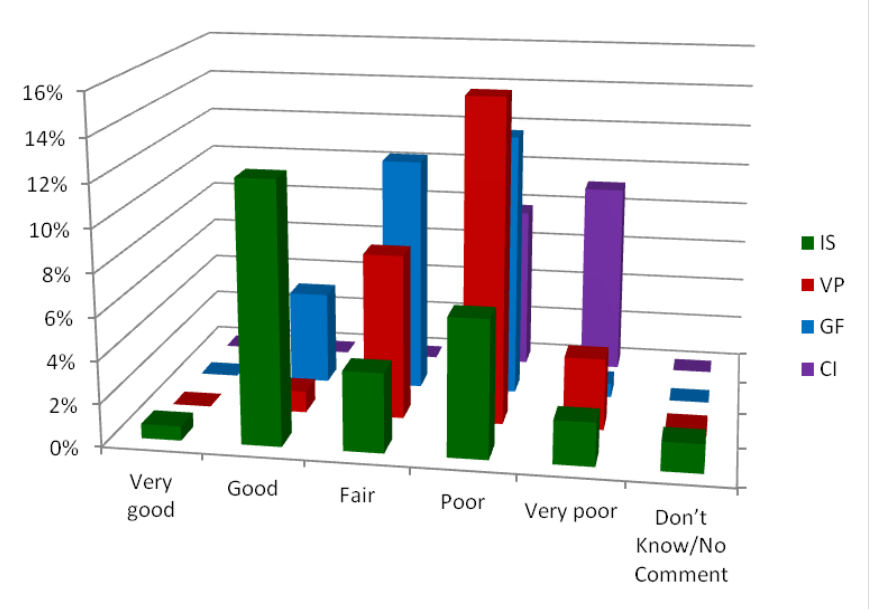


Figure 7.3 Ratings for sports and other facilities, by UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

As the Figure 7.3 shows the visitors from Crow Island only reported, sports and other facilities are just 'Poor' or 'Very poor'. Only 2 visitors out of all, mentioned sports and other visitors facilities as 'Very good'.

Rating for general impression of each park (Q. 23)

	IS	VP	GF	CI	Total
Very Satisfied	11 (4%)	0 (0%)	7 (2%)	0 (0%)	**18 (6%)**
Satisfied	55 (19%)	60 (20%)	63 (21%)	5 (2%)	**183 (62%)**
Dissatisfied	1 (0%)	4 (1%)	3 (1%)	14 (5%)	**22 (7%)**
To be improved	11 (4%)	17 (6%)	12 (4%)	31 (11%	**71 (24%)**
Don't Know/ No Comment	0 (0%)	1 (0%)	0 (0%)	0 (0%)	**1 (0%)**
Total	**78 (26%)**	**82 (28%)**	**85 (29%)**	**50 (17%)**	**295 (100%)**

Table 7.5 Overall impression rating of UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

Visitors were asked: "What is your overall impression of this green space?" Responses available were: Very Satisfied, Satisfied, Dissatisfied, To be improved, Don't Know and No Comment.

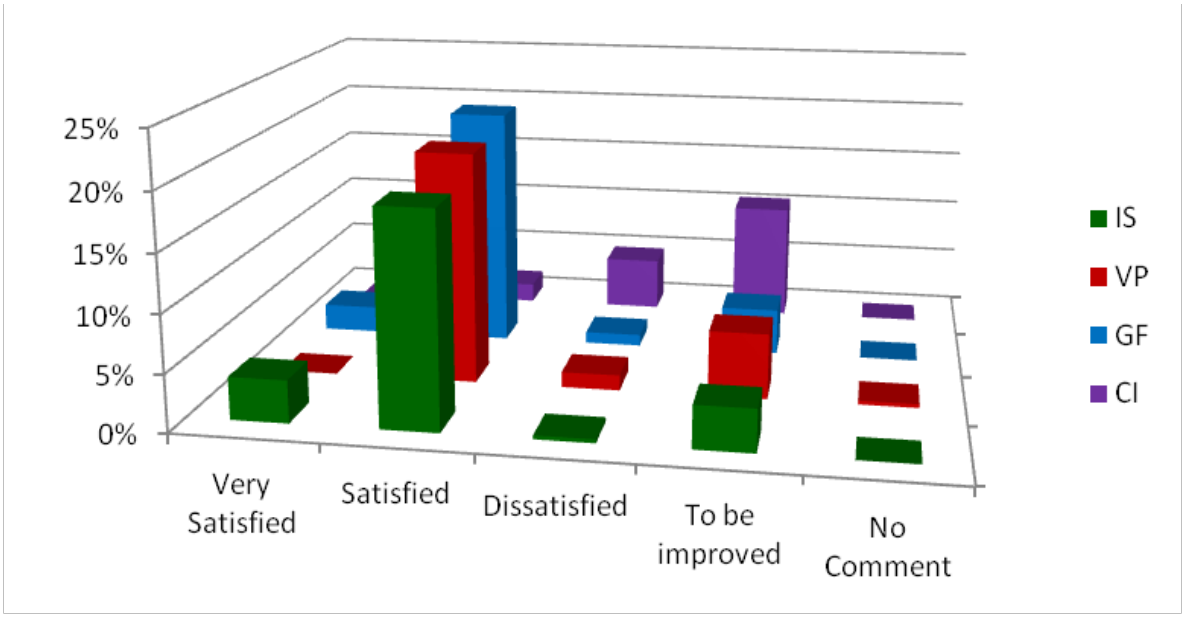


Figure 7.4 Overall impression rating by UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

Figure 7.4 (above) shows how visitors rated their overall impression of each park. Independence Square, Viharamahadevi Park and Galle Face Green were rated 'satisfied' as highest but Crow Island was clearly 'to be improved'.

Rating for design aspect of each park (Q. 24)

Visitors were asked: "How would you rate the design aspect of this park?" Responses available were: Very Good, Good, Fair, Poor, Very Poor, Don't Know and No Comment.

Apart from the Crow Island, the visitors were positive about the design aspect of the UGSs as were recorded 34% -Very good, 126% - Good and 90% as Fair.

	IS	VP	GF	CI	Total
Very good	20 (7%)	10 (3%)	4 (1%)	0 0(%)	**34 (11%)**
Good	42 (14%)	43 (15%)	37 (13%)	4 (1%)	**126 (43%)**
Fair	12 (4%)	29 (10%)	25 (8%)	24 (8%)	**90 (30%)**
Poor	4 (1%)	0 (0%)	19 (6%)	20 (7%)	**43 (15%)**
Very poor	0 (0%)	0 (0%)	0 (0%)	2 (1%)	**2 (1%)**
Don't Know/ No Comment	0 (0%)	0 (0%)	0 (0%)	0 (0%)	**0 (0%)**
Total	**78 (26%)**	**82 (28%)**	**85 (29%)**	**50 (17%)**	**295 (100%)**

Table 7.6 Rating for design aspect of UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

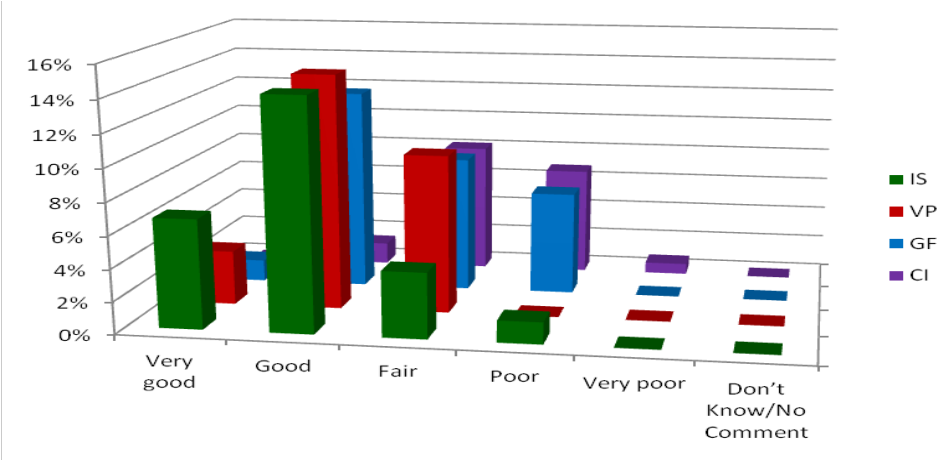


Figure 7.5 Ratings for design aspect, by UGS.

.

Comments on features and amenities

When questioned about the features and amenities that they would like to see, visitors gave a wide range of responses. These have been grouped into the categories below (Table 7.7). The points highlighted in ***Italic*** *i*ndicate requirement of different or designated areas for certain activities and certain groups of people.

Design aspect	Frequency
More seating	24
Informal play areas	23
More cooling plants	22
Formal sports area	21
Vegetation with more wild/natural feeling areas	19
More paved areas for rainy times	18
Disabled access	16
Toilet and sanitary facilities	15
Separate areas/zone within the park including dog zone	14
More passive activity areas for disabled people	14
Designated picnic areas with raised platforms	12
Drinkable water	11
Safe access to beach and sea bath	11

Design aspect	Frequency
Separate areas for young dating couples	9
Pavilions/summerhouses	8
Few entrance with different themes	8
Built-up seaside walkways	8
More flexibility of the jogging paths	7
Café or Kiosks	6
Swimming pool area	6
Different zones with special plants	5
Comprehensive plant labelling in three official languages	5
More heritage and the history	5
Clean paddling pools area	4
Educational zone with medicinal plants	3

Table 7.7 Features and amenities commented on by visitors.

Ratings for maintenance and cleanliness of each park (Q.25)

Visitors were asked: "How would you rate the maintenance and the cleanliness of the park?" Responses available were: Very Good, Good, Fair, Poor, Very Poor, Don't Know and No Comment.

Rating for maintenance and cleanliness were mainly average, however Crow Island showed more negative responses, with no-one rating it as category 'Good' or above (Table 7.8 and Figure 7.6.

	IS	VP	GF	CI	Total
Very good	18 (6%)	0 (0%)	0 (0%)	0 (0%)	**18 (6%)**
Good	35 (12%)	12 (4%)	43 (15%)	0 (0%)	**90 (31%)**
Fair	16 (5%)	50 (17%)	34 (12%)	3 (1%)	**103 (35%)**
Poor	6 (2%)	14 (5%)	8 (3%)	33 (11%)	**61 (21%)**
Very poor	0 (0%)	6 (2%)	0 (0%)	14 (5%)	**20 (7%)**
Don't Know/ No Comment	3 (1%)	0 (0%)	0 (0%)	0 (0%)	**3 (1%)**
Total	**78 (26%)**	**82 (28%)**	**85 (29%)**	**50 (17%)**	**295 (100%)**

Table 7.8 Rating for maintenance and cleanliness of UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

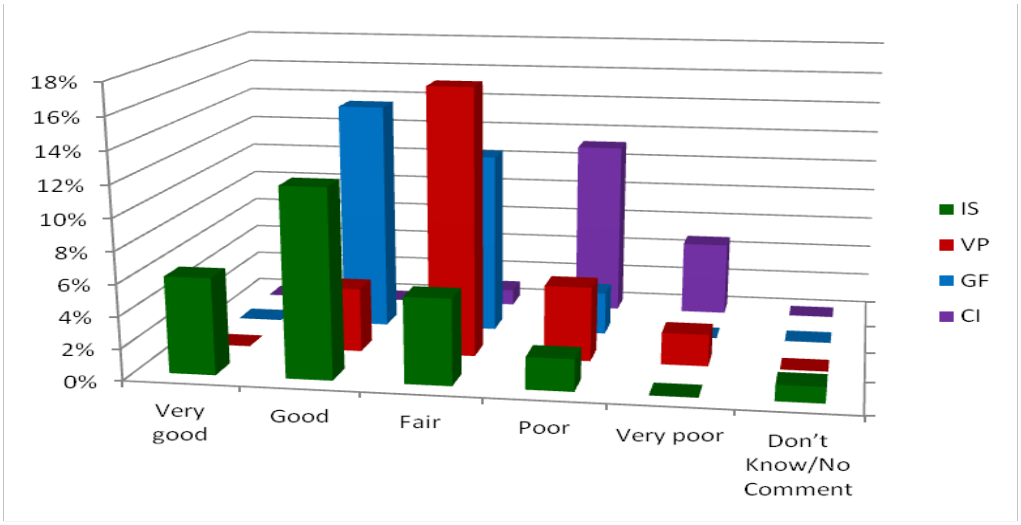


Figure 7.6 Rating for maintenance and cleanliness, by UGS.

Rating for Safety (Q. 27)

Visitors were asked: "How would you rate the safety of the park?" Responses available were:

Very Good, Good, Fair, Poor, Very Poor, Don't Know and No Comment.

Table 7.9 and Figure 7.7 show that rating for safety in UGSs is acceptable as 57% visitors answered as 'Good. Despite the recent safety issue in Crow Island, this site also scored, in total 35 either 'Very good' or 'Good'.

	IS	VP	GF	CI	Total
Very good	5 (2%)	0 (0%)	21 (7%)	25 (8%)	**51 (17%)**
Good	57 (19%)	44 (15%)	57 (19%)	10 (3%)	**168 (57%)**
Fair	12 (4%)	38 (13%)	7 (2%)	0 (0%)	**57 (19%)**
Poor	4 (1%)	0 (0%)	0 (0%)	1 (0%)	**5 (2%)**
Very poor	0 (0%)	0 (0%)	0 (0%)	12 (4%)	**12 (4%)**
Don't Know/ No Comment	0 (0%)	0 (0%)	0 (0%)	2 (1%)	**2 (1%)**

Table 7.9 Ratings for safety of UGS.

IS = Independence Square, VP = Viharamahadevi Park, GF = Galle Face, CI = Crow Island.

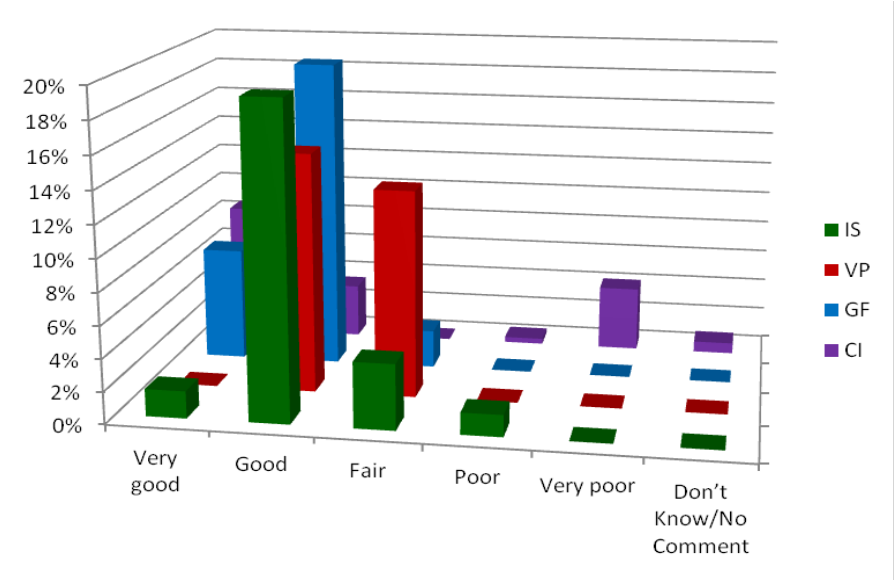


Figure 7.7 Ratings for safety, by UGS.

Suggestions to encourage more use (Q29)

Visitors were asked: “Are there any other comments you would like to make which encourage other people to use urban green spaces more often. Such as facilities, activities, management and maintenance?”

Responses included:

> “Giant TV screen for sports, special events and capacity for Party/ festivals.”
>
> “Organised Kids activities at least once a week and one off organised adults’ activities; flower shows, food fairs or regular excises classes.”
>
> “More sanitary facilities and disable access.”
>
> “Introducing community- involved programs such as community gardening/urban agriculture.”
>
> “As you enter into UGSs, psychologically should feel ‘WOW’ factor.”
>
> “A quiet area, where people can shut down for awhile with lots of nature and water
>
> “Allow to bring sport equipment.”
>
> “Increase transport and access to UGSs and build adjacent to library or shopping areas.”
>
> “Increase the awareness of surrounding nature e.g.; Crow Island.”
>
> “Increase the more living features such as aquarium, mini zoo with deer, duck and birds as well as more flowering plants and fruit plants.”

7.3. RESULTS FROM FOCUS GROUP DISCUSSIONS

During the three focus group meetings the author tried to obtain insight and information about the group members' perception of the political and planning issues related to their usage of UGSs in Colombo. Since this was a very informal type of meeting the discussions did not follow a strict order of question and answers.

The main questions relevant to this Political sphere were as follows:

Which type of UGS do you prefer mostly?

Which living and non-living features do you most enjoy, when you visit an UGS?

How would you rate the sport/ visitor facilities and other services of this UGS?

What is the overall impression of this UGS?

How would you rate the design aspect of this UGS?

Are there any other comments you would like to make to encourage other people to use the urban green spaces more often? Such as facilities, activities, management and maintenance?

How would you rate the maintenance and the cleanliness of the UGS?

How would you rate the safety of this UGS?

Statements made during the focus group discussions were categorised under the three main headings: 'Design and planning', 'Maintenance and management', and aspects of 'Decision-making and implementation'.

7.3.1. Focus Group comments on design and planning

General comments on landscape style and the type of landscaping features users expected to see were discussed in the Focus Groups. These comments on design and planning included:

> "Need more paved areas for rainy times and Build-up Seaside walkways."
>
> "Café, Kiosks and Telephone booth."
>
> "Extra sports areas, flexibility of the jogging paths, separate areas within the park including dog zone."
>
> "Emphasise more heritage and the history wherever possible."
>
> "Design with clean paddling pools."
>
> "Designing vegetation with more wild, cool and natural feeling."
>
> "Safe access to beach and sea bath."
>
> "Disable access and facilities elderly or less mobility people."
>
> "Designated picnic or BQQ areas with raised platforms, more seating areas, Pavilions/summerhouses."
>
> "Some rules for behaviour of young dating couples."
>
> "Few entrance with different themes."
>
> "Sanitary facilities and drinkable water."
>
> "Different areas with special plants for disabled people."
>
> "Educational zone with medicinal plants."
>
> "Comprehensive plant labelling in three official languages."

7.3.1.1. Features and amenities

The following statements were made during the focus group discussion regarding the sports, visitor facilities and other amenities of UGSs in Colombo:

"More jogging paths."

"Separate place for each sports/games."

"Safe bicycle tracks for kids within the park."

"Mobile outdoor gym-instructors around physical excising areas."

"Outdoor fitness facilities."

"Clean sanitary facilities must have to feel free and relax."

"Parking facilities or more walkable distance park access."

"More family-oriented activities."

7.3.2. Comments on safety, maintenance and management

For Safety-related issues, people commented on:

"Park office"

"Presence of security stuff"

"Emergency telephone and access to first-aid"

"Public should be educated and aware of their own safety"

"No security needed as war has ended"

"Introducing natural fencing/ hedges e.g. Bougainvillea"

"Improved safety in children areas"

Maintenance and management comments included:

"Maintain trees (removing any dangerous trees or branches including Coconut)."

"Long time non-completed building work, destroy the feeling of UGSs."

"Change the user attitudes in order to have less maintenance work."

"Camouflaged rubbish bins and recycling bins."

"Using minor-offence prisoners for maintenance work as an answer for debatable issue with army personnel in maintenance work."

"Use high tech maintenance procedures for speedy and reliable work."

7.4. RESULTS FROM INTERVIEWS WITH KEY PERSONNEL

As described on Chapter 4 methodology, twelve key personnel were interviewed representing the Urban Development Authority, Sri Lanka, Colombo Municipal Council and Central Environmental Authority. Although all 26 questions (full list in Appendix 2) had some relevance for the governance and decision-making aspects, the following questions were particularly associated with these political and management issues related to UGSs in Colombo:

Involvement with any particular project or development, in Colombo city in the recent past or near future? How were/are you involved? What were your initial expectations and did the outcome meet your expectations? have things changed after implementation of the project?

Project funding: how was/will the project be funded?

Was there any conflict over how the land was to be used or land ownership?

Who has power to finalise the proposed projects (governmental authority, semi-governmental, private sector, general public or combination of two or more above bodies)?

Do any current policies, perceptions, attitudes or behaviours towards Urban Green Spaces act as barriers to improving the future UGS's in Colombo?

How do possible future problems such as massive population growth, nature disasters, lack of space etc. affecting your planning? How are you dealing with that?

What do you feel are the most significant impacts of the project (e.g. neighbourhood revitalization, increased real estate value, economic benefits etc.)?

Design aspect: what kind of landscape designs did you /are you following? Example: traditional Sri Lankan, historical, colonial, mixed or any other?

What was the reason to choose that particular design style?

Are you following any effective environmental and landscape architectural theories and practices, which have already succeeded and been proven by any other developed and developing countries to a turn highly polluted and urbanized city like Colombo into a green city?

What would help promote and facilitate future redevelopment projects (e.g. public/private partnerships, community fund raising and involvement, federal support)?

Why are the relevant authorities highly focusing on development of urban green spaces in Colombo now more than ever? Is there a global/ political/ civilian or any the influences or pressure involved?

7.4.1. Design and planning in Colombo – professional views

7.4.1.1. Landscape style

In terms of landscape style, many managers recognised the value of the Urban Green Spaces.

> "Space within the city mainly covered by vegetation." (UDA- 3)
>
> "A space where the community can enjoy the nature" (CEA -12)
>
> "A Green oasis in middle of a busy, humid, stressful city" (CMC- 10)
>
> "Currently we are working to provide maximum benefit of nature towards well-being of the Colombo City." (UDA -2)
>
> "Place where citizen can enjoy a lot of recreational activities." (CMB -8)
>
> "A green park, with many free leisure activities offer by the city authorities." (UDA- 1)

"In my opinion what we call here an urban park is not what I seen in other western countries although people seem to be enjoying them in main parks in Colombo. To visit a park, is a major event to be organised and involve lot of stress." (UDA- 6)

"My opinion over 'role of nature for social well-being in Colombo', is much far away from the fulfilling the demand." (UDA -4)

"We are aware of the access problems, in terms of not having UGSs in walking distance and not have a functioning guide-lines for different types of Green Spaces and what they supposed to offer." (UDA-2)

"Although we trying our best to provide even facilities to all community here, but people are reluctant to mixed with all social classes here. I also as a citizen who live here, have notice, people have pre-judgments over the social class they prefer to hung out." (UDA- 1)

"My opinion is there is a tendency that all new development programs or simply proper cleaning and grooming programs are starting from so-called, upper-class areas." (UDA -8)

"By increase the awareness and enthusiasm towards natural environment among the school kids in the city will be able to get the bond from school level onward." (UDA- 3)

"In terms of school grounds and having flower beds, tree planting around the school buildings could give a chance to feel the ownership and the attachment to nature and social well-being." (UDA-6)

7.4.2. Maintenance and management – professional views

"Should encourage small local nature clubs/societies or friends groups to actively involve with designing and maintaining of small scale green patches around the city. Even little reservation-land at the end of a residential area could be planted by local residents." (CEA- 12)

"Introducing regular tree planting programs around the city is important." (CEA -12)

"For funding combine approach of private and public sectors is the more practical for us."

7.4.3. Decision-making and policy implementation – professional views

"However in terms of people attitudes and behaviour I don't see any negative issues. My personal observations (when I'm passing by city parks) I only see happy joyful users. Therefore I strongly believe if we made it (parks) they will use it. There is no doubt that we don't have to encourage general public to use parks. The positive attitude is there." (UDA-5)

"Politician desires are not always very practical." (UDA- 4)

"As a professional in the field, it's really difficult to bring our services or what we have learnt or experienced in foreign trainings to Sri Lanka, because the influences and pressure from the top management and politicians are too much." (UDA-6)

"As usual different governments have different agendas. The elements, such as Urban Green spaces, also being affected by such idealisms. Especially certain actions they have taken in past are not very long term or sustainable. Of course short-term is good, just for instant effect." (UDA -3)

"Although I was a former manager in one of those authorities, I could not really be involved with my full capacity, as expectations, attitudes and bureaucracy is crazy here. I did not want be the odd one out and as well as I need to protect my job first." (UDA -4)

"We would like to implement programs such as community gardening, allotment gardening in Colombo. But we can't simply follow or apply any existing program from other countries. We need custom-made programs for Sri Lanka to meet the local demands and culture." (UDA-1)

7.4.3.1. Integrating UGSs users' views

"So far we haven't questioned the users or public what they want in a park or any kind of green space, since we have most concern on management or trying to meet the authorities/ funding bodies requirements and guide-lines. Therefore never concerned about involving community opinions. However we assumed up to certain extend what public many want." (CMC –9)

"According to my knowledge such 'community involved' programs do not exist." (CEA -12)

"At least conducting a public survey like what you are doing now [the researcher in this study], would give a positive feeling that the community is being involved with greening of the city. Also the data and information will actually very valuable for the future planning of UGSs in Colombo." (CMC -10)

7.5. DISCUSSION

7.5.1. Design and planning

Perceptions related to site type

One of the research questions was to explore users' perception and preferences of site type or the landscape style of UGSs in Colombo. This study has identified that 'Formal' landscape style was the less preferred among the UGS users in Colombo, while 'Informal' and 'Mixed' as scored the most preferred with relatively closer interest. This result revealed that the park users in Colombo are capable of differentiate between 'Informal' and more obviously 'Formal' landscape design, and what they gained from each landscape style. The usage of photographs of 'Formal, Informal and Mixed' landscape styles during the survey helped to distinguish the three types and therefore enabled visitors to identify clear preferences in the Colombo context.

The 'formal' landscape style, which was inherited from history (Sri Lankan ancient history as well as colonial history) is no longer the most preferred landscape style among the UGS users' in Colombo. Although 13% of UGS users in Colombo appreciated formal style, such as the ornamental features, formal water fountains and symmetrical flowerbeds in Independence Square and Viharamahadevi Park, the qualitative data illustrated 'Informal' or wild looking natural style has much more demand for a city like Colombo. As a city dweller visitors demand to experience the real scenes of naturalness and relaxation, which bring benefit from these naturalistic scenes.

Nevertheless analytical results from other questions, related to public expectations in this research show that while visitors prefer more natural looking areas in UGSs, they would still like to see that area being taken care. For instance areas need to be tidy, look well managed and organised, with less dense and layered vegetation so forth. In previous researches, examples Kaplan (1984), Burgess; Harrison and Limb (1988) and Ozguner and Kendle (2006)

also identified that people need to see evidence of care, in UGSs, which make users less frightened. Further that unmaintained natural areas in parks may have a negative effect on security perceptions.

During the landscape architects and the designers' interviews, support was also gathered that while visiting a park, a less formal type gives a better chance for visitors to have more contact with nature. Generally one of the common expectations from urban greens are to have more human-nature contact (Wilson, 1984).

Features and amenities

As with UGS living-features (trees etc.), non-living features (commonly referred as built-in park amenities) are very important for the users. As this study identified 74 (25%) would like to have more benches or seating, which enhance the social connection among the UGS visitors regardless of the age or different social groups. For example, integrated seating into children's play area gives a better socialisation opportunity for parents and guardians who bring children to play area. For instance Refshauge, Stigsdotter and Cosco (2012) also confirmed that providing comfortable and integrated seating areas in UGSs supports desirable socialising opportunities. Not only in socialising context, but individually also, seating in UGS is important. For therapeutic purposes people may wish to sit over-looking a water feature for a long time or a busy office worker may prefer to have a lunch break in a UGS.

Other non-living features are also important for the visitors. Features such as paved paths or paved areas provide neat and tidy sitting areas and social gatherings places. Especially in a tropical country like Sri Lanka, having clear and visible paved areas encourage users to feel safe and secure, as they are able to see any danger such as snakes and biting or stinging insects. Also unpredictable and heavy rain may make lawns and natural paths muddier and

not suitable for walking or sitting. Non-living features also greatly assist with making disabled people's and children's visits to UGS more convenient.

Sports facilities

For particular activities, different individuals or groups also need special design elements. The focus group discussion together with qualitative data from public revealed that the most demanded facility they wanted was either structured formal sport facilities or unstructured informal playing pitches. This includes children's play areas equipped with artificial play instruments or trees and any kind of natural structures to climb on, secured water areas and nature trails for children to explore. Lloyd, Burden and Kieva (2008) also found in his studies that constructed and natural trails in green spaces are very important for adult visitors too.

Throughout the public survey, the focus groups, in-depth interviews and observations found that one of the highest demands and the barriers is that people cannot engage with sport related activities within parks. Remarkably people raised this issue quite frequently and they all had a high expectation that UGSs must provide such service.

The survey data, pre-knowledge of the researcher and particularly the points discovered from focus groups discussion (one of the focus groups was a private sport club) has highlighted problems occurring in outdoor sports in Colombo. These problems include limited or restricted access, lack of facilities for the majority of the population, and the elite club culture within the city.

One of the interesting points being suggested during the focus groups was the location for UGSs. Constructing UGSs adjacent to useful public buildings or attractions such as libraries, shopping malls, schools, public swimming pools, heritage building as museums are important among the local community in terms of accessibility. This requirement supports the idea that

the general public in Colombo tend to see UGSs as a part of day-to-day life and green should be harmoniously blend with their daily life. Hence they would like to be able to make a quick visit while they are dealing with other daily routines, not consider as an organised day trip like in current situation in Colombo.

Designing for all - Social and Cultural considerations in Colombo

As current research has examined (in Chapter 6), the motives for visits together with their different socio-demographical backgrounds, demands and expectations from the UGSs in Colombo are complex. For example; according to Chapter 6 findings, most visitors preferred to visit as a group. That makes pressure on the decision-makers to consider a wider range of needs and activities expected by particular groups or for mixed groups, as designs need to provide different activities simultaneously in different areas in the park. Hence introducing the different types of areas within a park is a necessity. Having different areas within each UGS was emphasised, when the UGS visitors were questioned over the design aspect of UGSs in Colombo.

As established in Chapter 6, special requirements due to age or impairment people were under-represented in the UGS-user population in Colombo. Seeland, Klaus and Nicolè (2006) also found, in a global context, that people with physical or mental handicaps are often excluded from social life in public UGSs. Their social participation is limited by their special needs. Therefore from the design aspect has lot to contribute. These handicaps should be taken into account when designing and planning social infrastructures as Cattelino (1988) stated in his studies. Reliable access-aids, multiple entrances, wide enough paths for wheelchairs or push-chairs, access ramps, sanitary facilities with special focus on disabled access, removal of any landscape features which may act as barriers to movement were the main requirements highlighted in Chapter 6 of this studies.

Appropriate unique UGS typology and hierarchy for Colombo

All possible types of urban green spaces were not identified within the targeted area of these studies. However, a wider range is available adjacent to greater Colombo and western province of Sri Lanka. The typology is mainly based on the dimensions such size, activities and facilities offered and how natural they are. As described in Chapter 3, there are more combined typologies with different level of hierarchy; for example one of the common is City parks, District parks, Neighbourhood parks, Local parks, Pocket parks and Amenity parks. However this type of hierarchical classifications properly apply for mainly non-private owned UGSs (Dunnett, 2002). As in Colombo context 76% out of total (171.15 hectare) green space coverage is privately or semi privately owned within Colombo Municipal area, the need for a complex sophisticated classification is highlighted. Due to time limitation the author could not established a completely new classification through field research, for UGSs in Colombo. However after thorough review of all possible classification found in literature from around the world, this study concluded the Department for Transport and Local Governments Regions (DTLR) the UK - (2002) classification, which covers all possible types of UGSs is the best classification for city of Colombo. For full details please refer Appendix C.

7.5.2. Maintenance and management

As the summary table (Table 7.10) below shows the ideal way of managing an urban green structure in Colombo is based on provision of what the community demands and need as well as meeting the challenges highlighted from this study for management and relevant authorities. In the literature, and also many managers and key personnel, frequently mentioned about the cost involved in different designs which act as barrier for better creation for UGSs (e.g. Ozguner, Kendle and Bisgrove 2007). Based on many previous studies and in literature (Chapter 3) introducing more informal, naturalistic landscape style possibly reduces costs, as

relatively more cost is involved in formal manicured Urban Green Spaces. However, as Hilborn (2009) also found, there are downsides such as more naturalistic type parks are more prone to vandalism or anti-social behaviour activities. In terms of safety and feel safe aspect, presence of wardens or security staff has been emphasised by many visitors, focus group members and key personnel too. The results found from the key personnel interviews emphasised that a green spaces strategy in Colombo Sri Lanka needs to be focussed on planning related to finance within budgets for development and maintenance. As found in this study (from in-depth interviews) most of the finance comes from foreign funding bodies, and only for short term (not for long-term maintenance) or as one-off donation. During the field research the author observed neglected projects (either partially implemented or not updated with maintenance). Therefore decision makers must come to appropriate decisions on whether projects are publicly or privately funded. However found results show that having a combined approach with public and private sector involvement is better in Colombo context, but every project needs to be consider one an individual basis.

Lack of qualified staff; for example skilled (educated in horticulture) ground staff for day-to-day work, was identified during observations and discussions.

7.5.3. Decision-making and policy implementation

The complexity of the decision-making approach and the politics involved in implementing decisions can make action on UGSs very challenging in Sri Lanka. There are gaps in communication particularly between community users and managerial staff, and complex and rapidly changing relations between managerial staff and political decision-makers. The summary of the key–personnel interviews emphasised that bureaucracy between different professions involved in UGS management was one of the major issues together with actual political power from politicians. This deters their full involvement for their assigned

responsibility. Furthermore not having regular communication between them as well as not focusing on one ultimate aim/ goal is also a problem. This difficulty they have to face on a regular basis. Further details can be found in Table 7.10.

7.6. CONCLUSIONS

7.6.1. Design and planning

According to the Urban Development Authority (UDA, Sri Lanka, 2008), total parks, and playgrounds (all UGSs) in Colombo, account for 171.15 hectares. About 95.4 ha., which accounts for 2.5% of the total of Colombo Municipal Council (CMC) area are publicly own UGSs, while nearly the same amount 75.91 ha. (2% of the total Colombo municipal council (CMC) area) are private (this does not include domestic gardens). As a proportion, almost half of the green coverage is owned by private recreational clubs and organisations, which give access to only a very small proportion of the Colombo community. As identified in Chapter 5, generally green spaces are unevenly distributed throughout the CMC area. Also, as identified in Chapter 6, facilities of UGS are not the same in all sites either. There are other possible green areas – potential linear parks by canals, transport corridors, beach strip and large water bodies such as Beira Lake (approximately 12 ha. in extent (UDA, 2008)) but these are all very much under-utilised.

What would be the best landscape style for Colombo's UGSs?

Based on finding from the public, focus group as well as the professional interviews, almost equally 'Informal and Mixed' are the most preferred landscape style in the UGSs Colombo. Emphasis should therefore be placed on 'informal /naturalistic' style in UGS design in Colombo. Therefore as Henke and Sukopp (1986) mentioned, even existing formal manicured, conventional green spaces can be enhanced with natural areas by following ecological design principles.

In terms of planning for the audience, one gap identified in Managers' role is a failure to understand the changing needs of users for specialised activities. Targeting particular groups with specialised amenities and events would encourage more visits. A broader offer to a wider audience range will also involve greater coordination with other indirectly relevant authorities or persons such as security personnel, police or parents or guardians of children, in order to regulate day-to-day management properly and effectively.

There is no sense of community ownership within the users of UGSs in Colombo, and extensive questioning and research (Chapters 5, 6 & 7) found no evidence of community involvement in UGS activities in Colombo. Researchers from other countries have demonstrated that visitors value the sense of community ownership, and this enhances their experience in and their engagement with UGSs (Jim 2004). Building community events around UGSs could help to establish this bond.

What is the UGS Strategy for Colombo?

When classifying an urban green space, they are many different ways as addressed in the Literature Chapter. However one of the main failures recognised by this research was that applying strategies for UGSs do not consider the changes in Socio-demographic patterns in the targeted area or community, and their preferences, perceptions, attitudes and behaviours too. In the past in Colombo such standards have not been empirically evaluated as well as not scientifically tested. UGS standards are there to guide and to ensure a professional approach to maintain a level of consistency. However as Bryne and Sipe (2010) explained "park standards were not based upon empirical research (scientifically verifiable data) but rather the assumptions of the designers". Therefore as Wilkinson (1985) also recognised in many councils in the USA found that theoretical standards are problematic or simply not practical (Bryne and Sipe 2010).

Therefore in order to bridge the gap and to achieve multiple benefits from UGS in Colombo, it is vital to adopt a 'need-based assessment' (Westphal, 2003), which includes a better way of categorising and to strategically approach the current gap in Colombo Sri Lanka. The uniquely created 'Urban Green Space Strategy' will be explained in the Conclusion Chapter.

7.6.2. Maintenance and management

When summarising the issues raised from the public point of view, there are simple things that managers can do to maintain appearances, such as perception of being looked after, dangerous problems removed, minimising hazards, helping people feel safe.

The present study has identified major challenges related to budget and securing funds for future maintenance and development. During the key-personnel interviews one of commonly used word is 'cost' involved. In the Colombo context, both initial cost and the long-term maintenance cost are often discussed as a barrier for full-scale projects. Most often in Sri Lanka projects are funded by the international development organisations for few years only. Therefore they do not have long-term financial sustainability to counter the pressure of urban development. A similar situation has been identified in 'Green Spaces in Sheffield, in the UK' (Beer, 2004). As costs were regularly identified as a barrier to implementing projects, this research suggests that finding a more sustainable method for long term funding for management and maintenance is a priority. These funding drives could include local sponsorships, for example to maintain traffic roundabouts, road-side vegetation or small sections within a park. Approaching planning and management strategically will maximise the value of capital investment and revenue expenditure. Properly organised community involvement programs may also greatly contribute to maintenance or fund raising activities.

7.6.3. Decision-making and policy implementation

For Colombo, the key gaps identified in terms of decision-makers' roles is a lack of understanding the different types of UGSs, and a failure to cater for all different age and social groups. That needs to be taken into account when developing or regenerating UGS.

An understanding of environmental characteristics in Colombo (Chapter 5) and identifying the need of the general public (Chapter 6) together with the results (Chapter 7) gathered from in depth interviews suggests that thorough integration of the many different professionals is the only to sustain the future of UGSs in Colombo. This combination allows a holistic approach to any policy, making decision-making much easier, as professionals can share the formal and informal technical skills, data, experiences and resources, which are relevant to a project, plan or design. A robust and supportive team is likely to be more efficient and more sustainable in the long term. This scenario can be further developed to concepts such as 'sustainability and Eco city'. As Hezri and Dovers (2006) suggested the concept of sustainability is an important model in modern urban planning and UGSs can positively linked to sustainable city policies. Therefore robust skills teams could be a part of an 'ideal sustainable city'.

As found in literature (chapter 3), successful implementation of a project requires establishment of appropriate management and planning policies, and bringing together a range of people with diverse skills and perspectives. In Colombo, however, projects tend to be not building collaborations in planning, designing and management of UGSs in Colombo, overall they have missed the potential multi-functionality aspect of the green spaces.

In Colombo a good example is the need to combine the skills of landscape-ecologists and urban planners together, prior to finalising any plan. These professionals have many similar concepts but different foci, as landscape ecologist are mainly focussed on the scientifically

ecological processed within pattern of landscape, while urban planners are identify needs and priorities, and eventually develop implementation, monitor and update the strategies as described in Chapter 3.

7.6.4. Summary: Identified gaps in current system, current status and recommendations.

Finally, the identified gaps in the political aspects of the current system, together with recommendations to meet the challenges in future are presented below.

Gaps identified	**Current situation and publics' and professionals' views**	**How to meet the challenges and future recommendations**
Community involvement	Equally both community and professional have accepted that there is almost no active community involvement in planning, designing, management and decision making of UGSs in Colombo.	Sufficient community participation in all UGS structural planning, development, maintenance and decision-making is important to increase the sense of ownership. Upkeep, visual amenity and attractiveness of UGSs help create a sense of civic pride.
Social cohesion through UGSs	Lack of regular social activities, events to bring community together.	Providing a wide variety of cultural, social and community facilities, including seasonal activities such as fairs, festivals and concerts.
Designated areas to accommodate different users or groups	Separate areas within one UGS do not exist, other than few children's play areas within a park.	Offering diverse activities and amenities in different areas of the UGSs; Improving physical accessibility and activities particularly for children, disabled and older people.
Cultural heritage and UGSs	Although there is little cultural heritage in UGS, this does not appear to be a major issue for visitors. There is scope for improvement in the cultural aspect.	Reinforcing local identity mixed within green spaces and enhancing the physical character of an area. Protecting the historical, cultural and archaeological heritage in and near the UGSs.

Gaps identified	Current situation and publics' and professionals' views	How to meet the challenges and future recommendations
Education, awareness and skilled and trained staff	Education or training in green spaces/ parks sector is not yet popular as a vocational field in Sri Lanka.	Need to invest in horticultural training, particularly on green space management. Explore new ways of attracting young people to a career in horticulture, in order to have knowledgeable, motivated and qualified staff.
Long term Environmental sustainability	Negative consequences, of situations where professionals are not adapting long-term sustainability are already noticeable in Colombo.	Need to implement environmental strategies and approaches, which are in themselves sustainable in the long run and would lead to the long-term management and maintenance of green spaces, working with landscape-ecologists.
Organisational barriers	Lack of or no collaboration between different professions indicates problems in project implementation and failures in existing projects.	Must bring all relevant departments, authorities and professionals and politicians under one 'umbrella organisation', where they can share the vision, skills, expertise together and to strengthen the whole procedure.
No inter-connected strategic approach to UGS issues in Colombo	Almost no strategy and different departments working separately with no interconnection or following any common strategic guidelines.	Formulation of new unique interconnected but practical strategy which is based on ecologically, geographically, social and culturally and politically sound theory is necessary.
Safety and presence of Park officers	No on-site designated park staff to run the day to day management.	To improve the perception of safety, and maintenance, skilled staff should be on-site.
UGS definition, standards, classification and typology	Regular strategies and classifications are practically not functioning in Colombo context.	Need to define need-based standards, action plans and strategies uniquely for Colombo.

Gaps identified	Current situation and publics' and professionals' views	How to meet the challenges and future recommendations
Funding and long term finance to maintain UGSs	Lack of consistency of funding is a massive problem as most of the projects are short-term donations from international funding bodies.	Boosting the economic potential through local and foreign tourism, leisure and cultural activities; seeking more long term domestic private sponsorships; securing long term external funding and focusing capital and revenue expenditure cost-effectively. Developing opportunities for volunteer working.
Programs to promote and develop UGSs	Hardly noticeable promotion or development programs are in Colombo.	Identify and evaluate the range of innovative models, which could be developed to recognise UGSs in broader capacity; possibly with different partnerships and organizational structures, including those, which are led by local authorities.
Monitoring of quality of UGSs	There is currently no rating systems or any kind of quality audit programs in Colombo.	Develop and carry out regular quality monitoring to identify the gaps and need of improvement.

Table 7.10 Summary of identified gaps in current system, current status and recommendations.

Having already identified ecological and social gaps, this chapter concludes by explaining identified gaps in the current system from a political perspective. These will inform the action plans in the main 'Urban Green strategy for Colombo' (Figure 8.1) in Chapter 8.

A combination of multi-disciplinary options in a comprehensive but collaborative setting should support to integration of many different perspectives (i.e. Ecological, Geographical, Social, Cultural and Political). Input from professionals with a diverse range of skills and knowledge should rationalise any planning and policy-making towards sustainable urban green spaces in city like Colombo.

Chapter 8: Conclusion

CHAPTER CONTENTS

8.1. OVERVIEW

The hypothesis of this research was "There is a unique set of social and cultural, geographical and ecological and political circumstances in city of Colombo that could enable it to become a leading 'Haritha-City' in South Asia, but there are gaps in the current planning system that are preventing that aim from being realised". As described in Chapter 1, 'Haritha' is a word from the Sinhala/Sanskrit language that means 'lush, green and verdant'.

Chapter 1 discussed the problem statement in detail and addressed how to proceed with a 'gap analysis'. After an initial overview of the literature, the complexity of the factors involved was identified. To manage these, the author has created a three-spheres frame to work on. These three primary aspects are believed to be the main dimensions/stakes on which UGSs

are structured, and by combining them and understanding how they interact, it is possible to identify and illustrate the possible gaps that need to be addressed to complete fully functioning Urban Green Spaces. Therefore analysing 'Urban Green Spaces' in-depth it was necessary to look in to those three primary subject areas; Social and Cultural, Ecological and Geographical, and Political approach.

First the author has obtained a comprehensive knowledge, through literature on the history and dynamics of Urban Green Spaces in Sri Lanka with particular interest in Colombo (Chapter 2). Here the author has studied how Urban Green Spaces originated in Colombo and how gradually they have developed, influenced and integrated with the society and or changed through different governing eras in Sri Lanka. The primary influence has been the last colonial period, under the British rulers, who introduced the whole Western style European garden culture and recreation and sports clubs into the traditional and Eastern society of Sri Lanka, particularly in the city of Colombo as the British administrative centre. Although the UGSs were introduced primarily for the white ruling class, for their leisure and recreation, slowly they emanated into local culture and the society. Political activities in the recent past have also had an influence and affect the current and future status of the UGSs in Colombo.

The comprehensive literature review (Chapter 3) explored the Urban Green Spaces in a global context in the recent past and to present-day with special reference to main cities in developing countries. By studying the empirical and scientific work throughout the world, Chapters 2 and 3 helped to define the exact research area, and how to research. This has laid the foundation to select the appropriate methodology for this thesis. Initially the expectation was to study a very specific defined subject matter, in one aspect of UGSs in Colombo. However it was realised that there was a need to research UGS in a broader context, involving many aspects and elements, since there was almost no prime or scholar-based studies reported in UGSs in the Colombo context. The author also sought a holistic approach.

Chapter 4, Methodology, justified the chosen methods to tackle the problem area. The study has employed a questionnaire-based public survey (in four selected sites within Colombo Municipal Council), focus group discussions (four public groups with different social and cultural backgrounds consisting of 6-8 members in each), in-depth interviews with key personnel from relevant authorities as well as observations wherever it was necessary to confirm the found results.

The next three chapters (6, 7 and 8) were focused on each of the three main factors that influence the dynamics of UGSs in Colombo Sri Lanka.

In chapter 5, the Ecological features of Colombo were explored. These include the tropical climate with monsoon rain, a diverse range of vegetation with existing mature trees in the city, a huge biodiversity, geographically unique location with a long sea-front, a large lake in middle of the city, extensive canal systems, and the city surrounded by agricultural fields, wetland and marshland. These features could be used to create strong links of an urban green network and are a unique circumstance that could enable the city of Colombo to become a leading Haritha-City in south Asia. However, major gaps were identified in the Ecological and Geographical situation of the UGSs surveyed in terms of the distance that people have to travel to reach them, the implications on traffic and transport use in the city and lack of consideration in ecological and geographical characteristics of Colombo.

In Chapter 6, the Social and Cultural factors and results were discussed. For this research, Social and Cultural data was mostly gathered from the public questionnaire and the focus groups. Colombo also has unique social and cultural circumstances. This is due to many different socio-demographical groups, with a multi-racial, multi-religious population from different social levels and classes that harmoniously blend in Colombo society. With such

circumstances UGSs could play a vital role in urban integration and the quality of life of the city dwellers.

Chapter 7 investigated the Political (governance and decision making) factors. As in Chapters 5 & 6, unique circumstances were identified, in design, management and maintenance with distinctive local political approaches being examined.

Finally, based on each results chapter, the hypothesis has been positively proved, and there are clear 'gaps' in the current UGS system in Colombo Sri Lanka. Despite the unique circumstances in Social, Cultural, Ecological, Geographical and Political in city of Colombo, the found gaps are currently preventing it from being a leading 'Haritha-City' in South Asia.

As none of the above factors work in isolation, the three-spheres model was used as the basic framework from which to explore how factors interacted. Moreover this provided an opportunity to investigate more deeply the current and future status of UGSs and to create a holistic approach with a systematic derivable strategy for Colombo in Sri Lanka.

After analysing results the conceptual three spheres model was updated with the identified complex gaps in overlapping areas of the diagram. The areas of the three spheres diagram were named as Social, Ecological and Political with overlapping areas as Socio-Eco, Socio-Political and Eco-Political.

8.2. SUMMARY OF FINDINGS, IDENTIFIED GAPS AND RECOMMENDATIONS

Table 8.1 (below) shows the overall summary of key findings, identified gaps in current system and possible recommendations for the identified gaps.

	Key findings	Identified gaps in UGS provision and quality	Recommendations
1	Logistical barriers. Visitors are travelling for a long distance and a long time to reach UGSs.	UGSs are not evenly spread within the city.	During planning and designing process, priority should on equal geographical distribution of UGSs
2	Public awareness of presence of Urban Heat Islands (UHI)	Lack of vegetation cover and not enough cooling plants	Further research into UHI and involvement of landscape ecologists in planning and decision making process
3	Many under-utilised water bodies, waterfronts and sea strip	Water as a major design feature or waterfront as a potential UGS, not been used in full capacity.	Adopting Blue-Green concept in UGS design
4	Overall poor management and maintenance of urban vegetation	Unevenly distributed, poorly managed, planting areas which are unsuitable as a city plant/tree, lack or no proper arboriculture records	Establishing a comprehensive tree inventory, maintaining a reliable plant nursery with native, cultivated and naturalised plants for new and replacement, vegetation management with hi-technology
5	Lack of ecologically planned plant areas in urban green spaces	Lack of interest in ecological value in urban green network	Increase and enhance the local biodiversity through environmentally friendly planning approaches. Promote more local flowering seasons as festivals to involve public actively and passively.

	Key findings	Identified gaps in UGS provision and quality	Recommendations
6	Under-utilised patches of land attached to private houses	Contribution and value of urban domestic gardens not adequately addressed	Recognise and promote urban domestic gardens as a major link in UGS network in Colombo
7	Brown-fields, ambiguous land or empty street corners	Government or private sector has little interest on those lands to re-develop as part of UGS network	Revitalisation of such places are essential for urban green fabric. Government and private sector should take practical steps to utilise these plots as a part of the green network.
8	Still there are solid walls surrounding certain green areas Colombo.	Lack of understanding in passive recreation and the importance of visual green connectivity in wellbeing.	Continue to ban erecting solid walls or fences that may work as a barrier for green connectivity. Remove the remaining ones that exist.
9	Need of new parks for public	No vacant land to create traditional/ conventional parks and lack of use in alternative methods or new technology	Optimising the ecological and geographical characteristics of Colombo and create more beneficial linear style UGSs. Enforce law on new planning permission with possible roof gardening.
10	Visitors mostly have a preference for naturalistic vs. formal landscape style, and the top three motives to visit an UGS were ‘nature’ associated	Public demand on more naturalistic designs or mixed to be more connected with more nature in urban areas	Integrated more natural living-features into design and planning of UGSs in Colombo
11	The Colombo community prefers to spend leisure time or taking recreation activity within a social set up.	Many UGSs lack facilities for large group sizes and the full diversity of group members.	Provide facilities to enhance the social coherence and offer many different activity zones, to accommodate different members’ demands

	Key findings	Identified gaps in UGS provision and quality	Recommendations
12	No sighting of formal sports or informal playing in UGSs. Most of the UGSs are not allow to play on grass or to bring any sports equipment.	Restrictions on for both formal and informal sports and games within UGSs (other than formal sport grounds) in Colombo.	Providing space and facilities of formal sport fields or informal playing pitches is a key priority for UGSs. The use of alternative spaces such as increasing the number of people who can access private sport grounds or encouraging usage of school playgrounds after school hours should be explored.
13	Run-down and poorly maintained UGSs	Not having long term donations, budget to keep up with effective maintenance, management or redevelopment of UGSs	Combined approach of public and private sector involvement, long-term local sponsorships, resources
14	Different representations among different socio-demographical groups	Failure to understand the changing needs of different user groups	Involve public in design, planning and decision making process
15	No sense of community ownership among the UGS users	No practical involvement of general public in UGS procedures	More community based activities and events around the UGSs
16	Current strategies are not practically functioning in Colombo context	Some theoretical ‘strategies’ are in place, which are not practical, but some assumptions of few key personnel only.	Usage of ‘need-based assessment’, which are scientifically tested, against changes and needs of all social groups
17	UGS projects are very much stand in isolation, which resulting lack of success	No collaboration between in relevant authorities and professionals.	Need to locate all relevant authorities under one ‘umbrella organisation’, where all professionals together share their visions, technical skills, industry expertise and resource with a holistic approach to strengthen the whole procedure

	Key findings	Identified gaps in UGS provision and quality	Recommendations
18	Widely noticeable failures in project implementation in UGSs in Colombo	Local political approaches (politicians power), bureaucracy and organisational barriers	Less political involvement, but employ skilled trained staff for each aspect of UGSs and all parties working in collaboration
19	Under presentation of less-able people in UGSs	Inadequate disabled facilities being offered in UGSs in Colombo	Provision of improved access, facilities, different zones with special designs and planning
20	Number of weekends-users are much higher than weekday users.	Less UGSs are in walking distance to use in regular basis or no UGSs nearby office areas as majority of users are in full time employment or education	Creation of UGSs near office or industrial areas will encourage regular week day visits
21	No complete and comprehensive database for UGS sector in Colombo	Lack of hi-tech in usage in UGS sector in Colombo	Establish GIS based, comprehensive information centre, use GIS for monitoring and regulate USGs in Colombo.

Table 8.1 Summary of research findings, identified gaps and recommendations.

8.3. URBAN GREEN SPACE STRATEGY FOR COLOMBO

Formulating a deliverable and practical strategy is very much the current need of Urban Green Spaces planning system in Colombo as well as one of the main outcomes of this research. It has clearly been demonstrated that relevant authorities and personnel need to follow one vision with a deliverable and methodical chain of action plans in all aspects to achieve the aims and goals they require with a holistic approach. The main purpose of this proposed Urban Green Space Strategy for Colombo is to bridge the identified gaps in the Colombo UGS context.

The UGS strategy explains what resources, knowledge, method, and time are needed to achieve the overall aim. The diagram below (Figure 8.1) illustrates a clear framework for a practical series of actions to protect, improve, develop and create Urban Green Spaces within the City of Colombo over the next ten years. The three core areas of the Urban Green Space strategy for Colombo should overarch many other strategies directly or indirectly within Colombo Council.

Having a strategic approach to planning and management of UGSs will greatly contribute to the other local objectives and create links between elements such as social and environmental services, recreational, regeneration and so forth. Together the action plans and recommendations in this strategy guide in;

- How to meet the Colombo community's needs and perception of UGSs;
- How to maximise the benefits of unique ecological and geographical characteristics of Colombo through UGSs;
- How to develop UGSs with amenity value and UGSs rating system for Colombo;
- How to implement possible changes in existing management system and local political approaches, deal with cross- organisational boundary issues, as well as a framework for prioritisation and resource allocation for management and improvement of delivering good practice in green space provision.

All-in-all formulating the UGSs strategy for Colombo provides local council and other relevant authorities a holistic structural plan to work on. Furthermore UGSs are as one element of overall urban planning and development; therefore it is easy to refer during the process. All the action plans attached give qualitative and quantitative information, and greater emphasis on primary as well as secondary vital facts to be considered during the process of UGSs planning.

Based on the research results, setting up the strategy structure used cultural, ecological and political factors as the main framework to provide the preliminary vision. This will be followed by defining overlapping areas with integrated action plans needed. All action plans will guide the strategy forward by explaining what needs to be done. Furthermore, relevant action plans may contribute to the development of comprehensive planning, integration between core areas, knowledge and understanding of each and every functional attributes such as recreation, landscape character, increased biodiversity etc. Biodiversity action plans will identify the ecological characteristics of environmental needs and enhance as well as creation of biodiversity in around of the UGSs.

To bridge the gaps between different elements of UGS planning system, it is essential for joint working between departments in Colombo council and arrangements made to address cross-boundary issues. In Ecological and Geographical perspectives the council will need to liaise with other authorities, for example, to deal with urban green network, ecological corridors and flood management via localised action plans.

From the political area with its strategy and action plans could possibly meet the aims by effective management with skilful staff for the right job. As an advantage of this strategy process it will provides an opportunity to assess and identify any issues or gaps in human resources too. As identified in Chapter 7, one of the main problems in the current system is

that UGSs planning has been based on local political approaches with only a small percentage towards any environmental aspect, and failure to integrate community participation. Therefore the strategy formulated for this research was comprehensive and included many different connections with UGSs.

8.4. THE GRAPHIC FORM OF THE STRATEGY OUTLINE

As describe in the earlier section the comprehensive strategy for Urban Green spaces in Colombo as follows. Figure 8.2 shows the summarised and proposed main strategies with relevant actions plans by the researcher. This was a combination of found results from the literature review, field data from interviewed members of the public, focus groups, professionals and other sources. The category 'other' involved observation and non-published documents. The colour coded key for the strategy outline is as follows:

1- Literature - ▬ · ▬ · ▬

2- Field data- public interviews - ———

3- Filed data- professionals interviews - ———

4- Field data- focus groups - ———

5- Other- Observation and other non published documents – – – – –

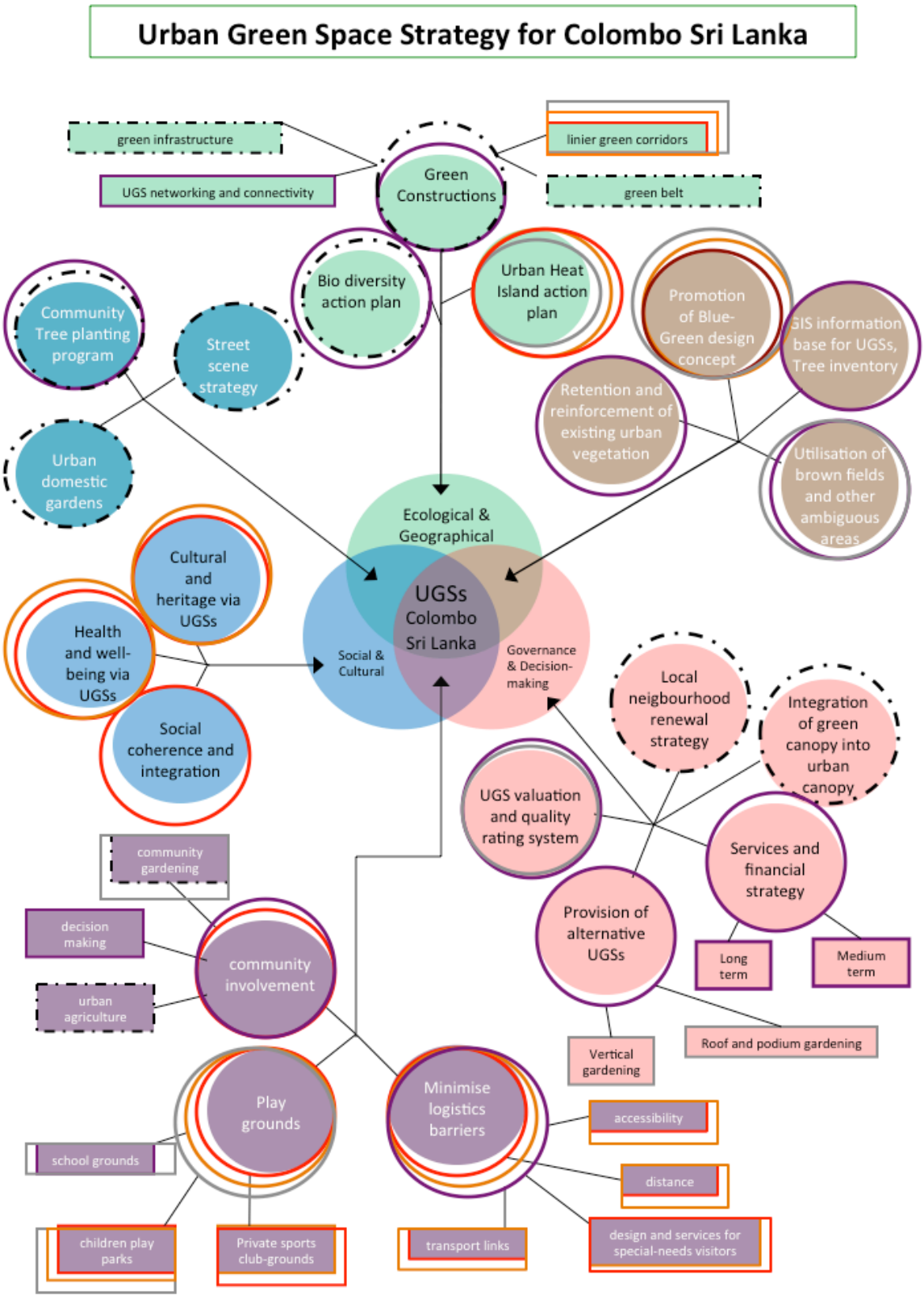


Figure 8.1 Urban Green Space Strategy for Colombo, Sri Lanka.

8.5. A NEW URBAN GREEN SPACES RATING SYSTEM AND VISUALISATION METHOD FOR COLOMBO

As a novel solution for the current situation the author has created a rating system and visualisation method for UGSs in City of Colombo, which can be used to either to pre-value proposed UGSs or to evaluate and improve the existing UGSs (see Figure 8.2)

The attributes that could be rated under this system are proposed as:

Features and amenities; Giving a numerical value for the features and amenities offered, indicate how much that particular UGS meet the social needs.

Character, distinctiveness and landscape diversity; each and every UGS should have its own character with diverse range of landscape features. Design and its typographies would be one of the reasons to attract more visitors.

Naturalness (habitat areas, biodiversity and conservation); From Ecological prospect, rating the naturalness is very important to measure the environmental contribution of UGS.

Sustainability (adaptability and robustness); Recently the attribute 'sustainability' became popular with modern urban planning, due to environmental changes and planning for future cities, sustainability now plays a major role.

Green canopy coverage; Green canopy coverage in UGS planning deserves more attention as it is a direct solution for issues such as urban heat islands and need of shade from direct sunlight in a warm city like Colombo.

Security and Safety; The security and safety aspect is very important to achieve high number of visitors, especially more women and children.

Accessibility and connectivity; As discussed in chapter 7, accessibility and connectivity play a major role for all different type of visitor- groups.

Financial viability; In Colombo most of the projects to date were based on short-term donations for international funding bodies. Many on-going projects are facing problems with financial issues and as a result of that quality of management and maintenance are low. Therefore assessing the financial viability is important.

Maintenance; Rating the maintenance demands, at the planning stage, will predict the feasibility of the financial future of UGS. Therefore high maintenance demanded designs could be changed at very early stage.

Each of assessment attributes need to be scientifically researched, in more detail and allocated a benchmark or minimum level. Because of time limitations in this research, benchmarks were not yet scientifically established. Each UGS should meet at least the minimum point of each attribute.

To visually portray this rating system, a radar diagram provides an ideal solution. Baseline, current situation, and objectives can be displayed together giving a clear illustration of strengths and weakness, and specific areas for improvement. The example diagram (Figure 8.2, below) is illustrated as an example for an UGS with hypothetical values for each aspect of the rating system.

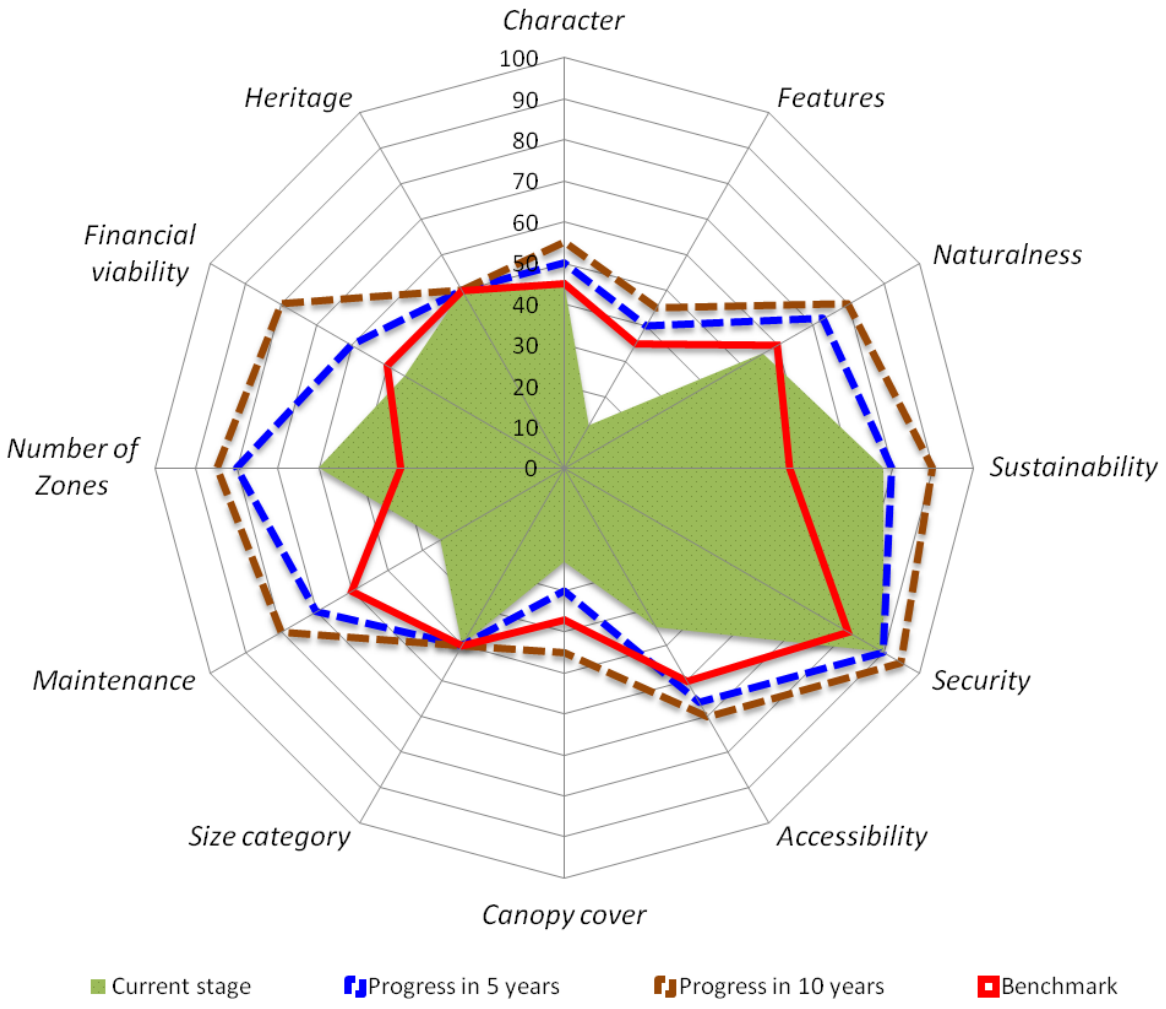


Figure 8.2 Radar chart example, illustrating the proposed rating system for UGSs in Colombo.

Proposed by the Author, with hypothetical figures for illustration purposes.

8.6. FUTURE RECOMMENDATIONS AND FURTHER STUDIES/RESEARCH

This study can be considered as a pioneering effort in Colombo's UGSs context. Due to time and practical limitations as well as the nature of the research, there are a few important areas not yet scientifically tested. Therefore investigations of following subject matters are fundamental:

- Green Space Ratio per person in Colombo
- Climate changes and its influence in UGSs
- Urban Heat Islands in Colombo
- Urban Green Spaces link with urban architecture and city planning
- Research on suitable vegetation for Colombo
- Domestic gardens in urban green network
- Community gardening and Urban Agriculture

The author believes there were a few methodological mistakes, which would have been better handled in a different way. These include considering the importance of private and domestic garden in urban green spaces network planning. This research did not investigate the access to a private or domestic garden, as it would be very useful attribute in total green in Colombo, and may influence how individuals use public green spaces. More involvement of non-users for interviews would provide more insight into the barriers that prevent people from using UGSs, both physical and psychological. Although, focus groups contained more non-users, of UGSs of Colombo.

Scientifically identifying different type of UGSs in city of Colombo by the author rather than through literature would be a help to classify the different types of UGSs in Colombo. This was also impossible due to time limitation.

8.7. SUMMARY

1. Urban green spaces in City of Colombo are currently far from meeting public needs. Despite their inadequacies, the public tend to use UGSs in Colombo intensively.

2. The majority of the general public or the UGS users in Colombo visit an UGS as a 'day trip destination'. As results showed the barriers, visitor demands, geographical locations, average distance from home to UGS, use of motorised modes of transport to visit a UGSs, the average length of time they spend in an UGS are all similar to a characteristics of a 'day trip destination'. Therefore there is a need to reduce logistical barriers involved with reaching a UGS and create the whole experience as part of the daily routine of a city dweller without the need for stressful forward planning.

3. In the area of 'social-political', there is a need for the public to be involved with decision-making and to be a part of the UGS system. A sense of ownership and community involvement are important. It was also identified that integrative research is very important. Professional and academic participants alone are not adequate for decision-making. Involvement of social representatives such as locals, broader public and relevant interest groups are vital.

4. The current study has identified the demand for setting up special recreational areas within each UGS to accommodate all.

5. There are concerns about better maintenance and management through adequate skilled and trained staff, who can effectively deal with the ecological and geographical characters of Colombo, together with professionals who understand the social and political demands of Colombo.

6. More attention needs to be paid towards long term sustainable and environmentally friendly design as well as conservation planning. A focus on ecosystem services is required, together with better integration of surrounding ecological features in the greater Colombo area, such as wetland, agricultural land, marshes, wetland and any biodiversity hotspots.

7. High-tech alternative designs and plans for future could provide solution for many current issues such as lack of available land for new UGSs, rapid urbanisation and population growth, cost effective maintenance and management.

8. Need of utilisation of brown-field and use school grounds and private sport clubs more effectively within the Colombo urban green network.

9. More attention needs to encourage large-scale tree-planting programs through politicians, private sponsorships and publicity.

After discovering all above gaps in the current system in Colombo, it is clear that planning urban green spaces requires an integrated approach, which balances Social, Ecological and Political aspects within the city of Colombo. It is important to preserve and protect the existing ecological and geographical characteristics, meet social and cultural needs of the local community, while simultaneously developing urban green spaces according to local political frameworks. Overall a combination of multidisciplinary, interdisciplinary and trans-disciplinary actions are necessary. Therefore a holistic approach is essential to close the gaps in current system in UGSs in city of Colombo to be a leading ‘Haritha-city’ in South Asia.

References

Adams, A., Harvey, H. and Brown, D. (2008). *Constructs of health and environment inform child obesity prevention in American Indian communities*. Obesity. vol-16, pp 311–317

Ahris, Y., Noordini, C., Nafisa, H., Haiza, W. and Susilawati ,S. (2006). *A GIS approach in evaluation of metropolitan green area: a case of Sungai Pulai wetland. Urban Forestry Conference: Managing Urban Green for Sustainable Cities.* Kuala Lumpur.

Antiquaprintgallery com. (2013). *British Isles.* Available at; http://www.antiquaprintgallery.com/british-isles-13-c.asp /Accessed 08.10.14

Asah, S., Bengston, D. and Westphal, L. (2012). *The influence of childhood: operational pathways to adulthood participation in nature-based activities*. Environment and Behavior.

Attwell, K. (2000). *Urban land resources and urban planting – Case studies from Denmark*. Landscape and Urban Planning, vol-52, pp. 145–163.

Aubertin, J. (1892). *Wanderings and wonderings : India, Burma, Kashmir, Ceylon, Singapore, Java, Siam, Japan, Manila, Formosa, Korea, China, Cambodia, Australia, New Zealand, Alaska, the States.* London, K. Paul, Trench, Trubner and Co., Ltd

Balram, S. and Dragic´evic,´ S. (2005). *Attitudes toward urban green spaces: integrating questionnaire survey and collaborative GIS techniques to improve attitude measurements*. Landscape and Urban Planning, vol-71, pp. 147–162.

Bandara, C. (1989). *Coastal changes of Crow Island and its Environs.* Coast Conservation, Department of Geography, University of Peradenya.

Baycan, T. and Nijkamp, P. (2006). *Urban Quality of Life: Analysis and Policy.* Studies in Regional Science, vol-2, Pp. 263-268.

Beatley, T. (2000). *Green Urbanism: Learning from European Cities*. Island Press, Washington, DC.

Beer, A. (2002). *The decline of the urban park in Britain: the impact of over twenty years of neglect on the quality of parks and greens paces*. Stads & Havne ingenioeren

Beer, A. (2003). *A Changing Understanding of the Role of Green space in High-density Housing: A European Perspective.* Built Environment, vol-2, Pp. 132-143

Beer, A. (2005). *The green structure of Sheffield; Green structure and urban planning.* Final report of COST Action C1

Beer, A. (2010). *Green spaces, Green Structure and Green Infrastructure Planning in Urban Ecosystem Ecology*. Agron Monogr. 55, p 432-448

Beer, A. and Jorgensen, A. (2003). *Greening Social Housing - the European perspective, Green Places*, Peobody trust, p19

Beer, A., and Jorgensen, A. (2004). *New approaches in Europe, Decent Homes, Decent Places, Improving the green spaces for social housing.* Peobody trust, 2004, p14-16

Bell, S., Montarzino, A. and Travlou, P. (2007). *Mapping research priorities for green and urban space in the UK*. Urban Forestry & Urban Greening, vol-6, pp. 103-115.

Bell, S., Morris, Findlay, Travlou, Montarzino, Gooch, Gregory, and Ward Thompson, (2004). *Nature for people: the importance of green spaces to East Midlands communities.* English Nature, UK

Bell, S., Travlou, P., and Ward -Thompson, C. (2003). *Contested views of freedom and control: Children, teenagers and urban fringe woodlands in Central Scotland*. Urban Forestry and Urban Greening, vol-2, pp. 87 – 100

Bengochea-Morancho, A. (2003). *A hedonic valuation of urban green areas*. Landscape and Urban Planning 66, 35–41.

Berglund, U. and Jergeby, U. (1989). *Uteliv: Med barn och pensionärer på gård och gata, i park och natur*. Byggforskningsrådet, Stockholm (English translation).

Berland, A. (2012). *Long-term urbanization effects on tree canopy cover along an urban–rural gradient.* Urban Ecosystems, vol-15, pp. 721–738

Berlin Council, (2010), *City Development, Berlin*. Available at; http://www.stadtentwicklung.berlin.de/umwelt/stadtgruen/gruenanlagen/de/gruenanlagen_plaetze/mitte/park_nordbahnhof/index.shtml /Accessed 19.04.14

Bernholt, H., Kehlenbeck, K., Gebauer, J. and Buerkert, A. (2009). *Plant species richness and diversity in urban and peri-urban gardens of Niamy, Niger.* Agroforestry Systems, vol-77, pp. 159–179.

Bigirimana, J., Bogaert, J., Cannière, Bigendako, and Parmentier, (2012). *Domestic garden plant diversity in Bujumbura, Burundi: Role of the socio economical status of the neighbourhood and alien species invasion risk*. Landscape and Urban Planning, vol-107, pp. 118–126

Bixler, R. and Floyd, M. (1997). *Nature is scaring, disgusting, and uncomfortable*. Environment and Behaviour, vol. 28 (4) - pp. 443–467.

Blaschke, T. (2006). *The role of the spatial dimension within the framework of sustainable landscapes and natural capital.* Landscape and Urban Planning, vol-75 (3–4), pp. 198–226.

Bolund, P. and Hunhammar, S. (1999). *Ecosystem services in urban areas.* Ecological Economics, vol-29, pp. 293–301.

Boone, C., Buckley, G., Grove, J. and Sister, C. (2009). *Parks and people: An environmental justice inquiry in Baltimore, Maryland.* Annals of the Association of American Geographers, vol-99 (4), pp. 767–787.

Brennan, C. (2008). *Green City Guidelines: Advice for the Protection and Enhancement of Biodiversity in Medium to High-Density Urban Developments*. University College, Dublin

Brohier, R. (1978). *Links between Sri Lanka and The Netherlands: A Book of Dutch Ceylon.* The Netherlands Alumni Association of Sri Lanka, Colombo

Brohier, R. (1984). *Changing face of Colombo, 1505-1972: Covering the Portuguese, Dutch, and British periods*. The Netherlands Alumni Association of Sri Lanka, Colombo

Brownlow, A. (2006). *An Archaeology of fear and environmental change in Philadelphia*. Geo forum, vol-37, pp. 227-245.

Brunson, M. and Reiter, D. (1996). *Effects of Ecological Information on Judgements about Scenic Impacts of Timber Harvest.* Journal of Environmental Management, vol-46, pp. 31-41.

Bryman, A and Cramer, D (2011). *Quantitative data analysis with IBM SPSS 17, 18 and 19: a guide for social scientists.* Routledge.

Buildsrilanka com, (2012). *Green Spaces and Recreation Colombo.* Available at; http://www.buildsrilanka.com/CDP/18_Open%20Space%20&%20Recreation%20Activities.htm /Accessed 06.08.13

Burgess, J, Harrison, C. and Limb, M. (1988). *People, parks and the urban green: a study of popular meanings and values for open spaces in the city.* Urban studies, SAGE Publications, vol-25 (6), pp. 455–473.

Burns, R. and Graefe, A. (2007). *Constraints to outdoor recreation: Exploring the effects of disabilities on perceptions and participation*. *Journal of Leisure Research, 39(1),* 156-181

Busch, G. (2006). *Future European agricultural landscapes – what can we learn from existing quantitative land use scenario studies?* Agriculture, Ecosystems and Environment, vol-114, pp. 121–140.

Buyantuyev, A., Wu, J. and Gries, C. (2009). *Multiple analysis of the urbanization pattern of the Phoenix Metropolitan landscape of USA: time space and thematic resolution*. Landscape and Urban Planning, vol-94 (3-4), pp. 206 - 217.

Byrne, J. (2011). *When green is White: the cultural politics of race, nature and social exclusion in a Los Angeles urban national park. School of Environment*, Griffith University, Australia

Byrne, J. and Sipe, N. (2010). *Green and open space planning for urban consolidation–A review of the literature and best practice.* Griffith University, Australia

Byrne, J. and Wolch, J. (2009). *Nature, race, and parks: past research and future directions for geographic research*. Progress in Human Geography, vol-33 (6), pp. 743-765.

Byrne, J., Kendrick, M. and Sroaf, D. (2007). *The park made of oil: Towards a historical political ecology of the Kenneth Hahn State Recreation Area.* Local Environment, vol-12 (2), pp. 153-181.

Byrne, J., Wolch, J. and Zhang, J. (2009). *Planning for environmental justice in an urban national park*. Journal of Environmental Planning and Management, vol-52 (3), pp. 365-392.

CABE Space (2004). *Green Space Strategies: A Good Practice Guide*, CABE Space, London.

CABE Space (2006). *Does Money Grow on Trees?* CABE Space, London.

Camagni, R. (1998). *Beyond Complexity in Urban Development Studies, The City and its Sciences.* Heidelberg: Springer, pp. 363-385.

Casie, S. (1834). *The Ceylon gazetteer*; Colombo, Distributors: M. D. Gunasena, Available from: https://archive.org/stream/ceylongazetteer00chitgoog/ceylongazetteer00chitgoog_djvu.txt. Accessed 19.02.12

Cattelino, P. (1988). *Studio inerente l'individuazione e l'adattamento di sentieri ed aree attrezzate per la fruizione da parte di portatori di handicap*. Aosta: Regione Autonoma della Valle d'Aosta. (English translation)

Cattell, V., Dines, N., Gesler, W. and Curtis, S. (2008). *Mingling, observing, and lingering: everyday public spaces and their implications for well-being and social relations.* Health and Place, vol-14, pp. 544-561.

Cave, H. (1912). *The book of Ceylon*. Publisher do not known

Census and Statistic (2012). *Census of India 2011*. The Government of India, New Delhi, India.

Census and Statistics (2011). Sri Lanka; Available at: http://www.statistics.gov.lk/PopHouSat/CPH2011/Pages/Activities/Reports/CPH_2012_5Per_Rpt.pdf/ Accessed 08.05.12

Census and Statistics (2012). *Hong Kong in figures 2012 edition*. Government of Hong Kong.

Chakravorty S. (2013). *A new price regime: Land markets in urban and rural India*. Economic and Political Weekly, vol-49(17), pp. 48–54.

Cheng, C., Cheung, K. and Chu ,L. (2010). *Thermal performance of a vegetated cladding system on facade walls*. Building and Environment, vol-45, pp. 1779–1787.

Chiesura, A. (2004). *The role of urban parks for the sustainable city*. Landscape and Urban Planning, vol-68, pp. 129-138.

Choumert, J. and Salanie´, J. (2008). *Provision of urban green spaces: Some insights from economics*. Landscape Research, vol-33, pp. 331–345

Christmann, K., Rogerson, M. and Walters, D. (2003*). Fear of crime and insecurity in New Deal for Communities Partnerships* (Research Report; no 14), Sheffield: New Deal for Communities Evaluation.

Chua, G. (2012). *Green petitions a sign of growing civic consciousness.* The Straits Times, Singapore Press Holdings.

Cilliers, S. (2010). *Social aspects of urban biodiversity: An overview: Urban biodiversity and design – Implementing the convention on biological diversity in towns and cities, UK.* Blackwell Publishing. pp. 81–100

Cleantechnica, (2012). *Green roof solar panels.* Available at; http://cleantechnica.com/2012/07/11/green-roofs-solar-panels-the-future-of-renewable-energy/ Accessed 12.07.2013

Codrington, H. (2000). *A Short History of Lanka*. http://www.lakdiva.com/codrington / Accessed 12.05.14

Colding, J., Lundberg, J. and Folke, C. (2006). *Incorporating green-area user groups in urban ecosystem management.* Ambio, vol-35, pp. 237–244.

Coley, R., Kuo, F. and Sullivan, W. (1997). *Where does community grow? The social context created by nature in urban public housing.* Environment and Behavior, vol-29 (4), pp. 468-494.

Collinge, S. (1996). *Ecological consequences of habitat fragmentation: Implications for landscape architecture and planning.* Landscape and Urban Planning, vol-36, pp. 59-77.

Collinge, S. (2000). *Effects of grassland fragmentation on insect species loss, colonization, and movement patterns.* Ecology,vol- 81, pp. 2211-2226.

Collins, S., Carpenter, S., Swinton, S., Orenstein, D., Childers, D. and Gragson, T. (2011). *An integrated conceptual framework for long- term social–ecological research*. Frontiers in Ecology and the Environment, vol. 9(6)- pp. 351–357.

Colombo Municipal Council (2012). *The History of the City. Colombo Municipal Council*, Available from: http://www.cmc.lk/index.php?option=com_content&view=article&id=84&Itemid=70. - Accessed 07.01.15

Comber, A., Brunsdon, C. and Green, E. (2008). *Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups*, Landscape and Urban Planning, 86 (1), pp. 103-14.

Convention on Biological Diversity, (1992). *Convention on Biological Diversity* Report. Available at; https://www.cbd.int/doc/legal/cbd-en.pdf (Convention on Biological Diversity, 1992) / Accessed 17.03.15

Cook, E. (2002). *Landscape structure indices for assessing urban ecological networks*. Landscape and Urban Planning, vol-58, pp 269–280.

Cordiner, J. (1807). *A Description of Ceylon.* Longman, Hurst.

Costanza, R., d'Arge, R., De Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R. and Paruelo, J. (1998). *The value of the world's ecosystem services and natural capital*. Ecol. Econ, vol. 25- pp. 3–15.

Council of Southampton, UK, (2010). *Open Space and Green Infrastructure.* Available at; http://www.southampton.gov.uk/policies/Open-Space-and-Green-Infrastructure-background-paper.pdf /Accessed 03.10.14

Cranz, G. (1982). *The Politics of Park Design: A History of Urban Parks*. Harvard University Press, Cambridge.

Crompton, J. and Kim, S. (2004). *Temporal changes in perceived constraints to visiting State parks*. Journal of Leisure Research, vol-36 (2), pp. 160-182.

Cultural Affairs SL Department, (2015). *Independence Square*. Available at; http://www.culturaldept.gov.lk/web/index.php?option=com_content&view=article&id=76&Itemid=83&lang=en. / Accessed 14.07.15

Daniel, T. (2001). *Whither scenic beauty? Visual landscape quality assessment in the 21st century*. Landscape and Urban Planning, vol-54, pp. 267–281.

Davis, A., Belaire, J., Farfan, M., Milz, D., Sweeney, E. and Loss, S. (2012). *Green infrastructure and bird diversity across an urban socioeconomic gradient.* Ecosphere, vol-3 (November), pp. 1–18.

Day, K. (2000). *The ethic of care and women's experiences of public space*. Journal of Environmental Psychology, vol-20, 103-124.

Dayaratne, R. (2012). *Regenerating Sri Lanka: Architects And The Built-Environment*. The Architect: The Journal of the Sri Lanka Institute of Architects

De Groot, R. (1988). *Functions and socio-economic importance of the natural environment in the Galapagos Islands, Ecuador. Case study report.* Nature Conservation Department. Agricultural University Wageningen, pp. 99.

De Groot, R. (1995). *Towards a conceptual framework for measuring ecological sustainability of ecosystems. Workshop on Sustainability of Ecosystems: Ecological and Economic Factors*. Slovakia, Bratislawa, pp. 33.

De Ridder, K., Adamec, V., Bañuelos, A., Bruse, M., Bürger, M., Damsgaard, O., Dufek, J., Hirsch, J., Lefebre, F., Pérez-Lacorzana, J., Thierry, A. and Weber, C. (2004). *An integrated methodology to assess the benefits of urban green space*. Science of the total environment, Vol-334 – 335, pp. 489 - 497.

De Silva, K. (1981). *A History of Sri Lanka*. Oxford University Press, New Delhi.

De Sousa, A. (2003). *Turning Brownfields into Green Space in the City of Toronto*. Landscape and Urban Planning, vol-62, pp. 181-198

DeFries, R. and Pandey, D. (2010). *Urbanization, the energy ladder and forest transitions in India's emerging economy.* Land Use Policy, vol-27 (2), pp. 130–138

Denardo, J., Jarrett, A., Manbeck, H., Beattie, D. and Berghage, R., (2005). *Stormwater mitigation and surface temperature reduction by green roofs*. Transact Asae 48:1491-1496

Department for Culture, Media and Sport. (2010). *Taking Part: The National Survey of Culture, Leisure and Sport Adult and Child Report 2009/10*. UK

Department of Statistic, Singapore, (2012). *Statistics Singapore* . Available at; https://www.mti.gov.sg/AboutMTI/Pages/Singapore-Department-of-Statistics-(DOS).aspx?tag=Boards%20&%20Committees /Accessed 12.04.15

Devas, N. (2001). *Urban Governance and Poverty: Lessons From a Study of Ten Cities in the South.* University of Birmingham.

Dissanayake, L. and Pereira, R. (1996). *Restoring Beira Lake: An Integrated Urban Environmental Planning Experience in Colombo, Sri Lanka*. Metropolitan Environmental Improvement Program (MEIP), World Bank

Dubbeling, M. (2014). *Integrating urban agriculture and forestry into climate change action plans: Lessons from Sri Lanka. Climate and Development Knowledge Network*, Available from: http://cdkn.org/wp-content/uploads/2014/05/SriLanka_Inside_Story_final_web-res.pdf. /Accessed 07.07.2015

Dunnett, N. and Hitchmough, J. (2004.) *The Dynamic Landscape*. Spon, London, pp. 416–458

Dunnett, N. and Swanwick, C. and Woolley, H. (2002). *Improving urban parks, play areas and green spaces*. Ecosystems & Environment, vol-114, pp. 296–310.

EIU (2000) *Sri Lanka: Country Report November 2000*. The Economist Intelligence Unit, London.

El Geneidy, A., Levinson, D. and County, H., (2006). *Access to destinations: Development of accessibility.* Minnesota Department of Transportation, Research Services Section 2006.

Elsley S. (2006). *Children's experience of public space*. Children & Society, vol-18, pp. 155–164.

Elton, C. (1966). *The Pattern of Animal Communities in urban.* Methuen, London

Emery, M. (1986) *Promoting Nature in Cities and Towns: A Practical Guide.* Croom Helm, London

Emmanuel, R. and Fernando, H. (2007). *Urban heat islands in humid and arid climates: role of urban form and thermal properties in Colombo, Sri Lanka and Phoenix, USA*. Climate Research, inter-research nordbunte 23, d-21385 oldendorf luhe, germany, vol-34(3), pp. 241.

Ernstson, H. (2013). *The social production of ecosystem services: A framework for studying environmental justice and ecological complexity in urbanized landscapes*. Landscape and Urban Planning, vol-109 (1) , pp. 7–17 .

Escobedo, F., Varela, S., Zhao, M., Wagner, J. and Zipperer, W. (2010). *Analyzing the efficacy of subtropical urban forests in offsetting carbon emissions from cities*. Environmental Science & Policy, vol-13, pp. 362–372.

Faryadi, and Taheri, (2009). *Interconnections of urban green spaces and environmental quality of Tehran.* International Journal of Environmental Research 2009; 3(2): 199-208.

Flink, C. and Seams, R. (1993). *Greenways: a guide to planning, design, and development*. Washington D.C., Island Press.

Flint, R. (1985). *Encouraging Wildlife in Urban Parks: Guidelines to Management.* The London Wildlife Trust. Gordon Press, London.

Flynn, T., Louviere, J., Peters, T. and Coast, J. (2010). *Using discrete choice experiments to understand preferences for quality of life. Variance-scale heterogeneity matters*. Social Sci. Med, vol. 70- pp. 1957–1965.

Forbes, S., Cooper, D. and Kendle, A. (1997). *The history and development of ecological landscape styles. Urban Nature Conservation: Landscape Management in the Urban Countryside.* E & F Spon, London.

Forest Survey of India. (2011). *India: State of Forest Report 2011*. Ministry of Environment & Forests, Government of India.

Forman, R. and Godron, M. (1986). *Landscape Ecology*. John Wiley & Sons, New York.

Frick, C. and Schweitzer, C. (1700). *A Relation of Two Several Voyages Made Into the East-Indies*. Publisher unknown

Fry, G. (2001). *Multifunctional landscapes towards trans-disciplinary research.* Landscape and Urban Planning, vol-57, pp. 159–168.

Fuller, R. and Gaston, K. (2009). *The scaling of green space coverage in European cities.* Biology Letters, vol-5, pp. 352–355.

Futrell, C. and Lamb, J. (1981). *Effect on mail survey return rates of including questionnaires with follow-up letters. Perceptual and Motor Skills.* Ammons Scientific, vol-52(1), pp. 11–15.

Gangopadhyay, K. and Balooni, K. (2012). *Technological infusion and the change in private, urban green spaces.* Urban Forestry & Urban Greening, vol-11, pp. 205–2010.

Gaston, K. Loram, A., Tratalos, J. and Warren, P. (2007). *Urban domestic gardens: The extent and structure of the resource in five major cities.* Landscape Ecology, vol-22, pp. 601–615.

Georgi, J. and Dimitriou, D. (2010). *The contribution of urban green spaces to the improvement of environment in cities: Case study of Chania, Greece.* Building and Environment, vol-45, pp. 1401–1414.

Gilbert, O. (1989). *The Ecology of Urban Habitats*. Chapman and Hall, New York.

Givoni, B. (1991). *Impact of planted areas on urban environmental quality.* Urban Atmosphere, vol-25, pp. 289–299.

Gobster, P. (1995). *Perception and use of a metropolitan greenway system for recreation.* Landscape and Urban Planning, vol-33 (1–3), pp. 401–413.

Godefroid, S. (2001). *Temporal analysis of the Brussels flora as indicator for changing environmental quality*. Landscape and Urban Planning52: 203–24.

Gonzalez-Garcia, A. and Sal, A. (2008). *Private urban greenspaces or "Patios" as a key element in the urban ecology of tropical Central America.* Human Ecology, vol-36, pp. 291–300.

Goode, D. (1998). *Integration of Nature in Urban Development*. Urban Ecology, Berlin: Springer-Verlag, Pp. 25-93.

Gorman, J. (2004). *Residents' opinions on the value of street trees depending on tree location*. Journal of Arboriculture, vol-30, pp. 36-44.

Government of Singapore, (2010). *Singapore Budget Report 2010*. Available at; http://www.singaporebudget.gov.sg/budget_2010/index.html /Accessed 12.04.15

Government of Sri Lanka (1978). *Colombo Central Area/Colombo Master Plan Project*. Ministry of Local Government, Housing and Construction, Colombo.

Government of Sri Lanka (2014). *Census of Population and Housing. Department of Statistics.* Available at: http://www.statistics.gov.lk/Documents/census2001/resultindex.htm -Accessed 11 December 2014).

Government of Sri Lanka, (2014). *Statistics Report of Sri Lanka (2014).* Available at; http://www.statistics.gov.lk/PopHouSat/Pop_Chra.asp-2014 /Accessed 01.04.14

Gowda, K. and Sridhara, M. (2008). *Planning and management of parks and green areas: The case of Bangalore metropolitan area.* Management of Environmental Quality, vol-19, pp. 270–282.

Green Spaces Scotland organisation, (2008). Green spaces Scotland. Available at; http://www.greenspacescotland.org.uk/upload/File/greenspace%20and%20quality%20of%20life%20literature%20review%20aug200 8.pdf /Accessed 15.04.15

Grove, J., Troy, A., O'Neil-Dunne, J., Burch, W., Cadenasso, M. and Pickett, S. (2006). *Characterization of households and its implications for the vegetation of urban ecosystems.* Ecosystems, vol-9, pp. 578–597.

Guangzhou Census Office. (2002). *Tabulation on the 2000 population census of Guangdong Province (Guangzhou)*. Guangzhou: Guangdong Economic Press (in Chinese).

Guillerme, S., Kumar, B., Menon, A., Hinnewinkel, C., Maire, E. and Santhoshkumar, A. (2011). *Impacts of public policies and farmer preferences on agroforestry practices in Kerala, India.* Environmental Management, vol-48, pp. 351–364.

Guitart, D., Pickering, C. and Byrne, J. (2012). *Past results and future directions in urban community gardens research.* Urban Forestry and Urban Greening, vol-11, pp. 364–373.

Gullone, E. (2000) *The biophilia hypothesis and life in the 21st century: increasing mental health or increasing pathology*?. Journal of Happiness Stud, vol-1, pp. 293–322.

Habitat International (2014). *Socio-demographic variation in motives for visiting urban green spaces in a large Chinese city Xi-Zhang.* Habitat International, Vol-41, pp. 114–120

Hamdi, N. and Goethert, R .(1997). *Action Planning for Cities: A Guide to Community Practice*, Chichester, New York.

Haq, S. (2011). *Urban Green Spaces and an integrative approaches to sustainable environment*. Journal of Environmental Protection, vol-2, pp-601-608.

Harnik, P. (2010). *"Community Gardens" in Urban Green: Innovative Parks for Resurgent Cities.* New York: Island Press. pp. 83 – 89.

Hassan, R. (1969). *Some Social Implication on Social Housing in 'Singapore'*. Southeast journal for Sociology 29(1)

Henderson, K. and Bialeschki, M. (2005). *Leisure and active lifestyles: Research reflections.* Leisure Sciences, vol-27, pp. 335-365.

Henke, H., and Sukopp, H. (1986). *A natural approach in cities.* Ecology and Design in Landscape. Blackwell, Oxford, pp. 307–324.

Herath, and Jayasundara, (2007). *Colombo, Living High: A City in Transition*. Institute of Town Planners, Sri Lanka

Herath, S. (1996). *Utilizing Canal Banks as Urban Water Fronts to Enhance the Built-Environment in Colombo City,* M.Sc. (Architecture) Dissertation Submitted to the University of Moratuwa. SriLanka

Heynen, N., Perkins, H. and Roy, P. (2006). *The political ecology of uneven urban green space*. Urban Affairs Review, vol-42(1), pp. 3–25.

Hezri, A. and Dovers, S. (2006). *Sustainability indicators, policy and governance: Issues for ecological economics*. *Ecological Economics, 60,* 86-99.

Hilborn, Jim, (2009). *Dealing With Crime and Disorder in Urban Parks*, Response Guide No. 9

Hitchmough, J. (1994). *Urban Landscape Management*. Sydney, Australia, 600p

Home, R., Hunziker, M. and Bauer, N. (2012). *Psychosocial outcomes as motivations for visiting nearby urban green spaces,* Leisure Sciences, vol-34 (4), pp. 350–365

Hope, D., Gries, C., Zhu, W., Fagan, W., Redman, C., Grimm, N., Nelson, A., Martin, C. and Kinzig, A (2003). *Socioeconomics drive urban plant diversity*. Proceedings of the National Academy of Sciences of United States of America, vol-100, pp. 8788–8792.

Hopkins, L. (1977). *Methods of Generating Land Suitability Maps: A comparative evaluation*. Journal of the American Planning Association, vol-43(4), pp. 386 – 400.

Hough, M. (1994). *City Form and Natural Processes, London: Sustainable Cities*, JKP, London.

Howell, A., Passmore, H. and Buro, K. (2013). *Meaning in nature: meaning in life as a mediator of the relationship between nature connectedness and well-being*. J. Happiness Stud. 14.

Huang, J. Akbari, H. and Taha, H. (1990). *The wind-shielding and shading effects of trees on residential heating and cooling requirements.* ASHRAE Transactions. 96

Hughes, B. (1994). *Lost Childhoods- Taking Children's Play Seriously. The Future of Urban Parks and Open Space.* London

Hulugalle, H. (1965). *Centenary Volume of the Colombo Municipal Council 1865-1965*. Colombo Municipal Council, Colombo.

Hwang, R., Lin, T. and Matzarakis, A. (2011). *Seasonal effects of urban street shading on long-term outdoor thermal comfort.* Building and environment, Elsevier, 46(4), 863–870.

Ignatieva, M. (2010). *Design and future of urban biodiversity. In: Müller, N., Werner, P., Kelcey, J.G. (Eds.). Urban Biodiversity and Design.* Wiley-Blackwell, Oxford, pp. 118–144.

Irvine, K., Warber, S., Devine-Wright, P. and Gaston, K. (2013). *Understanding urban green space as a health resource: a qualitative comparison of visit motivation and derived effects among park users in Sheffield, UK*. International Journal of Environmental Research and Public Health, vol-10(1), pp. 417-442.

Iso-Ahola, S. (1999). *Motivational foundations of leisure. In E. L. Jackson, T. L. Burton (Eds.), Leisure studies: Prospects for the twenty-first century*. State College, PA: Venture Publishing. pp. 35-51.

Jaafar, B., Said, I., Rasidi, M. and Ruas, J. (2009). *Evaluating the impact of vertical greenery system on cooling effect on high rise buildings and surroundings:* a review, vol-9 (2), pp. 1-9

Jackson, E. (1993). *Recognizing patterns of leisure constraints: results from alternative analyses*. Journal of Leisure Research, vol-25 (2), pp. 129-149.

James, P., Tzoulas, K., Adams, M., Barber, A., Box, J., Breuste, J., Elmqvist, T., Frith, M., Gordon, C., Greening, K., Handley, J., Haworth, S., Kazmierczak, A., Johnston, M., Korpela, K., Moretti, M., Niemela, J., Pauleit, S., Roe, M., Sadler, J. and Ward-Thompson, C. (2009). *Towards an integrated understanding of green spaces in the European built environment.* Urban Forum for Urban Green, vol-8, pp. 65–75.

Jay, M. and Schraml, U. (2009). *Understanding the role of urban forests for migrants – Uses, perception and integrative potential.* Urban Forestry & Urban Greening, vol. 8 (4)- pp. 283–294.

Jayasuriya, D. (2000). *The Colombo Municipal Council Experience. In Asian Cities in the 21st Century: Contemporary Approaches to Municipal Management*. Vol. 4

Jim, C. (1998b). *Urban soil characteristics and limitations for landscape planting in Hong Kong*. Landscape and Urban Planning, vol-40,pp. 235–249.

Jim, C. (1998a). *Soil compaction at tree planting sites in urban Hong Kong. In The Landscape Below Ground II.* International Society of Arboriculture, Savoy, IL., pp. 166–178.

Jim, C. (1998c). *Old stone walls as an ecological habitat for urban trees in Hong Kong*. Landscape and Urban Planning, vol-42, pp. 29–43.

Jim, C. (2000). *The urban forest programme in the heavily built- up milieu of Hong Kong.* Cities, vol-17, pp. 271–283.

Jim, C. (2004). *Green-space preservation and allocation for sustainable greening of compact citi*es. Cities, vol-21 (4), pp. 311 – 320.

Jim, C. and Chen, S. (2003). *Comprehensive green space planning based on landscape ecology principles in compact Nanjing City, China*. Landscape and Urban Planning, vol-65, pp. 95 – 116.

Jim, C. and Chen, W. (2006). *Recreation-amenity use and contingent valuation of urban green spaces in Guangzhou, China*. Landscape and Urban Planning, vol-75 pp. 81-96.

Jim, C. and Chen, W. (2009). *Diversity and distribution of landscape trees in the compact Asian city of Taipei.* Applied Geography, 29(4), 577–58

Jim, C. and Liu, H. (2000). *Statutory measures for the protection and enhancement of the urban forest in Guangzhou city*, China. Forestry, vol-73, pp. 311–329.

Jim, C. and Ng, J. (2000a). *Soil porosity and associated properties at roadside tree pits in urban Hong Kong. In Soils of Urban, Industrial, Traffic and Mining Areas*. University of Essen, Essen, Germany, vol-3, pp. 629–634.

Jim, C. and Shan, X. (2013). *Socioeconomic effect on perception of urban green spaces in Guangzhou, China* Cities, vol-31, pp. 123–131

Jim, Y. (2004). *Green-space Preservation and Allocation for Sustainable Greening of Compact Cities*. Cities, vol-4, Pp. 311-320.

Johansson, E. and Emmanuel, R. (2006). *The influence of urban design on outdoor thermal comfort in the hot, humid city of Colombo, Sri Lanka*. International Journal of Biometeorology, Springer, 51(2), 119–133

Johnson, J. and Hurley, J. (2002*). A future ecology of urban parks: reconnecting nature and community in the landscape of children.* Landscape Journal, vol-21(1), pp. 110-115.

Johnston, J. (1990). *Nature areas for city people.* Ecology Hand- book 14. London Ecology Unit, London.

Jolliffe, I. (2002). *Principal Component Analysis.* 2nd ed. Springer Series in Statistics, Springer-Verlag New York.

Jorgensen, A. and Tylecote, M. (2007). *Ambivalent landscapes – wilderness in the urban interstices*. Landscape Research, vol-32, pp. 443–462.

Jorgensen, A., Hitchmough, J. and Calvert, T. (2002). *Woodland spaces and edges, their impact on perception of safety and perception.* Landscape and Urban Planning, vol-60, pp. 135–150.

Kaczynski, A. and Henderson, K. (2007). *Environmental correlates of physical activity: a review of evidence about parks and recreation.* Leisure Sciences, Taylor & Francis, vol-29(4), pp. 315–354.

Kahn, P. (1997). *Developmental psychology and the biophilia hypothesis: Children's affiliation with nature.* Developmental Review, vol-17(1), pp. 1–61

Kahn, R. and Cannell, C. (1957). *The dynamics of interviewing; theory, technique, and cases.* John Wiley & Sons, Oxford, England.

Kaplan, R. (1984). *Impact of urban nature: a theoretical analysis*. Urban Ecology, vol-8, pp. 189–197.

Kaplan, R. and Herbert, E. (1987). *Cultural and sub-cultural comparisons in preferences for natural settings.* Landscape and Urban Planning, vol-14, pp. 281–293

Kaplan, R. and Kaplan, S. (1989). *The experience of nature: A psychological perspective.* Cambridge University Press, Cambridge, MA.

Kaplan, S. (2001). *Meditation, restoration, and the management of mental fatigue*. Environment and Behavior, vol-33(4), pp. 480-506.

Kellert, S. and Wilson, E. (1993). *The Biophilia Hypothesis*. Island Press, Washington, DC. pp. 31–41.

Kellert, S., Heerwagen, J. and Mador, M. (2011). *Biophilic design: the theory, science and practice of bringing buildings to life*. John Wiley & Sons Accessed 15.04.12

Kendle, T. and Forbes, S. 1997. *Urban Nature Conservation*. E&FN SPON, pp. 53-54.

Kenya National Bureau of Statistics (2008). *Kenya 1999 population and housing census. Analytical report on population projections, Nairobi:* Republic of Kenya, vol-8.

Kerr, J. and Swarup, R. (1997). *Natural resource policy and management problems in India*. India

Kingsbury, N. (2012). Singapore – *The Garden City State; Gardening gone wild.* Singapore

Kithiia, J. and Lyth, A. (2011). *Urban wildscapes and green spaces in Mombasa and their potential contribution to climate change adaptation and mitigation*. Environment and Urbanization, vol-23, pp. 251–265.

Kong, L., Yuen B., Briffett, C. and Sodhi, N. (1997). *Nature and nurture, danger and delight: urban women's experiences of the natural world.* Landscape Research, vol-22(3), pp. 245-266.

Konijnendijk, C., Ricard, R., Kenney, A. and Randrup, T. (2006). *Defining urban forestry – A comparative perspective of North America and Europe.* Urban Forestry & Urban Greening, vol-4, pp. 93–103.

Korpela, K., Kyttä, M. and Hartig, T. (2002). *Restorative experience, self-regulation, and children's place preferences*. Journal of Environmental Psychology, vol-22, pp. 387–398

KSLUB. (1995). *Land resources of Kerala state. Thiruvananthapuram*, Kerala: Kerala State Land Use Board.

Kuchelmeister, G. (1998). *Urban forestry in the Asia-Pacific region – Status and prospects*. Asia-Pacific forestry sector outlook study, Working Paper No.: APF- SOS/WP/44. Bangkok: Forestry Policy and Planning Division, Rome & Regional Office for Asia and the Pacific.

Kuchelmeister, G. and Braatz, S. (1993). *Urban forestry revisited. Unasylva* 173(44):13-18

Kumar, B. and Nair, P. (2004). *The enigma of tropical home gardens*. Agroforestry Systems, vol-61, pp. 135–152.

Kumar, B. and Nair, P. (2006). *Tropical home gardens: A time-tested example of sustainable agroforestry, advances in agroforestry, Dordrecht, The Netherlands*. Springer, vol-3.

Kuo, F., Bacaikou, M. and Sullivan, W. (1998a). *Transforming inner-city landscapes: trees, sense of safety, and preference*. Environment and Behavior, vol-30(1), pp. 28–59.

Kuo, F., Sullivan, W., Coley, R. and Brunson, L. (1998). *Fertile ground for community: inner-city neighbourhood common spaces.* American Journal of Community Psychology, vol-26(6), pp. 823–851.

Kyle, G., Mowen, A. and Tarrant, M. (2004). *Linking place preferences with place meaning: an examination of the relationship between place motivation and place attachment.* Journal of Environmental Psychology, vol-24(4), pp. 439-454.

Læssøe, J. and Iversen, T. (2003). *Naturen i et hverdagslivs-perspektiv: En kvalitativ interview- undersøgelse af forskellige danskeres forhold til naturen, Danmarks Miljøundersøgelser* (DMU, National Environmental Research Institute, Denmark). (English translation)

Lam, C. (2011). *Weather and climate. In: Jim, C.Y., Li, S.M., Fung, T. (Eds.), A New Geography of Hong Kong.* Friends of the Country Parks and Cosmos Books, Hong Kong, vol. I- pp. 7–45.

Landelma, R., Salminen, P. and Hokkanen, J. (2000). *Using multicriteria methods in environmental planning and management* Environ. Manage., vol-26 (6), pp. 595–605

Lanka Library, (2010). *Explore Sri Lanka.* Available at; http://www.lankalibrary.com/geo/dutch/dutch4.htm. - Explore Sri Lanka (n.d.) *Dutch Waterways in Sri Lanka* /Accessed 04.06.12

Lankapura (2011). *Lankapura: Historic Images of Sri Lanka*. Available at: http://lankapura.com/photo-gallery/publication-and-illustrations/maps-of-sri-lanka-ceylon/. Accessed 10.10.11

Lankapura, (2009). *Bambalapitiya road Colombo.* Available at; http://lankapura.com/2010/06/bambalapitiya-road-colombo-c-1900s/ Accessed 08.10.14

Lankapura, (2009). *Ceyl*on harbour. Available at; http://lankapura.com/2009/04/colombo-harbour-ceylon-c1880/ Accessed 11.12.14

Lankapura, (2009). *Galle Face Hotel, Colombo.* Available at; http://lankapura.com/2009/03/galle-face-hotel-colombo-sri-lanka-1800s/ Accessed 08.10.14

Lankapura, (2009). *Surroundings areas of Colombo.* Available at; http://lankapura.com/2009/03/galle-road-near-colombo-sri-lanka-late-1800s/ Accessed 11.12.14

Lankapura, (2010). *Gordon Garden Colombo.* Available at; http://lankapura.com/2010/07/gordon-gardens-colombo-sri-lanka/ Accessed 08.10.14

Lankapura, (2011). *Cinnamon gardens Colombo.* Available at; http://lankapura.com/2011/10/cinnamon-gardens-police-station-colombo/ police new /Accessed 11.12.14

Lankapura. (2011). *Galle Face View Colombo.* Available at; http://lankapura.com/2011/04/panoramic-view-galle-face-green-colombo/hotellll / Accessed 08.10.14

Lankapura. (2013). *Colombo Racecourse.* Available at; http://lankapura.com/2013/01/colombo-racecourse-cinnamon-gardens-1913/ Accessed 14.11.14

Lawson, L. (2004). *The planner in the garden: a historical view into the relationship between planning and community gardens.* J. Plan. Hist., vol-3,pp. 151–176.

Lawson, L. (2005). *City Bountiful: A Century of Community Gardening in America.* University of California Press, Berkeley.

Lee, J., Scott, D. and Moore, R. (2002). *Predicting motivations and attitudes of users of a multi-use suburban trail.* Journal of Park and Recreation Administration, vol-20(3), pp. 18-37.

Leichenko, R. and Solecki, W. (2008). *Consumption, inequity, and environmental justice: The making of new metropolitan landscapes in developing countries*. Society & Natural Resources, vol-21(7), pp. 611–624.

Lennard, S. and Lennard, H. (1987). *Liveable Cities: People and Places, Social and Design Principles for the Future of the City*. Gondolier Press, Southampton, NY.

Li, F., Wang, R. and Paulussen, J. (2004). *A study on ecological concept planning of urban green space in Beijing*. Urban Plann. Forum.- pp. 14.

Lindgren, T. and Nilsen, M., 2012. *Safety in residential areas*. Tijdschrift voor Economische en Sociale Geografie 103(2), 196-208.

Liu, C. and Li, X. (2011). *Carbon storage and sequestration by urban forests in Shenyang, China*. Urban Forestry & Urban Greening, vol-11, pp. 121–128.

Liu, S. and Liu, B. (2008). *Using GIS to assess the ecological-niche for urban green Space planning in Wuxi City,* Anhalt University of Applied Science. Bernburg, Germany.

Lloyd, K., Burden, J. and Kieva, J. (2008). *Young girls and urban parks: planning for transition through adolescence*. Journal of Park and Recreation Administration, vol- 26, pp. 21–38.

Lo, A. and Jim, C. (2010). *Willingness of residents to pay and motives for conservation of urban green spaces in the compact city of Hong Kong.* Urban Forestry and Urban Greening, vol-9(2), pp. 113-120.

Lo, A. and Jim, C. (2012). *Citizen attitude and expectation towards green space provision in compact urban milieu.* Elsevier.

Loder, A. (2011). *Greening the city: Exploring health, well-being, green roofs, and the perception of nature in the workplace*. Doctoral dissertation. Ontario: University of Toronto.

Lohr, V., Pearson, Mims, C., Tarnai, J. and Dillman, D. (2004). *How urban residents rate and rank the benefits and problems associated with trees in cities*. Journal of Arboriculture, vol-30, pp. 28-35.

London Biodiversity Partnership (LBP). (2001). *The London biodiversity action plan*, vol-2.

Lorenzo, A., Blanche, C., Qi, Y. and Guidry, M. (2000). *Assessing residents' willingness to pay to preserve the community urban forest: a small-city case study*. Journal of Arboriculture, vol-26 (6), pp. 319–325

Lothian, A. (1999). *Landscape and the philosophy of aesthetics: is landscape quality inherent in the landscape or in the eye of the beholder*? Landscape and Urban Planning, vol-44, pp. 177-198.

Lubbe, C., Siebert, S. and Cilliers, S. (2010). *Political legacy of South Africa affects the plant diversity patterns of urban domestic gardens along a socio-economic gradient*. Scientific Research and Essays, vol-5, pp. 2900–2910.

Lui, J. (2012). *Heart of green: NParks chief Poon Hong Yuen's lack of specialised training is far outweighed by his love of greenery*. Singapore Press Holdings Limited.

Ma, S. and Wang, R. (1984). *Social–economic–natural complex ecosystem*. Acta Ecologica Sinica.

Maas, J., Verheij, R. A., Groenewegen, P., de Vries, S. and Spreeuwenberg, P. (2006). *The influence of the residential environment on green space travel: testing the compensation hypothesis.* Environment and Planning A, vol-38, pp. 2111-2127.

Maco, McPherson, Greg, Simpson, James, R., Peper, Paula, and Scott, (2005). *Municipal Forest Benefits and Costs in Five US Cities*: Society of American Foresters. Journal of Forestry, Volume 103, Number 8

Maier, D. (2012). *Theories of biodiversity value. In what's so good about biodiversity?: A call for better*. Springer science. pp. 159–307

Manfredo, M., Driver, B. and Tarrant, M. (1996). *Measuring leisure motivation: a meta-analysis of the recreation experience preference scales.* Journal of Leisure Research, vol-28, pp. 188-213.

Mathes, A. and Motha, M. (1994). *Industrial Development and the Control of Pollution to Preserve the Natural Balance of Aquatic Resources.* In: Erdelen, W, Preu, C, Natarajan, I, et al. (eds), Proceedings of the International and Interdisciplinary Symposium, Colombo, Sri Lanka, 12-26 March 1990, Available from: http://192.248.98.23:8080/jspui/bitstream/123456789/1007/1/ITIREPORT023_MFN405.pdf.

Matsuoka, R. and Kaplan, R. (2008). *People needs in the urban landscape: analysis of landscape and urban planning contributions.* Landscape and Urban Planning, vol-84(1), pp. 7-19.

McHarg, I. (1969). *Design with Nature*. 25th anniversary edition. New York: John Wiley & Sons, INC.

McKercher, B. (1993). *Some Fundamental Truths About Tourism: Understanding Tourism's Social and Environmental Impacts.* Journal of Sustainable Tourism, 1(1), 6–16

McPherson, E. and Luttinger, N. (1998). *From nature to nurture: the history of Sacramento's urban forest*. Journal of Arboriculture, vol-24, pp. 72–88.

McPherson, E., Simpson, J. and Livingston, M. (1989). *Effects of 3 landscape treatments on residential energy and water-use in Tucson. Arizona.* Energy and Buildings, vol-13, pp. 127–138.

MCUDP (2014). *Environmental Screening Report for the Proposed Beach Park at Crow Island.* Project Management Unit, Metro Colombo Urban Development Project, Ministry of Defence and Urban Development, Sri Lanka

Mendis, W. (1998). *Improving Urban Land Management in Sri Lanka.* Colombo, Sri Lanka

Merzthal, G., Mecklenburg, F. and Gauthier, M. (Eds.). (2009). *Trees connecting people: In action together: Meeting proceedings. Rome: Urban & Peri-urban Forestry*, Working Paper 1, Food and Agricultural Organization of United Nations.

Millennium Ecosystem Assessment (2005). *Ecosystems and Human Health: Synthesis*. Island Press, Washington, DC.

Miller, Dugelby, Foreman, Martinez del Rio, Noss, Phillips, Reading, Soulé, Terborgh, and Willcox, (2001). *The importance of large carnivores to healthy ecosystem. Endangered Species, pp. 202–210*

Miller, R. (1997). Urban forestry : planning and managing urban green spaces, 2nd ed. Prentice Hall, New Jersey

Ministry of Environment & Water Resources, 2002. *The Singapore Green Plan 2012, SGP 2012 Action Programmes, Conserving Nature.* Available at; http://www.mewr.gov.sg/sgp2012/apc_conserving_nature.htm.

Mitchell, R. and Popham, F. (2008). *Effect of exposure to natural environment on health inequalities: An observational population study*. Lancet, vol-372, pp. 1655–1660

Miyawaki, A. (1998). *Restoration of urban green environments based on the theories of vegetation ecology*. Ecological Engineering, vol-11, pp. 157–165.

MOF (2010). *MOF Singapore budget 2010, Ministry of Finance*, Singapore.

Morrison, B. (2001). *The transformation of Sri Lankan society, 1948–1999: the fragmentation of centralism* Journal of Asian and African Studies, vol-36 (2), pp. 181–202

Mumford, L. (1961). "*The City in History: Its Origins, its Transformations, and its Prospects*". Secker and Warburg, London.

Mumford, L. (1961). *The City in History San Diego*, Harcourt Inc. Press, USA

Munasinghe, G. (2013). *Colombo City Development Plan History*. Available from: http://townplanninginsrilanka.blogspot.co.uk/2013_02_01_archive.html. - Accessed 15.04.15

Murakami, A., Zain, A., Takeuchi, K., Tsunekawa, A. and Yokota, S. (2005). *Trends in urbanization and patterns of land use in the asian mega cities Jakarta, Bangkok, and Metro Manila*. Landscape and Urban Planning 70, p. 251–259.

Musacchio, L., Ozdenerol, E., Bryant, M. and Evans, T. (2005). *Changing landscapes, changing disciplines: seeking to understand interdisciplinarity in landscape ecological change research*. Landscape and Urban Planning, vol-73, pp. 326–338.

Myeong, S., Nowak, D., Hopkins P. and Brock, R. (2003). *Urban cover mapping using digital high-spatial resolution aerial imagery*. Urban Ecosystems, vol-5, pp. 243 – 256.

Nagendra , H. andGopal, D. (2010). *Street trees in Bangalore: Density, diversity, composition and distribution.* Urban Green, 129-137

Nagendra, H., Nagendran, S., Paul, S. and Pareeth, S. (2012). *Greying, greening and fragmentation in the rapidly expanding Indian city of Bangalor.* India

Nair, J. (2005). *The Promise of the Metropolis: Bangalore's Twentieth Century.* Oxford University Press, New Delhi.

Nair, S. and Eapen, L. (2012). *Food price inflation in India (2008–2010): A commodity-wise analysis of the causal factors*. Economic and Political Weekly, vol-47, pp. 46–54.

Neuman, W. (2000). *Social research methods: qualitative and quantitative approaches*. 5th ed. Allyn and Bacon.

Newman, P. (1999). *Sustainability and cities, extending the metabolism model*. Landscape and Urban Planning, vol-44 pp. 219–226.

NHS, UK, (2010). *National Health Service; Health Benefits.* Available at; https://www.evidence.nhs.uk/Search?pa=11&ps=30&q=health+benefits+walking /Accessed 01.07.12

Nilsson, J. (1991). *"Investment decisions in a public bureaucracy"*. Journal of Transport Economics and Policy, vol-25(2), pp. 163-75.

Nilsson, K. (2001). *Planning for sustainable development - Dilemmas for local authority planners.* Paper presented at *ACSP*–AESOP– PSA-ANZAPS Congress Shanghai, China, July 2001

Nowak, D., Crane D., Stevens, J. and Hoehn R. (2003). *USDA Forest Service*, North-eastern Research Station, Syracuse, New York.

Nowak, Rowntree, R., McPherson, E., Sisinni, S., Kerkmann, E. and Stevens, J. (1996). *Measuring and analyzing urban tree cover*. Landscape and Urban Planning, vol-36, pp. 49 - 57.

NParks (2011). *Handbook on tree conservation and tree planting provision for development projects.* National Parks Board, Singapore

NParks (2011b). *Singapore: A City in a Garden. Challenges, R&D needs and opportunities.* In Urban sustainability R&D congress, 28 June 2011. Singapore: National Parks Board.

Oguz, D. (2000). *User surveys of Ankara's urban parks.* Landscape and Urban Planning, vol-52, pp. 165-171.

Olembo, R. and Rhan P. (1987). *Urban forestry; cities, trees and people*. Unasylva, pp. 155.

Opdenakker, and Raymond R. (2006). *Advantages and Disadvantages of Four Interview Techniques in Qualitative Research.* Eindhoven University of Technology, vol-7

Ozguner, H., Kendle, A. and Bisgrove, R. (2007). *Attitudes of landscape professionals towards naturalistic versus formal urban landscapes in the UK.* Landscape and Urban Planning, vol-81, pp. 34–45

Özgüner, H. and Kendle, A. (2006). *Public attitudes towards naturalistic versus designed landscapes in the city of Sheffield (UK).* Landscape and Urban Planning, vol-74(2), pp. 139-157

Panditharatna, B. (1963). *A Critical review of Plans for the Development of Colombo City and some Trends in Planning.* Ceylon Historical and Social Studies Publication Board

Panditharatna, B. (1993). *Contemporary Urbanization of Sri Lanka: Impact on the Quality of Urban Environment. In: Mohanty B (ed.), Urbanisation in Developing Countries: Basic Services and Community Participation.* Urban Studies Series, Concept Publishing Company

Panduro, T. (2013). *Classification and valuation of urban green spaces: A hedonic house price valuation. Copenhagen* : Centre for Industrial Economics. University of Copenhagen, Denmark

Pauleit, S. and Duhme, F. (2000). *Assessing the environmental performance of land cover types for urban planning.* Landscape and Urban Planning, vol-52, pp. 1-20.

Pauleit, S. (2003). *Perspectives on Urban Greens pace in Europe*. Built Environment, vol-2, Pp. 89-93.

Peddle, D., White, H., Soffer, R., Miller, J. and LeDrew, E. (2001). *Reflectance processing of remote sensing spectroradiometer data*. Geosciences, vol-27, pp. 203–213

Percival, G. and Hitchmough, J. (1995). *Tree establishment and performance in a cool growing season arboretum*. Arboriculture Journal, vol-19, pp. 357–371.

Perera, N. (1998). *Society and Space: Colonialism, Nationalism and Postcolonial Identity in Sri Lanka* Westview Press, Boulder.

Perera, N. (2003). *The Transforming Asian City: The Challenges and Potential for Planners*. In: National Organization of Students of Planning Forum, pp. 11–15

Perera, N. (2008). *The planners' city: the construction of a town planning perception of Colombo.* Environment and Planning, Sri Lanka

Perera, R. (2003). *Problems and prospects of utilizing canal banks to enhance the built-environment in Colombo*. Built-Environment Sri Lanka, Sri Lanka Institute of Architects. Colombo, vol-3, pp.75–82.

Peschardt, K., Schipperijn, J. and Stigsdotter, U. (2012). *Use of small public urban green spaces (SPUGS)*. Urban Forestry and Urban Greening, vol-11(3), pp. 235-244.

Peters, K., Elands, B. and Buijs, A. (2010). *Social interactions in urban parks: Stimulating social cohesion?*. Urban Forestry & Urban Greening, vol-9 (2), pp. 93–100 .

Petersen, H. and Goossen, M. (2009). *Assessing and planning the supply of opportunities for forest recreation.* In: Bell S., Simpson M., Tyrväinen L., Sievänen T., Pröbstl U. (Eds.), European Forest Recreation and Tourism. Taylor, Francis, pp. 134–14

Peyre, A., Guidal, A., Wiersum, K. and Bongers, F. (2006). *Dynamics of home garden structure and function in Kerala, India.* Agroforestry Systems, vol-66, pp. 101–115.

Pfaffenberger, B. (1994). *Introduction: the Sri Lanka Tamils, C. Manogaran, B. Pfaffenberger (Eds.), The Sri Lankan Tamils*. Westview Press, Boulder, pp. 1–27

Pieris, P. and Naish, R. (1920). *Ceylon and the Portuguese, 1505-1658.* Tellippalai, Ceylon : American Ceylon Mission Press

Pincetl, S. and Gearin, E. (2005). *The reinvention of public green space*. Urban Geography, vol-26 (5), pp. 365-384.

Planning Department Planning (2012*). Statistics: Land utilization in Hong Kong*. Hong Kong Government

Platt, R., Rowntree, R. and Muick, P. (1994). *The Ecological City: Preserving and Restoring Urban Biodiversity*. University of Massachusetts Press, Amherst

Pretty J., Hine, R. and Peacock, J. (2006). *Green Exercise: The benefits of activities in green places*. The Biologist, vol-53(3), pp.143-148

Pretty, J. (2004). *How nature contributes to mental and physical health*. Spirituality and Health International, vol-5(2), pp. 68-78.

Rajapaksa, G. (2011). *Development plans for the city of Colombo*. Ministry of Defence, Sri Lanka

Rasid, Jamirsah, and Said, (2012). *Urban Green Space Design Affects Urban Residents' Social Interaction*. Department of Landscape Architecture, Faculty of Built Environment, University Teknologi Malaysia

Redevelopment Authority (URA) (2006). Urban Redevelopment Authority (URA) Handbook on Gross Floor Area. Singapore

Rees, William, and Wackernagel ,M. (2008). "*Urban ecological footprints: why cities cannot be sustainable—and why they are a key to sustainability."*, Urban Ecology. Springer US, pp. 537-555.

Refshauge, A., Stigsdotter, U. and Cosco, N. (2012). *Adults' motivation for bringing their children to park playgrounds*. Urban Forestry and Urban Greening, vol-11(4), pp. 396-405.

Robson, C. (2002). *Real World research* Oxford; Blackwell Publishers

Rohde, C. and Kendle, A. (1994). *Report to English Nature—Human Well-being, Natural Landscapes and Wildlife in Urban Areas: A Review.* Department of Horticulture and Landscape and the Research Institute for the Care of the Elderly, University of Reading, Bath.

Rohde, C. and Kendle, A. (1997). *Nature for people*. *Urban Nature Conservation*—Landscape Management in the Urban Countryside. E. and F. N. Spon, London, pp. 319–335

Roseland, M. (1998). *Toward Sustainable Communities: Resources for Citizens and their Governments*. New Society, Gabriola Island, BC.

Rosley', Rafida, Rahman, and Lamit,(2014*). Biophilia Theory Revisited: Experts and Non-experts Perception on Aesthetic Quality of Ecological Landscape.* Social and Behavioral Sciences Volume 153, 16 October 2014, Pages 349–362

Ross, R. and Savada, A. (1990). *Sri Lanka: a country study*. Handbook Series, Federal Research Division, Library of Congress, Washington, D.C.

Ruangrit, V. and Sokhi, B. (2004). *Remote Sensing and GIS For Urban Green Space Analysis – A Case Study Of Jaipur City, Rajasthan*. Institute of Town Planners, India Journal, vol-1(2), pp. 55-67.

Rugalema, G., Okting'Ati, A. and Johnsen, F. (1994). *The home garden agroforestry system of Bukoba district, North-Western Tanzania. Farming system analysis*. Agroforestry Systems, vol-26, pp. 53–64.

Russell, S. and Vidler, E. (2000). *The rise and fall of government – community partnerships for urban development: grassroots testimony from Colombo.* Environment and Urbanization, vol-12 (1), pp. 73–86

Sailor, D. (2008) *A green roof model for building energy simulation programs*. Energy and Buildings, vol-40, pp. 1466–1478.

Sallis, J., McKenzie, T., Elder, J., Broyles, S. and Nader, P. (1997) *Factors parents use in selecting play spaces for young children*. Archives of Peadiatric and Dolescent Medicine, vol-151, pp. 414–417

Samaranayake, R. (2006). *Pre-and post-tsunami coastal planning and land-use policies and issues in Sri Lanka*. Colombo, Sri Lanka

Sandström, U. 2002). *Green infrastructure planning in urban Sweden*. Planning Practice and Research, vol-17 (4), pp. 373–385

Sanesi, G. and Chiarello, F. (2006). *Residents and urban green spaces: the case of Bari*. Urban Forestry and Urban Greening, vol-4, pp. 125–134.

Sanesi, G., Lafortezza, R., Bonnes, M. and Carrus, G. (2006). *Comparison of two different approaches for assessing the psychological and social dimensions of green spaces.* Urban Forestry and Urban Greening, vol-5, pp. 121–129.

Schipperijn, J., Ekholm, O., Stigsdotter U., Toftager, M., Bentsen, P., Kamper, Jørgensen F. (2010). *Factors influencing the use of green space: results from a Danish national representative survey*. Landscape and Urban Planning, vol-95(3), pp. 130-137.

Schroeder, H. and Anderson, L. (1983). *Perception of personal safety in urban recreation sites*. Journal of Leisure Research, vol. 16 (2) - pp. 178–194.

Scott, A., Carter, C. and Brown, K. (2009). *Seeing is Not Everything': Exploring the landscape experiences of different publics.* Landscape Research, Taylor & Francis, vol-34 (4), pp. 397–424.

Scott, D. and Munson, W. (1994). *Perceived constraints to park usage among individuals with low incomes*. Journal of park and Recreation Administration, vol-12 (4), pp. 79-96.

Scottish Executive (2001). *Rethinking Open Space.* The Stationery Office, Kit Campbell Associates, Edinburgh.

Seeland, Klaus, and Nicolè, S. (2006). *"Public green space and disabled users."* Urban Forestry & Urban Greening, vol-5(1), pp. 29-34.

Seitz J. and Escobedo, F. (2011). *Urban Forests in Florida: Trees Control Storm water Runoff and Improve Water Quality.* University of Florida, Institute of Food and Agricultural Sciences (IFAS Extension Publication FOR184).

Senanayake, I., Welivitiya, W. and Nadeeka ,P. (2013). *Remote sensing based analysis of urban heat islands with vegetation cover in Colo,mbo city, Sri Lanka using Landsat-7 ETM+ data. Urban Climate*, 5(0), 19–35, Available at: http://www.sciencedirect.com/science/article/pii/S2212095513000345- Accessed 15.11.14

Sevanatha, (1999). *City Profile – Colombo, Sri Lanka*. UNDP/UNCHS Supported Urban Management Programme (UMP), Colombo.

Sevanatha, (1999a). *Provision of Municipal Services and Community Participation for Effective Service Delivery by the Colombo Municipal Council: A Review of the Role of Community Based Organizations (CBOs) in Urban Low Income Settlements.* Sevanatha Urban Resource Centre: Nawala.

Sevanatha, (1999b). *Report of the Stakeholder Workshop with the Community Development Council (CDC) Leaders of Low-Income Settlements in Kirula District of the Colombo Municipal Council*. Sevanatha Urban Resource Centre, Nawala.

Shan, X. (2012). *Attitude and willingness toward participation in decision making of urban green spaces in China.* Urban Forestry and Urban Greening, vol-11(2), pp. 211-217.

Silva, R. and Abeyawardana, H. (2007). *Ethnicity*. Survey Department, Sri Lanka, p. 114, %20Atlas/5.2-Ethnicity-Religion.pdf. - Accessed 02.04.15

Silva, R. and Abeyawardana, H. (2007c). *The National Atlas of Sri Lanka - 2nd Edition*. Survey Department of Sri Lanka.

Singer, M. (1990). *New realities in Sri Lankan politics*. Asian Survey, vol-30 (4), pp. 409–425

Singh, V., Pandey, D. and Chaudhry, P. (2010). *Urban forests and open green spaces: lessons for Jaipur, Rajasthan,* India. RSPCB Occasional Paper, 1, 1–23

Smardon, R. (1988). *Perception and aesthetics of the urban environment: Review of the role of vegetation*. Landscape and Urban Planning, vol-15, pp. 85–106.

Smith, R., Thompson, K., Hodgson, J., Warren, P. and Gaston, K. (2006). *Urban domestic gardens: Composition and richness of the vascular plant flora, and. implications for native biodiversity.* Biological Conservation, vol-129, pp. 312–322.

Sri Lanka Tourism Development Authority (2014). *The History Of Ceylon.* Sri Lanka Tourism Development Authority Sri Lanka

Sudha, P. and Ravindranath, N. (2000). *A study of Bangalore urban forest*. Landscape and Urban Planning, vol-47, pp. 47–63.

Sudhira, H., Ramachandra, T. and Subrahmanya, M. (2007). *City profile Bangalore*. Cities, vol-24, pp. 379–390.

Sundaram, A. (2011). *Urban green-cover and the environmental performance of Chennai city. Environment*, Development and Sustainability, vol-13, pp. 107–119.

Survey Department Sri Lanka (1989). *Annual Report – Crow Island Beach Area*. Survey Department of Sri Lanka.

Tahvanainen, L., Tyrvainen, L., Ihalainen, M., Vuorela, N. and Kolehmainen, O. (2001). *Forest management and public perceptions visual versus verbal information.* Landscape and Urban Planning, vol-53, pp. 53-70.

Talbot, J. and Kaplan R. (1984). *Needs and fears: the response to trees and nature in the inner city*. Journal of Arboriculture, vol-10, pp. 222–228.

Tan, P. (2012). *Singapore, a vertical Garden City in the making. Architecture and Urbanism,* Special Edition, pp. 138–141.

Tan, P. and Hamid, A. (2012). *From being green to becoming ecological: Urban ecological research in Singapore and its relevance to the advancement of urban ecology and sustainability*. In International workshop in Frontiers in urban ecological research and planning: Linking ideas from the east and west, October 2012, pp. 25–30

Tan, P., Wang, J. and Sia, A. (2012*). Department of Architecture, National University of Singapore, Singapore, Centre for Urban Greenery and Ecology,* National Parks Board, Singapore.

Tan, W. (2006). *A greenway network of Singapore*. Landscape and Urban Planning, vol-76, pp. 45–66

Tana, P., Wang, J. and Sia, A. (2013). *Perspectives on five decades of the urban greening of Singapore, Cities*, Vol-32, pp 24–32

Taubenböck, H., Wegmann, M., Roth, A., Mehl, H., and Dech, S. (2009). *Urbanization in India—Spatiotemporal analysis using remote sensing data.* Computer Environ. Urban Syst., vol-33, pp. 179–188.

Taylor, A., Kuo, F. and Sullivan, W. (2001). *Coping with ADD: The surprising connection to green play settings.* Environment and Behavior, vol-33, pp. 54–77.

Taylor, A., Kuo, F. and Sullivan, W. (2002). *Views of nature and self-discipline: Evidence from inner city children.* Journal of Environmental Psychology, vol-22, pp. 49–63.

Thaiutsa, B., Puangchit, L., Kjelgren, R.and Arunpraparuta, W. (2008). *Urban green space, street tree and heritage large tree assessment in Bangkok, Thailand.* Urban Forestry & Urban Greening, vol-7, pp. 219–229.

The Norwegian Institute of Public Health, (2009) *Public Health of Norway*. Available at; http://www.fhi.no/eway/default.aspx?pid=240&trg=Content_6870&Main_6664=7003:0:25,8254&MainContent_7003=6870:0:25,8279&List_6871=6876:0:25,8279 /Accessed 02.05.14

Thompson, C. (2002). *Urban green space in the 21st century*. Landscape and Urban Planning, vol. 60- pp. 59–72.

Tiana, and Jim, C. (2003). *Factors influencing the spatial pattern of sky gardens in the compact city of Hong Kong.* Landscape and Urban Planning 101 (2011). 299–309

Treib, M. (1999). *Power plays: the garden as pet, The Meaning of Gardens: Idea, Place, and Action*, MIT Press, Cambridge, Massachusetts, pp. 86–93

Troy, A., Grove, J., O'Neil-Dunne, J., Pickett S. and Cadenasso, M. (2007). *Predicting opportunities for greening and patterns of vegetation on private urban lands*. Environmental Management, vol-40, pp. 394–412.

Tyrväinen, L. (1997). *The amenity value of the urban forest: an application of the hedonic pricing method*. Landscape and Urban Planning, vol-37, pp. 211–222.

Tzoulas, K., Korpela, K., Venn, S., Yli-Pelkonen, V., Kazmierczak, A., Niemela, J. and James, P. (2007). *Promoting ecosystem and human health in urban areas using green infrastructure: a literature review.* Landscape Urban Plan, vol. 81- pp. 167–178.

UDA (1995). *City of Colombo: Development Plan 1995. Ministry of Urban Development, Housing and Construction*. Battaramulla, Sri Lanka.

UDA (1998). *Colombo Metropolitan Regional Structure Plan. Vol. 1: Synthesis*. UDA/Ministry of Housing and Urban Development.

UDA (1999). *City of Colombo: Development Plan 1999*. Ministry of Urban Development, Housing and Construction, Battaramulla.

UDA (2001). *City of Colombo.* Urban Development Authority , Colombo , Sri Lanka

UDA (2005). *Annual Report.* Urban Development Authority , Colombo , Sri Lanka

UDA (2008). *Annual Report.* Urban Development Authority , Colombo , Sri Lanka

UNDP (2001) Human Development Report 2001. Available at; http://www.undp.org/hdr2001/back.pdf - Accessed 15.02.15

Une, H. (2010). *Global Mapping - Development of a Global Geographic Dataset.* Geographical Survey Institute (GSI), Ministry of Land, Infrastructure and Transport 305-0811, Tsukuba, JAPAN

UNESCO, (2002). *Ancient City of Sigiriya. Available at;* http://whc.unesco.org/en/list/202. - UNESCO *Ancient City of Sigiriya*. UNESCO World Heritage Centre / Accessed 10.02.12

UNFPA. (2007). *State of world population 2007: Unleashing the Potential of Urban Growth:* United Nations Population Fund, vol-99.

United Nation, (2007). *Statistics; United Nation Population Fund*. Available at; https://www.unfpa.org/sites/default/files/pubpdf/695_filename_sowp2007_eng.pdf / Accessed 17.02.15

Urban green spaces task force (2002). *Green Spaces, Better Places: Final report of the Urban Green Spaces Taskforce. London.* DTLR. Urban Planning, vol-52, pp. 203 - 224.

Uy, P. and Nakagoshi, N. (2008). *Application of land suitability analysis and landscape ecology to urban greenspace planning in Hanoi, Vietnam*. Urban Forestry & Urban Greening, vol-7, pp. 25 - 40.

Van den Berg, A., Hartig, T. and Staats, H. (2007). *Preferences for nature in urbanized societies: stress, restoration, and the pursuit of sustainability.* Journal of Social Issues, vol-63(1)., pp. 79-96.

Van Den Berg, A., Van Winsum-Westra M., De Vries, S., and Van Dillen, S. (2010). *Allotment gardening and health: a comparative survey among allotment gardeners and their neighbors without an allotment. Environ*. Health: Glob. Access Sci. Source, vol- 9, pp. 74.

Van der Valk, A. (2002). *The Dutch planning experience*. Landscape and Urban Planning, vol-58, pp. 201 – 210.

Van Herzele, A. and Wiedemann, T. (2003). *A monitoring tool for the provision of accessible and attractive urban green spaces.* Landscape and Urban Planning, vol-63 (2)., pp. 109–126.

Van Horen, B. (2002). *City Profile: Colombo*. Cities, Vol-19(3)., Pages 217–227.

Veal, A. (1997). *Research Methods for Leisure and Tourism*. London: Financial Times, Prentice Hall.

Veitch, J., Bagley, S., Ball, K., and Salmon, J. (2006). *Where do children usually play? A qualitative study of parents' perceptions of influences on children's active free-play*. Health and Place. Vol-12, pp 383–393.

Veitch, J., Salmon, J. and Ball, K. (2007). *Children's perceptions of the use of public open spaces for active free-pla*y. Children's Geographies. Vol-5, pp 409–422.

Venn, S. and Niemelä, J. (2004). *Ecology in a multidisciplinary study of urban green space: The URGE project*. Boreal Environment Research, vol-9, pp. 479–489.

Vogel, M. and Jongman, R. (2008). *Biodiversity monitoring in Europe: The EU FP7 EBONE project – European Biodiversity Observation Network*. Poster & Proceedings at the International Congress Biodiversity in

Africa – Observation and Sustainable Management for the Future, 29 September-3 October 2008 in Spier/Stellenbosch, South Africa, pp 109

Vos, W. and Meekes, H. (1999). *Trends in European cultural landscape development: perspectives for a sustainable future*. Landscape and Urban Planning, vol-46, pp. 3-14

Ward-Thompson, C., Aspinall, P. and Montarzino, A. (2008). *The childhood factor: Adult visits to green places and the significance of childhood experience*. Environment and Behavior, vol-40(1)., pp. 111-43.

Ward-Thompson, C., Aspinall, P., Bell, S. and Findlay, C. (2005). *"It gets you away from everyday life": local woodlands and community used what makes a difference?* Landscape Research, vol-30(1)., pp. 109-146.

Ward-Thompson, C., Aspinall, P., Bell, S., Findlay, C., Wherrett, J. and Travlou, P. (2004). *Open Space and Social Inclusion: local woodland use in Central Scotland*. Edinburgh: Forestry Commission.

Ward-Thompson, C., Roe, J., Aspinall, P., Mitchell, R., Clow, A. and Miller, D. (2012). *More green space is linked to less stress in deprived communities: evidence from salivary cortisol patterns*. Landscape and Urban Planning, vol-105(3)., pp. 221-229.

Warren, W. (2013). *Singapore: City of Gardens*. Tuttle Publishing.

Weber, D. and Anderson, D. (2010). *Contact with nature: recreation experience preferences in Australian parks*. Annals of Leisure Research vol-13 (1–2)., pp. 46–49

Wei, W. and Linsen, Z. (2007). *Evaluation method of the ecological benefits if urban green spaces and application conditions*. Forestry Studies in China, vol-9, pp. 213–216.

Weiner, M. (1992). *Planting a Tree: Choosing, Planting and Maintaining this Precious Resource*. John Wiley and Sons.

Wendela, H., Zargerb, R. and Mihelcica, J. (2012). *Accessibility and usability: Green space preferences, perceptions, and barriers in a rapidly urbanizing city in Latin America*. Landscape and Urban Planning, Vol-107 (3)., pp. 272

Westphal, L. (2003). *Social Aspects of Urban Forestry: Urban Greening and Social Benefits: a Study of Empowerment Outcomes.* Journal of Arboriculture 29(3).:137-147

WHO, (2011). *World Health Organisation Report Summery 2011*. Available at: http://www.who.int/nmh/publications/ncd_report_summary_en.pdf /Accessed 15.04.15

Wijesundara, J. (2002). *Towards Planned Urban renewal- Comparative Approaches of Germany and Sri Lanka.* Sri Lanka Institute of Architects National Conference Proceedings, February 2002, Sri Lanka, Sri Lanka Institute of Architects, pp. 43-48

Wilkinson, P. (1985*). The golden fleece: the search for standards*. Leisure Studies. vol-4, pp. 189-203.

Wilson, E. (1984). *Biophilia*. Cambridge, MA: Harvard University Press.

Wolch, J., Byrne, J. and Newell, J. (2014). *Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough.* Landscape and Urban Planning, Elsevier, 125, 234–244,

Wong, N. and Jusuf, S. (2010). *Study on the microclimate condition along a green pedestrian canyon in Singapore.* Architectural Science Review, vol-53, pp. 196–212

Wong, N., Chen, Y., Ong, C., Tan, P. and Long, S. (2002)., *Handbook on sky rise greening in Singapore*. 1 vols. Singapore.

World Bank (1997). *Policy Framework for the Clean-Up Project to Develop Low-Income Settlements*. World Bank, Colombo.

World Health Organization (2011). *Global Recommendations on Physical Activity for Health. Available at;* http://whqlibdoc.who.int/publications/2010/9789241599979- /Accessed 15.03.14

Xi-Zhang, S. (2014). *Socio-demographic variation in motives for visiting urban green spaces in a large Chinese city*. Habitat International, Vol-41, pp. 114–120

Xiao, Q. and McPherson, E. (2002). *Rainfall interception by Santa Monica's municipal urban forest*. Urban Ecosystems 6, 291-302.

Xu, X., Duan, X., Sun, H. and Sun, Q. (2011). *Green spaces changes and planning in the capital region of China*. Environmental Management, vol-47, pp. 456–467.

Yang, B. and Brown, T. (1992). *A cross-cultural comparison of preferences for landscape styles and landscape elements*. Environment & Behavior, 24, 471-507.

Yang, T. and Matthews, S. (2010). *The role of social and built environments in predicting self- rated stress: A multilevel analysis in Philadelphia*. Health and Place 16: 803-810.

Yılmaz, S., Zengin, M. and Yıldız, D. (2007). *Determination of User Profile At City Parks: A Sample from Turkey*. Building and Environment.

Yuen, B. (1996). *Use and experience of neighbourhood parks in Singapore*. Journal of Leisure Research, vol-28(4)., pp. 293-311.

Yuen, B., Kong, L. and Briffett, C. (1999). *Nature and the Singapore resident*. Geo-Journal, vol-49, pp. 323-331.

Zhang, W. and Dong, W. (2004). *An advanced course on statistical analysis with SPSS*. Beijing: Higher Education Press (in Chinese)..

Zhanga, H., Chenb, B., Suna, Z. and Baoa, Z. (2013). *Landscape perception and recreation needs in urban green space in Fuyang, Hangzhou, China.* Urban Forestry & Urban Greening, Vol-12 (1)., pp. 44–52

Zhao, C., Fu, G. and Liu, X. (2011). *Urban planning indicators, morphology and climate indicators: A case study for a north-south transect of Beijing, China*. Building and Environment, 46(5)., 1174–1183.

Appendices

Appendix A: **Public survey of users and non-users of**

Urban Green Spaces (UGS's)

In Colombo – Sri lanka 2011

Part A.

Site Name: *ස්ථානය*:	Weather condition: *කාලගුණික ස්වභාවය*:
Date: *දිනය*:	Time: *වේලාව*:
Gender: *ස්ත්‍රී / පුරුෂ භාවය*:	

A1. Which of the following categories best describes your age?

පහත සඳහන් ඒවායෙන් ඔබේ වයස් කාණ්ඩය කුමක්ද?

Under 18 *අවු: 18ට අඩු*		18-24yrs *අවු: 18-24 අතර*		25-34yrs *අවු:25-34 අතර*		35-44yrs *අවු:35-44 අතර*	
45-54yrs *අවු:45-54 අතර*		55-64yrs *අවු:55-64 අතර*		65-74yrs *අවු:65-74 අතර*		Over75yrs *අවු:75ට වැඩි*	

A2. What is your current occupation?

ඔබේ වර්තමාන වෘත්තෝපාය කුමක්ද?

Student(*ශිෂ්‍ය*)		Unemployed(*රැකිය වියුක්ති*)	
Full time employed (*පූර්ණ කලීන රැකියා නියුක්ත*)		Part-time employed (*අඩු කාල රැකියා නියුක්ත*)	
Parent/ Guardian (*දෙමාපිය / භාරකරු*)		Retired(*විශ්‍රාමික*)	
Other (please state) (*වෙනත්(කරුණාකර සඳහන් කරන්න)*)			

A3. Which of the following describes your ethnic origin?

පහත සඳහන් ඒවායෙන් ඔබේ ජනවර්ගය කුමක්ද?

Sinhalese-*සිංහල*	Tamil-*දෙමළ*	Muslim-*මුස්ලිම්*	Other-native -*වෙනත් ස්වදේශික*	Other-non native -*වෙනත් විදේශික*

Part B.

B1.How far away from this site do you live?

මෙම ස්ථානයේ සිට ඔබේ පදිංචි ස්ථානයට ඇති දුර කොපමණද?

<1/2 Km(*කි.මී.1/2 ට අඩු*)	½-1Km(*කි.මී.1/2-1ත් අතර*)	1-5Km(*කි.මී.1-5 ත් අතර*)	>5Km(*කි.මී.5 ට අඩු*)	Outside Colombo(*කොළඹින් පිටත*)

B2.How often do you visit this Green Spaces (Please tick only one answer)

කොපමණ කලකට සැරයක් ඔබ මේ ස්ථානයට පැමිණෙනවද?(එක් පිළිතුරක් පමණක් සඳහන් කරන්න.)

More than once a week(*සතියකට සැරයකට වඩා*)	
More than once a month(*මසකට සැරයකට වඩා*)	
Monthly(*මාසිකව*)	
Yearly(*වාර්ෂිකව*)	
1st visit(*පළමු පැමිණීම*)	

B3. When did you first visit this site?

ඔබ ප්‍රථම වරට මෙම ස්ථානයට පැමිණියේ කවදද?

Today or Since 1 month(*මාසයකසිට*)		Since 6 months(*මාස 6 කසිට*)	
More than 1 year(*අවු: 1 කට වඩා පෙර*)		Since post war (2009) (*පශ්චාත් සංග්‍රාමයේසිට (2009)*)	
Before the war(*යුද්ධයට පෙර*)		Since childhood(*ළමා කාලයේ සිට*)	

B4.How would you normally travel to this green space (please tick one only)?

ඔබ සාමාන්‍යයෙන් නාගරික පොදු හරිත උද්‍යාන කරා ගමන් කරන්නේ කුමන මාධ්‍යයකින්ද? (එකක් පමණක් ලකුණු කරන්න.)

On foot(*පයින්*)		Car(*කාරයෙන් *)		Bicycle(*බයිසිකලයෙන්(යතුරු පැදි/පාපැදි)*)	
Bus(*බසයෙන්*)		Other(*වෙනත්*)			

B5.Approximately how long does your normal journey takes?
ආසන්න වශයෙන් ඔබගේ ගමනට කොපමණ කාලයක් ගතවේද?

Less than 5 minutes(විනාඩි 5 කට අඩු)		5-10 minutes(විනාඩි 5- 10 ත් අතර)	
10-20 minutes(විනාඩි 10-20 ත් අතර)		More than 20 minutes(විනාඩි 20 කට වඩා)	

B6.How long do you normally stay? (Please tick one for weekdays and one for weekends)
කොපමණ කාලයක් ඔබ මේ ස්ථානයේ රැඳිසිටිනවාද?

Duration(රැඳිසිටින කාලය)	**Weekday**(සතියේ දිවාවල)	**Weekend**(සති අන්තවල)
Do not visit(නොපැමිණෙයි)		
Less than 30 minutes(විනාඩි 30 ට අඩු)		
30 minutes- 1hour(විනාඩි 30- පැය 1 ත් අතර)		
1 - 2 hours(පැය 1-2 ත් අතර)		
More than 2 hours(පැය 2 කට අඩු)		

B7.Do you usually visit this site? (Please tick only one)
ඔබ සාමාන්‍යයෙන් මෙම ස්ථානයට පැමිණෙන්නේ?(එක පිළිතුරක් පමණක් සඳහන් කරන්න.)

Alone(තනිවම)		Go to B9. Please(කරුණාකර B9 ප්‍රශ්නයට යොමුවන්න)
In a group(කණ්ඩායමක් සමග)		Go to B8. Please(කරුණාකර B8 ප්‍රශ්නයට යොමුවන්න)
Both(ඉහත දෙආකාරවම)		Go to B8. Please(කරුණාකර B8 ප්‍රශ්නයට යොමුවන්න)

B8.When you visit as part of a group, how many people would normally be visiting with you (including yourself)?
ඔබ කණ්ඩායමක් සමග පැමිණෙන විට සාමාන්‍යයෙන් කොපමණ පිරිසක් ඔබ සමග පැමිණෙන්නේද?(ඔබද ඇතුලත්ව)

	Children(ළමා) (0-12)	Teenagers(නව්‍යෙන) (13-19)	Adults(වැඩිහිටි) (19-60)	Senior Citizen(ජ්‍යෙෂ්ඨ පුරවැසියන්)(60+)
Male(පිරිමි)				
Female(ගැහැණු)				

B9. What does the word " Urban Green Spaces" mean to you?
ඔබ "නාගරික පොදු හරිත උද්‍යාන" යන වචනයෙන් අදහස් කරන්නේ කුමක්ද?

……
……
……

B10.Which type of urban parks do you prefer mostly?
ඔබ වඩාත් කැමති කුමන වර්ගයේ හරිත උද්‍යාන වලටද?

Formal(ආකෘතික)	Natural(ස්වභාවික)	Mixed(මිශ්‍ර)	No preference(විශේෂ කැමැත්තක් නැත)	Don't Know(නොදනී)

B11. Which living and non-living features do you most enjoy, when you visit a park (please tick one from each)
ඔබ හරිත උද්‍යාන වලට පැමිණෙන විට, ඔබට වඩාත් විනෝදජනකවාදය ගෙන දෙන ජීවී සහඅජීවී අංග මොනවද? (එක කොටසකින් එකක් පමණක් ලකුණු කරන්න)

Living Features(ජීවී අංග)		**Non-living Features**(අජීවී අංග)	
Trees/woodlands(ශාක/වන ලැහැබ)		Build-up play areas(ඉදිකරන ලද ක්‍රීඩා පෙදෙස්)	
Wild animals-birds etc.(වන ජීවීන්/පක්ෂීන්)		Monuments(ස්මාරක)	
Flower Beds/Bushes(මල් පාත්ති/පදුරු)		Benches /seating(බංකු/අසුන්)	
Neat Lawns(තණ බිම්)		Build up picnic areas(විනෝද සවාරි පැමිණ ආහාර ගැනීම සඳහා ඉදිකර ඇති ප්‍රදේශ)	
Natural streams/pond(ස්වභාවික දිය පහර/පොකුණු)		Artificial fountains(කෘතිම වතුර මල්)	
Natural Paths(ස්වභාවික අඩි පාරවල්)		Paved areas(බිම අතුරපු ප්‍රදේශ)	

B12.What are the two main purposes of your visit here?
ඔබ මෙම ස්ථානය නැරඹීමට පැමිණෙන ප්‍රධාන අරමුණු 03 මොනවද?

To keep fit/ exercise (ව්‍යායාම සඳහා)		To relax and get fresh air (නිස්කලංකව සිටීම හා නැවුම් වාතාශ්‍රය ලබාගැනීම සඳහා)		Enjoy the nature (plants) (ස්වභාවධර්මය විඳගැනීමට(ශාක))	
See the wildlife (වන ජීවීන් නැරඹීමට)		Picnic/family outing (විනෝද ගමන් සඳහා)		Walk the dog (සුනඛයන් ඇවිද්දවීමට)	
Visiting the play area (ක්‍රීඩා කිරීමට)		Take a short cut(කෙටි පාරකින් යෑමට)		Other(වෙනත්)	

Part C.

C1.What is the overall impression of this green space (Please tick one only)?
මෙම ස්ථාන පිළිබඳ සමස්ත හැඟීම කුමක්ද?(එක් පිළිතුරක් පමණක් සඳහන් කරන්න.)

Very Satisfied (*ඉතා තෘප්තිමත්*)	Satisfied (*තෘප්තිමත්*)	Dissatisfied (*අතෘප්තිමත්*)	To be improved (*වැඩිදියුණු කළ යුතුයි*)	Don't Know (*නොදනී*)	No Comment (*අදහසක් නැත*)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් අතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කරන්න.

……
……

C2.How would you rate the design aspect of this park?
ඔබ මෙම හරිත උද්‍යාන සැළසුම් කර ඇති ආකාරය අගය කරන්නේ කෙළෙසද?

Very Good (*ඉතා හොඳයි*)	Good (*හොඳයි*)	Fair (*සාමාන්‍යයි*)	Poor (*දුර්වලයි*)	Very poor (*ඉතා දුර්වලයි*)	Don't Know (*නොදනී*)	No Comment (*අදහසක් නැත*)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් අතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කරන්න.

……
……

C3.How would you rate the maintenance and the cleanliness of the park?
ඔබ මෙම ස්ථානයේ නඩත්තු කිරීම හා පිරිසිදු භාවය අගය කරන්නේ කෙසේද?

Very Good (*ඉතා හොඳයි*)	Good (*හොඳයි*)	Fair (*සාමාන්‍යයි*)	Poor (*දුර්වලයි*)	Very poor (*ඉතා දුර්වලයි*)	Don't Know (*නොදනී*)	No Comment (*අදහසක් නැත*)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් අතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කරන්න.

……
……

C4.How would you rate the sport/ visitor facilities and other services of this park?
ඔබ මෙම ස්ථානයේ සපයා ඇති ක්‍රීඩා හා පැමිණෙන්නන් සඳහා වූ පහසුකම් හා සේවාවන් අගය කරන්නේ කෙසේද?

Very Good (*ඉතා හොඳයි*)	Good (*හොඳයි*)	Fair (*සාමාන්‍යයි*)	Poor (*දුර්වලයි*)	Very poor (*ඉතා දුර්වලයි*)	Don't Know (*නොදනී*)	No Comment (*අදහසක් නැත*)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් අතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කරන්න.

……
……

C5. How would you rate the safetyof these park?
ඔබ මෙම ස්ථානයේ සුරක්ෂිතභාවය අගය කරන්නේ කෙසේද?

Very Good (*ඉතා හොඳයි*)	Good (*හොඳයි*)	Fair (*සාමාන්‍යයි*)	Poor (*දුර්වලයි*)	Very poor (*ඉතා දුර්වලයි*)	Don't Know (*නොදනී*)	No Comment (*අදහසක් නැත*)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් අතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කරන්න.

……
……

ඔබ මෙම ස්ථානයේ ඇති පීවී අංගයන්ගේ නියෝජනය අගය කර්නේ කෙසේද?

Very Good (ඉතා හොදයි)	Good (හොදයි)	Fair (සාමාන්‍යයි)	Poor (දුර්වලයි)	Very poor (ඉතා දුර්වලයි)	Don't Know (නොදනි)	No Comment (අදහසක් නැත)

If you would like to include any comments please state below
ඔබට කිසියම් අදහසක් ඇතුළත් කිරීමට කැමති නම් කරුණාකර පහතින් සඳහන් කර්න.

……
……

C7.Are there any other comments you would like to make which encourage other people to use the urban green spaces more often. Such as facilities, activities, management and maintenance?
මෙම හරිත උද්‍යාන නාවිතා කිරීමට අනෙක් මිනිසුන් පෙළඹවීමට ඔබ මෙම ස්ථානය සම්බන්ධයෙන් දැක්වීමට කැමති අදහසක් තිබේද?
(පහසුකම්,ක්‍රියාකාරකම් කළමණාකරණය සහ නඩත්තුව වැනි යමක්)

Yes(ඔව්)		No(නැත)		Don't 'know(නොදනි)	

If your answer is "Yes" please provide your additional comments below
ඔබේ පිළිතුර "ඔව්" නම්,ඔබගේ අමතර අදහස් පහතින් දක්වන්න.

……
……

C8. Does every citizen in Colombo get same benefits from Urban Green Spaces regardless of the part of the city, wealth, social class etc.? if "not" why?
කොළඹ නගරයේ පීවිත්වන සෑම වැසියෙකුටම තමන් පීවිත්වන ප්‍රදේශය, වත්පොහොසත්කම, සමාජ පන්තිය නොසලකා සමසේ ප්‍රතිලාභ විඳීමේ හැකියාව තිබේද?
එසේ "නැතිනම්" ඇයි?

……
……
……

Appendix B:

The In-depth Interview-questions for the key personnel related to Urban Green Spaces in Colombo - Sri Lanka

General Introduction:

- Introduction to the proposed research
- Introduction to how the information will be used
- Obtain permission to record the discussion for later transcription (individual contribution remains anonymous)
- Opportunity for participants to ask questions

1. What does the word "Urban Green Space" means to you?
-

2. What do you think is the appropriate definition for "Urban Green Spaces (UGS's)" in the context of the Colombo city?

3. What do you feel is the role of nature for social well being and in the Colombo city?

4. Could you please briefly relate the background of your involvement with any particular project or development, in Colombo city in the recent past or near future?

5. How were/are you involved?

6. Project funding: how was/will the project be funded?

7. Community involvement: describe the role of the local community in planning and implementing the project?

8. Was there any conflict over how the land was to be used or land ownership?

9. What were your initial expectations from this development/project?

10. Did the outcome meet your expectations?
-

11. How have things changed after implementation of the project?
-

12. Who has power to finalise the proposed projects (governmental authority, semi-governmental, private sector, general public or combination of two or more above bodies)?

13. Do any current policies, perceptions, attitudes or behaviours towards Urban Green Spaces act as barriers to improving the future UGS's in Colombo?

14. How do possible future problems such as massive population growth, nature disasters, lack of space etc. affecting your planning? How are you dealing with that?

15. Community benefits: In what way do you consider this development/ project to be contributing to the identity of and civic pride attached to, this place or locality and how would this affect the social-well being of the local community?

16. Does every citizen of Colombo get the same benefits regardless of the area of the city, wealth, social class etc.?

17. What do you feel are the most significant impacts of the project (e.g. neighbourhood revitalization, increased real estate value, economic benefits etc.)?

18. Environmental support: Is the development well integrated into its surroundings and what in your view are the main impacts on the local environment: to what extent are environmental impacts such as energy consumption, accessibility, traffic generation, planting/ecology important in your decisions?

19. Design aspect: what kind of landscape designs did you /are you following? Example: traditional Sri Lankan, historical, colonial, mixed or any other?

20. What was the reason to choose that particular design style?

21. Are you following any effective environmental and landscape architectural theories and practices, which have already succeeded and been proven by any other developed and developing countries to a turn highly polluted and urbanized city like Colombo into a green city?

22. If yes, how can they be adapted and applied to Colombo and with whom are we working together (countries, organisations etc.)?

23. If not, what are the reasons?

24. Lessons learned: what would help promote and facilitate future redevelopment projects (e.g. public/private partnerships, community fund raising and involvement, federal support)?

25. Why are the relevant authorities highly focusing on development of urban green spaces in Colombo now more than ever? Is there a global/ political/ civilian or any the influences or pressure involved?

26. Where do you see Colombo in 10, 20 and 50 years time in terms of ‘Green city’ concept?

Appendix C:

TYPOLOGY OF URBAN GREEN SPACES

By Department for Transport, Local Government and the Regions: London, The UK

Improving Urban Parks, Play Areas and Green Spaces - May 2002

Table 1.1: A Typology of urban green space

Main types of Green Space			
ALL URBAN GREEN SPACE	Amenity Green Space	**Recreation Green Space**	Parks and Gardens Informal Recreation Areas Outdoor Sports Areas Play Areas
		Incidental Green Space	Housing Green Space Other Incidental Space
		Private Green Space	Domestic Gardens
	Functional Green Space	**Productive Green Space**	Remnant Farmland City Farms Allotments
		Burial Grounds	Cemeteries Churchyards
		Institutional Grounds	School Grounds (including school farms and growing areas) Other Institutional Grounds
	Semi-natural habitats	**Wetland**	Open/Running Water Marsh, Fen
		Woodland	Deciduous woodland Coniferous woodland Mixed woodland
		Other Habitats	Moor/Heath Grassland Disturbed Ground
		Linear Green Space	River and Canal Banks Transport Corridors (road, rail, cycleways and walking routes) Other linear features (e.g. cliffs)

Table 1.2: Definitions of types of urban green space

AMENITY GREEN SPACE All land which is designed primarily for amenity, both visual amenity and enjoyment for access and recreation. It consists mainly of publicly owned land but also includes private land, such as domestic gardens, which can contribute greatly to the green fabric of towns and cities. Sub–types of amenity green space are:	**Parks and Gardens** Areas of green space specifically designed for public access and enjoyment and combining a variety of landscape and horticultural elements (sometimes including semi-natural habitats) and facilities for the public (including buildings) and in some cases incorporating sports facilities and/or play areas. At the smaller scale may include community gardens.
	Informal Recreation Areas Areas of green space available for public access and enjoyment but with only low key provision of facilities. Usually consist mainly of grass areas for informal recreation, but may also have trees, a play area, paths and sometimes toilets and parking area.
	Outdoor Sports Areas Green space designed to accommodate sports; including sports pitches, playing fields, golf courses, and other outdoor activities. Often occur within parks, but may also be separate, especially in the case of golf courses.
	Play Areas Green space designed specifically for children's play, with various levels of provision of equipment and facilities. May occur separately but also often incorporated within parks, informal recreation areas and outdoor sports facilities.
	Incidental Green Space Areas of green space that, although publicly owned and managed, and accessible for public enjoyment, have no clear recreation function, and little significant value as habitat. Their function is usually as a green 'landscape backdrop' but their landscape value can sometimes be minimal because of poor design. They include the 'left over' green spaces within housing and other forms of development.
	Domestic Gardens Green space within the curtilage of individual dwellings, which is generally not publicly accessible, but which often makes a significant contribution to the green fabric of urban environments.
FUNCTIONAL GREEN SPACE Green space which has a primary function other than amenity or recreation, although some of these areas may also be publicly accessible and available for people's enjoyment. The primary functions include farming, horticulture, burial grounds and educational and other institutional use. Access to these green spaces may go hand in hand with the primary function (for example cemeteries, churchyards and allotments) or be by public right of way, or by agreement, for example where school grounds are made available for public use.	**Farmland** Green space under agricultural management. Includes farms which also have a recreation and education function such as City Farms.
	Allotments Green Space available for members of the public who occupy them to cultivate vegetable or fruit crops for their own use.
	Burial Grounds Land used as burial grounds, including cemeteries and churchyards.
	School Grounds Green space in the grounds of schools including sports pitches, other outdoor sports facilities, play areas, gardens, nature areas, school farms and growing areas and incidental green space.
	Other Institutional Grounds Green space in the grounds of institutions such as universities and colleges, hospitals and nursing homes, and associated with commercial and industrial premises, including gardens, sports pitches, other outdoor sports facilities, play areas, semi-natural habitats and incidental green space.

Table 1.2: Definitions of types of urban green space (continued)

SEMI-NATURAL GREEN SPACE Green space that is made up of semi-natural habitat. These habitats may be encapsulated areas of the countryside that existed before the urban area expanded. Alternatively they may have been formed by the natural processes of colonisation and succession on abandoned or disturbed ground or by deliberate creation of new habitats through initiatives such as urban forestry and reclamation of derelict land. All these habitats make a vital contribution to the urban landscape but may or may not be accessible for public enjoyment. In some cases where there is access it may be unofficial, but still extremely important to local people.	**Wetland** Green space dominated by wet habitats, including water bodies, running water and fen, marsh, bog and wet flush vegetation.
	Woodland All forms of urban woodland including deciduous woodland (both ancient semi-natural and woodlands of more recent origin) and mixed and coniferous woodland (including plantations and shelterbelts). Includes newly planted woodland.
	Moor and Heath Areas of moorland and heathland vegetation consisting mainly of ericaceous species, and including moorland grass, shrub moor, shrub heath and bracken. Likely to include some Commons within urban areas.
	Grassland Grassland which is not agriculturally improved and not formally part of an amenity greenspace, including calcareous grassland, acidic upland grassland and unimproved meadows. Could include established vegetation on reclaimed derelict land which is not part of a formal recreation green space.
	Disturbed Ground Land which has been disturbed by previous development or land use but is now abandoned, waste or derelict and is becoming re-colonised by processes of colonisation and natural succession.
LINEAR GREEN SPACE Green space that occurs in association with linear features, especially transport routes such as roads, railways and canals, but also rivers and streams. It is a matter for debate whether this category should be considered separately, since these spaces might also be defined as either semi natural habitat, or functional green spaces whose primary function is transport, or incidental green space with a visual amenity function. These spaces are, however, distinguished by their linear character and are often an important part of strategic green space designations such as green links and green corridors and for this reason we suggest that they should be considered separately.	**River and Canal Banks** Green space occurring along the margins of canals or rivers and forming part of the river or canal corridor.
	Transport Corridors The often substantial areas of green space associated with transport. Includes: the variety of habitats, associated with railways, which are often inaccessible but when they fall into disuse can become an important part of an open space network; green space associated with roads, and especially the large areas of grassland, scrub, trees and woodland found along major roads and motorways; and green space along cycleways and walking routes.
	Other Linear Features Cliffs and other natural areas of linear green space.

Table 1.3: Hypothetical example of classification of publicly accessible urban green spaces

Hierarchy of Importance⇨ Type of Greenspace⇩	Principal/City/ Metropolitan	District	Neighbourhood/ Local
GREEN SPACE SPACES WHERE RECREATION IS THE PRIMARY USE			
Parks	Norfolk Heritage Park Weston Park Rivelin Valley Park Porter Valley Parks Millhouses Park Firth Park Concord Park	Bingham Park Chapeltown Park Crookes Valley Park Meersbrook Park *(and 16 others)*	
Gardens	Sheffield Botanical Gardens Peace Gardens Hillsborough Walled Garden	Beauchief Park Whinfell Quarry Garden Stocksbridge War Memorial Garden	Barkers Pool Garden Bocking Lane Garden Monument Ground
Outdoor Sports Areas	Beauchief Golf Course	Beighton Sports Ground Steel City Sports Ground Redmires Road Playing Field	Arbourthorne Playing Field Ellesmere Park Manor Sports Ground *(and 46 other spaces)*
Play Areas (Outside Parks)			Grammar Street Playground Errington Avenue Playground Motehall Playground *(and 63 others)*
Informal Recreation Spaces			Abbey Lane Catcliffe Road Meadowgate Lane *(and 170 other spaces)*
2. OTHER GREEN SPACES WHERE RECREATION MAY BE A SECONDARY USE			
City Farms	Graves Park Animal Farm Heeley City Farm		
Allotments			Bowstead Allotments Manor Allotments Shirecliffe Allotments *(and 71 others)*
Cemeteries	General Cemetery		Attercliffe Common Burial Ground Oughtibridge Cemetery
Churchyards	St Peter and St Pauls Cathedral		Dore Church Yard St George's Church
Woodland	Ecclesall Woods	Gleadless Valley Woodland Park Limb Valley *(and 13 others)*	Abbeydale Wood Crabtree Wood Poggs Wood Rivelin Lodge *(and 107 Others)*
Moor/Heath		Loxley/Wadsley Common Blacka Moor	

Appendix; D

Date & Day: **Time:** **Place:** **Weather condition:**

	GENDER	ETHNICITY	GROUP/ ALONE Number	TOTAL TIME	ACTIVITY	NOTES
SMALL CHILDREN						
CHILDREN						
TEENAGER						
YOUNG ADULT						
OLDER ADULT						
ELDELY						

KEY:

Small children –S	Gender	Ethnicity	With whom	Total time	Activity	Notes
Children –C	Male –M	Sinhala –S	Alone –A	Approx. time spent	Active –A	Special needs
Teenager –T	Female –F	Tamil –T	Group –G		Sedentary – S	Which activities
Young adult –Y		Muslim –M	How many -Nr			
Older adult –O		Other -O				
Elderly –E		Don't know -D				