SPATIAL PATTERN, PATHWAYS OF CHANGE AND USERS' PERCEPTIONS ON PUBLIC OPEN SPACES IN POKHARA METROPOLITAN CITY, NEPAL

A Dissertation

Submitted to Faculty of Humanities and Social Sciences of Tribhuvan University in Fulfillment of the Requirement for the Degree of

DOCTOR OF PHILOSOPHY

in

GEOGRAPHY

By

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Ph.D Reg. No.: 16/2072

Tribhuvan University

Kathmandu, Nepal

June 2022

LETTER OF RECOMMENDATION

We certify that this dissertation entitled **"Spatial Pattern, Pathways of Change and Users' Perceptions on Public Open Spaces in Pokhara Metropolitan City, Nepal"** was prepared by Ramjee Prasad Pokharel under our guidance. We, hereby, recommend this dissertation for final examinations by the Research Committee of the Faculty of Humanities and Social Sciences, Tribhuvan University, in fulfillment of the requirements for the Degree of DOCTOR OF PHILOSOPHY in GEOGRAPHY.

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APPROVAL LETTER

This dissertation entitled **Spatial Pattern and Pathways of Change and User' Perception on Public Open Space in Pokhara Metropolitan City, Nepal** was submitted by Ramjee Prasad Pokharel for final examination to the Research Committee of the Faculty of Humanities and Social Sciences, Tribhuvan University, in fulfillment of the requirements for the **Degree of Doctor of Philosophy** in **Geography.** I hereby, certify that the Research Committee of the Faculty has found this dissertation satisfactory in scope and quality and has therefore been accepted it for the degree.

.....

Prof. Kushum Shakya, PhD
Dean and Chairperson
Research Committee

Date: July 20, 2022

DECLARATION

I, hereby, declare that this dissertation is my own work and that it contains no materials previously published. I have not used its material for the award of any kind and any other degree. Where others' sources of information have been used, they have been duly acknowledged.

.....

Ramjee Prasad Pokharel

Date: 06 June, 2022

ACKNOWLEDGEMENTS

This study "Spatial Pattern, Pathways to Change, and Users' Perceptions on Public Open Spaces in Pokhara Metropolitan City" is carried out in fulfillment of the requirements for the degree of Doctor of Philosophy (Ph.D) in Geography at faculty of Humanities and Social Sciences, Tribhuvan University. I am grateful to my supervisor Professor Narendra Raj Khanal (Ph.D) for his motivation, cooperation and insightful guidance. His valuable suggestions and continuous support for guiding me on right track during the preparation of this study are worth appreciating.

Similarly, I express gratitude for the immense support of my Co-supervisor, Professor Hriday Lal Koirala (Ph.D) for comprehensively going through my dissertation and providing valuable comments and fruitful suggestions.

I owe to debt of sincere gratitude and acknowledgement to Professor Debendra Bahadur Lamichhane (Ph.D), former Head of the Department of Geography, PNC, Pokhara and my other colleagues of this Department and the members of the Central Department of Geography, Kirtipur.

I am grateful to Professor Padma Chandra Poudel (Ph.D), Professor Pasupati Nepal (Ph.D), Professor Prem Sagar Chapagain (Ph.D), Professor Vikas Kumar K. C. (Ph.D), Professor Krishna Prasad Poudel (Ph.D), Professor Krishna K. C. (Ph.D), Professor Lekhnath Bhattarai, (Ph.D), Professor Umesh Kumar Mandal (Ph.D), Associate Professor Shova Shrestha (Ph.D), Rajesh Thapa (Ph.D), Er. Badri Nath Baral, Teaching Assistance Mr. Arjun Pokharel, Mr. Yadu Pokharel, Mr. Bishwo Raj Pokharel, Mr. Dhruba Pokharel, Mr. Santosh Kumar Acharya, Mrs. Binita Pokharel and Mrs. Amrita Pokharel. I extend my thanks to Associate Professor Naresh Poudel, Lecturer Khagendra Poudel and Teaching Adjunct Rajeev Upadhaya and Dayasagar Subedi.

Likewise, I extend my special thanks to all ward Chairmen of PMC and respondents for untiringly volunteering, cooperating and allowing me to collect valuable information during the field study. This dissertation is a result of collective efforts of many individuals and institutions. Therefore, I would like to express my sincere gratitude to all of them. I extend special thanks to Mr. Netra Bahadur Subedi for his task of editing and proofreading my dissertation within a very short period of time.

Last, but not least, I am grateful toward my parents Purna Prasad Pokharel, Humakala Pokharel and my family members, my wife Sabitri Devi Pokharel, daughter Er. Pragya Pokharel, son Aayush Pokharel and niece Sabigya Pokharel for their patience and continuous support to me in my journey of accomplishing this research work.

Ramjee Prasad Pokharel

06 June, 2022

ABSTRACT

Public open space (POS) is defined as “managed open space, typically green and available and open to public”. All open spaces are referred to as public open spaces whether green, grey or garlanded by civic. Public open space is the backbone for the sustainable urban development which promotes the quality of life in many ways to the urbanites, tourists and at the same time it provides safe shelter during disaster and post disaster situations. Also, it enhances the beauty of the city highlighting the aesthetic dimensions, decorated with rich cultural and natural beauty and provides opportunity to enjoy. Hence, there is a need to explore the current status of POS in cities and compare the changes from the past to present in order to develop their prospects in the future to make them user-friendly site. Furthermore, as a matter of everyone’s interest, plans to protect, preserve, and manage the POS maximize the beauty of the area.

Review of the available literatures focuses the empirical researches on the perceptions in relation with economic value and typology of public open spaces. Several studies have also been made on urban open spaces relating with environment, economic value and impacts. There are very few studies on spatial and attribute dimensions of public open space in urban land use particularly focusing with the issues of morphological, social, accessibility, openness, sense of safety and environmental dimension of an area. In this context, the present study has attempted to understand the issues of spatial distribution and pattern, pathways and magnitude of change and drivers as well as visitor's perception and satisfaction level on POS of the urban landscape. It is anticipated that the understanding of the public open spaces in Pokhara Metropolitan City (PMC) would also help to understand the problems associated with open spaces in other metropolises, sub-metropolises and municipalities of Nepal.

The objectives of the present research are to explore the typology, spatial distribution and pattern as well as per capita of public open space; to analyze the magnitude and pathways of change and its drivers; and to examine the management of POS and the user's perception on the existing situation in public open space.

PMC, one of the fastest growing urban cities of mountain area in Nepal, has been chosen as the study area for the present research. The city is situated in Kaski district Gandaki Province. Pokhara is also the headquarters of the Kaski district as well as Gandaki Province. PMC is divided into 33 wards and almost 500 small settlements known as *Toles*. Pokhara was linked by historical trade routes as well as present day major highways such as Prithvi Highway, Siddhartha Highway and Bhupi Sherchan

Highway. The metropolitan area extends 33.8 km from north to south, 22.9 km from east to west and covering area of 464.24 km² with a population of 2,55,465 in 2011 census. The city is a naturally attractive as well as internationally renowned tourism area of Nepal.

The philosophical orientation of the present research is based on both positivist and humanistic philosophy in the process of data gathering and analysis of spatial pattern and process of POS. Qualitative data were collected through KII interviews, field observation, and/or review of documents. On the other hand, quantitative data were generated through surveys using structured questionnaires as well as various analysis on the spatial data of different sources. A reconnaissance survey was conducted to identify the existing situation. Based on reconnaissance survey POS are grouped into 32 sub-typologies and further regrouped into eight typologies. Three phases of interviews, with semi structured, unstructured and structured questionnaires were used to collect the information. Altogether, 32 patches and 770 visitors were selected as a sample through the purposive and convenience sampling respectively. Required spatial and attribute information was collected using checklist, GPS Mapping, Google Earth Pro and Cadastral Map. The analysis of spatial distribution pattern of POS was conducted using Nearest Neighbor Index and Quadrat Analysis. The descriptive method was used to compare past and present transformation of POS while visitor's perception towards POS was being tested through the Chi-Square test.

The summary of the major findings is as the following:

The total number of the POS in Pokhara metropolitan city are 275 covering an area of 2574.2 hectares which is five percent of the total area of PMC. The shapes, sizes and uses of these POS are varying in nature. The size of patches ranged from 0.02 hectares to 558 hectares. Based on spatial and attribute characteristics of POS, all 275 patches were categorized into 32 sub-typologies and eight typologies such as parks, playgrounds, religious sites, water surfaces, viewpoints, cave premises, river strips, and distinct spaces.

Due to their different nature and attractions, visitors visit different POS different purposes. Approximately 24,455 visitors visit the POS of Pokhara every day. The ward-wise number of POS varies from one to twenty-five patches and spatial pattern is clustered pattern. As the spatial distribution pattern of patches across PMC is towards clustered, not every ward resident has equal access. PMC has 62.2 m^2 per capita POS

but 25 wards don't have enough POS as per the WHO standards. Out of the total 275 patches only 162 patches cover 170 hectares of usable POS in the case of risk reduction area. During the calamities, per person only 4.1 m^2 of POS is available which is very insufficient. Similarly, there is a need to make a distribution pattern uniform among wards as well as expand the POS area for the risk reduction during calamities.

The magnitudes and pathways of change of area of POS, and its driving factors is examined based on Key Informant Interviews (KIIs) and field study. The transformation process of patches seems unfavorable for urban environment because 22 percent of POS area have been shrunk by natural factors like landslides, erosion, and flood etc. over 20 years (1998-2018) and 28 percent of patches by human encroachment. Only Pokhara stadium has been able to increase its initial size with the help of individual land pooling process by the government. However, 47 percent of patches have remained the same in terms of shape and size for 20 years. Various factors like urbanizations, natural and social factors as well as individual human encroachment have led to the decrease of POS by 0.13 percent (1.23 ha) annually in the last two decades.

The pathways of changes in the existing POS indicates for a variation among the patches. The land titled under the government (public) including barren lands, bush areas, rivers strip, water surface, open grounds, grazing land have been converted into park, playground, religious site, water park, viewpoints, changed due to urbanization process, religious purposes, community initiations and the policies of the different governments. Similarly, the POS has been changed with basic infrastructural development like footpath, shed, benches, gardening, etc. Therefore, natural and socio-economic factors are the major factors behind the pathways of change on the POS.

The perceptions of the visitors were different on the status of POS in PMC due to the variations in visitor's demographic, economic conditions and intention. Similarly, the visitors' perceived experiences on the available facilities such as accessibility, natural attraction, cultural gravity, internal layout, sanitation, safety and security, parking facilities, and surrounding environment have also played the role. The test results of the hypotheses on the perceived perception of the POS and the variables on the visitor's characteristics show significant relationship.

Furthermore, it shows that visitors have a high positive satisfaction perception on well-managed patches while patches with poor management or no management have low level of satisfaction. The analysis conducted through the perception of visitors need of

development of POS, its preservation, and to make them user-friendly. Natural attraction of most of the POS was the positive point for most of the visitors while surrounding environment and accessibility were other highly appreciated characteristics of the existing POS of PMC. There is a need for the development of basic infrastructures, work on attractive lay outing and improvement on the safety and security situation of the POS to make these POS more popular and user's friendly.

POS have provided several advantages to the visitors as physical wellbeing, mental freshness, socialization and intimacy in addition to aesthetic beauty to the Pokhara City. However, the decrease in sizes of the POS per year is a serious issue for PMC and there are urgent needs to increase the numbers as well as expand the area even by land pooling to reach to the standard of 9 square meter POS per capita as recommendation by WHO.

Finally, this study suggests to make a solid plan for proper management of POS so that it creates a uniform distribution pattern of POS among wards and citizens which could provide equal opportunities to the urbanities. Also, suitable policies need to be formulated and executed by Local Government, Provincial Government and Federal Government for better managed POS. Hence, an in-depth study should be conducted to identify the loopholes that have caused the reduction in area of POS and devise a strategy to protect them. Lastly, public participation with bottom up approach should be applied to encourage the stakeholders and making more powerful management committees at the POS.

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ACRONYMS AND ABBREVIATIONS

CBS	:	Central Bureau of Statistics
FAO	:	Food and Agriculture Organization of the United Nations
FO	:	Field Observation
GIS	:	Geographical Information System
Govt.	:	Government
GPS	:	Global Positioning System
ha	:	Hectares
KII	:	Key Informant Information/ interview
mm	:	Millimeters
MUTM	:	Modified Universal Transverse Mercator
Patan	:	Big open area
PMC	:	Pokhara Metropolitan City
POS	:	Public open space
RMp	:	Rural Municipality
SPSS	:	Statistical Package for Social Science
UN	:	United Nations
WHO	:	World Health Organizations

CHAPTER - I

INTRODUCTION

1.1 Background

Public open space is one of the most important components of urban environment. It has positive impact on the quality of life of those people living in urban areas (Nasution and Zahrah, 2012). Public space interventions have the potential to contribute to the progress of numerous agenda of 2030 goals and targets; that is to say, they are not limited to Sustainable Development Goal (SDG11) on sustainable cities only (Kristie, 2015). Public open space is an urban place that is generally open and easily accessible to people.

The term 'open space' was first used in 1833 by a committee in a "public trial" in London (Maruant and Amit-Cohen, 2007). But 'Metropolitan Open Space Act' made in London in 1877 and then in 1906, defined "open space" pertains to any land, whether enclosed or not, on which there are no buildings or of which not more than the one-twentieth part is covered with buildings, and the whole or the remainder of which is laid out as a garden or is used for purposes of recreation or lies unused and unoccupied (Open Space Act, 1906). Similarly, Wang and Gao (2012) have defined it as any land, less than five percent of which is occupied with buildings. Open space is described as any patches of land that is undeveloped and has no building structure on it. It is an integral part of the city. Ward Thompson (2002) defines 'open space as a place in the city where cultural diversity intermingles with the natural process and conserves memory'. He further elaborates it as an outdoor room to relax and enjoy the urban experience, a venue for different activities such as outdoor eating, entertainment, sport and play areas, a venue for civic or political functions and most importantly a place for walking and sitting-out. In terms of physical perspective, open space is defined as land and water which is located in the urban area, but not covered by buildings (Gold, 1980 and Cranz, 1982). Hence, urban open spaces are an important part of the urban landscape with its specific function. It promotes the quality of urban life in many ways (Burke and Evans, 1999). Urban open spaces are an inseparable part of the urban landscape because the city is a space that first delineates its shape, and then shapes us (Perovic and Folic, 2012). So,

urban public open space (POS) is a human produced space in urban areas (Lefebvre, 1991).

In a broader sense, open space can also be considered as something wider and more all-encompassing, namely as the continuous matrix of all unbuilt land in urban areas – public parks as well as private gardens; urban streets as well as city squares (Sthale, 2008). The Metropolitan Toronto (1976, p.3) defined open space as,

> "All urban land and/or water open to the sky . . . that is subject to management limitations, access to freely chosen activity and/or visual explorations and which provides service for man and nature in an educative, aesthetic, productive and recreation capacity".

Etymologically, the term "public" is originated from the Latin and it refers to a relationship between people, society, and the municipal. Public is defined as the opposite of private, and so public space is often defined in terms of its distinction from the private realm of the household (Madanipour, 2010). Public open space is defined as "managed open space, typically green and available and open to all, even if temporally controlled" (Carmona, 2010). Urban, open public spaces, therefore, have usually been multipurpose spaces distinguishable form and mediating between, the demarcated territories of households" (Madanipour, 2003).

However, there is a lack of consensus in definition of public open space (POS) in the literatures. Swanwick, Dunnett and Woolley (2003) described POS as a combination of green spaces and civic gray spaces as the part of urban land that contributes positively to its amenity and urban landscape. All open spaces which are publically accessible are referred to as public open spaces whether green, grey or garlanded by civic. Walzer, 1986 and Woolly, 2003 defined public open space as the space for politics, religious purpose, commerce, sports, space for peaceful, coexistence and important encounter.

Landscape of urban open space is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors (Council of Europe, 2000). But most of the analytical reviews of urban open space mention that public open space is accessible place for all people within the urban area. Urban spaces are expected to function not as an isolated unit but as a vital part of the urban landscape with its own specific set of functions (Urban Task Force, 1999). Public open spaces are

all publicly accessible sites comprising streets, parks, gardens, urban small forests, etc. as well as non-developed parts of public facilities which are open for free public use (UN-Habitat, 2018). Public open space represents land commonly known as a park, reserve, esplanade reserve, beach, or civic area, and also includes those land areas acquired for flood protection/water quality purposes which have recreation potential (Manukau Operative District Plan, 2002). Similarly, urban public open spaces are defined by Swanwick, Dunnett and Woolley (2003) as "a mixture of public (or civic) and green space, where public spaces are mainly 'hard' spaces such as squares, street frontages and paved areas".

As the concept of cities began, the importance of urban open space has been recognized. The definition of open space has been changed as well as form, function, and relationships have also been changed in time. In the past, open space had been taken as negative form as an area for the non-building. However, open space is considered as the positive elements as well as supplementary of urban growth (PAS, 1968). Woolly defined it as:

> "Open space is an essential part of the urban heritage, a strong element in the architectural and aesthetic form of a city, plays an important educational role, is ecologically significant, is important for social interaction and in fostering community development and is supportive of economic objectives and activities. In particular, it helps reduce the inherent tension and conflict in deprived parts of urban areas of Europe; it has an important role in providing the recreational and leisure needs of a community and has an economic value in that of environmental enhancement" (Woolly, 2003:1).

Public open spaces are those that are accessible to all and used for the purpose of meeting among the group of people and also for the recreational purpose which is the prior characteristics of public open spaces (Khan, 2014). The importance of POS increased its aesthetic views and social activities. Socio-economic change can be understood through changes in urban space organization (Harvey, 1973; Lefebvre, 1991). Three major trends in urban space transformation are 1) fragmentation of urban fabric and deterioration of public space 2) the privatization of public space, and 3) renaissance of such spaces (Carmona, 2010; Landman, 2016; Madanipour, 2019). UN-Habitat (2011) considers public spaces "a vital ingredient of successful cities" and the

places in a city that build a sense of community, culture, social capital, and community revitalization. It has also changed by management practices. Therefore, public open spaces are one of the major elements of the urban area. These are essential for the purpose of different public functions, recreational and leisure activities of the city dwellers.

Though environmental and spatial benefits seem to be obvious the economic dimension of urban public open spaces is still not widely recognized (Woolly, 2003). Open space amenities such as trees, water, parks, etc. are the evidence of higher real estate values which can also be described by property taxation (Luttik, 2000, Carmona, Heath and Tiesdell, 1995). Lynch's theory (1981) puts emphasis on the eligibility as the most important factor in evaluating and designing high quality urban public open spaces.

But, the urban area's intensive and diversified land use pattern is indirectly guided by open space as well as cultural heritage. Urban land use pattern is quite complex because of manifold use of land. So, public open spaces are essential for urban life. Due to various factors such as high density, traffic congestions, etc. city centers and sub-center areas are congested and overcrowded. Around the world, most of the urban land use practices are more complicated due to its functional value as well as land value. Several attractions and opportunities are available in the city thus; more people want to live in an urban areas. The trend of migration of people from the rural area to urban area has consequently created congestion (Madanipour, 1996). In that respect, providing people with new public spaces, where they can feel invited, welcome and safe, can encourage them to spend more time outside and foster interaction among lower income communities (Bisat, 2016). Therefore, it, directly and indirectly, raises the value of POS for the urban people as well as commuters.

Public open space is generally fluctuating. It has been decreasing with infrastructure development by publicly and individual encroachment (Adhikari, 2004). Different types of public open spaces are shrinking in size because of the increasing human encroachment of POS for outdoor activities (Nicol and Blake, 2000).

Due to natural as well as anthropogenic causes the magnitude of change of patches of POS are taking place differently. Open space has a dynamic nature and its change depends on over a period of time, the sequence of land cover types, the magnitude by

natural and cultural types (Watson, Luck, Spooner, and Watson, 2013). The pathways of change of POS are different from barren land to open space, grassland to open space and agriculture area to open space and so on. The magnitude of change of patches is mainly determined by various natural as well as anthropogenic factors. Its changes are often seen as a function of biophysical and socio-economic factors that are referred to as the driving factors of land-use change (Thomas, 2008). Most landscapes or urban spaces are affected by five major groups of driving factors which are named as socioeconomic, political, technological, natural, and cultural (Burgi, Hersperger, and Schneeberger, 2004). The changing face of the public open space is an indicator of the changing social, economic and cultural face of the city (Villanueva, et al., 2015). Public space seems to be driven by the desire to ensure that spaces are safe, lucrative, predictable and, all in all (Galic, 2017). POS is a space bearing natural as well as cultural characteristics. Human–human and human-nature interactions in the POS play a vital role in the sustainable environment in city life (Omar, Ibrahim, and Mohamad, 2015).

Most of the analysis and empirical evidence strongly suggests that public open space has a positive impact on the urban development process and environs that results on recreational, social inclusion, cultural attraction, health wellbeing, beautification of urban surrounding, commercial performances enhancement and so on (Woolly, 2003). Furthermore, public spaces create livable communities and facilitate the enjoyment of the higher-density neighborhoods typically found in cities.

Open space and recreational activities improve the physical and mental health of urban residents (Francisco General Plan, 2010). It can play a vital role in providing entertaining opportunities that helps reduce mental stress and overall cost of health. It is the main source of fun, stimulation, refreshment and recurring insight for people in PMC. People have taken active and passive recreations from the available open space like a park, playground, religious sites, water surface, etc. The level of perception depends on people's or visitor's nature of interest. Because urban life is quite busy, people there feel mentally and physically tired. Therefore, they compel to seek a recreational site for their recovery. So it has become necessary for well-being from the urban busy life. People enter open sites for its pleasant environment and peaceful nature

The management of open spaces varies according to ownership, spatial location and authority (Islam et al., 2015). Immigration from rural to urban areas of the city and alterations in economic and social structure rise the rapid expansion of urban areas results in a dramatic change in the open space system of town (Esbah and Deniz, 2007). So pathways of change and changing process occurred continuously. Urban planning, design guidelines and new management practices have radically transformed the using pattern of urban spaces (Mandeli, 2019). POS is an important in urban land use. It plays significant role to urban morphology and maintains urban gorgeousness. Due to its valuable contributions geographers, urban planners, and architects should pay attention to study the existing situation, magnitude and pathways of change, changing drivers', and users' experiences for development of POS.

In the context of Nepal, a study has been carried on the POS of Kathmandu city which shows the change in open space due to the community management process but the transformation of POS offers challenges in terms of management and the quality of neighborhood social life (Chitrakar, 2015). However, the processes of change and driving factors of POS in Pokhara and other cities of Nepal are rearly studied. It is in this context, this study is proposed aiming to understand the spatial pattern, typology, pathways and magnitude of change and drivers, and user experience toward the POS in Pokhara Metropolitan City.

1.2 Statement of the Problems

Public open spaces are an integral part of the city life as it provides physical and mental satisfaction to urban people and other visitors. POS also provides an opportunity to utilize the leisure time that people manage from their busy schedules for entertainment. POS is also important for political, religious, and economic activities as well as the socialization of urban people. It is also considered a safe shelter during natural or human-caused disasters and post-disaster situations. POS is important for the shelter during the disaster. An example can be taken from the 2015 earthquake.

POS is the source of environmental, economic, and spatial benefits which provides a high quality of urban life (Carmona, et al., 1995)."Open space is the window to a city's soul" (Zukin, 1995). Open space is a public living room for the locality (Council of

Europe, 1986). Public open spaces provide ecological, socioeconomic, recreational opportunities, etc. in the urban area.

Public open spaces are the heart of democratic living (Carr et al., 1992). WHO suggested that the availability, accessibility, quality, and security of public green spaces may vary in metropolitan regions, this so-called green environment is one of the indicators of healthy cities (WHO, 2012). It also helps to maintain quality of city life for sustainable development in the context of climate change, noise reduction and air filtrations (Barleant, 2005). It is essential in an urban area because it gives structure, shape, and form of the city as well as aesthetic appearance of the city because people are seeking eye catching scenario in urban areas. It is a site for social benefit, aesthetic value, psychological comfort, economic opportunities, structural development, ecological process, and recreational opportunity. Therefore, adequate sites and spaces of POS are essential because they play a vital role in the functioning of the urban system. Likewise, it helps to keep the urban environment in an equilibrium situation for the future.

Carmon et al. (1995) has described that open spaces have distinctive characteristics for democratic activities, also a healthy environment so that people get the opportunity to mix the degree of choice. Because the attractive dimensions of POS easily grasp people's leisure time. It also helps to maintain the quality of life and sustainable development of cities. In addition to helping to achieve the cities' goal, public spaces have the potential to contribute to progress across other development goals. Public spaces are the "workplaces" for many informal workers, and also been used as streets, local public markets, as well as to sell food, clothing and other items (Kristie, 2015).

According to WHO and adopted by the publications of FAO; a minimum of 9 sq. meters' open space per city dweller is required which is also international minimum standard. Currently, developed countries have tended to adopt a general standard of green space of 20 sq. m park area per capita (Wang and Gao, 2012). Being a social space it is interconnected with peoples' attitude. Madanipour (1996, p.34) argued for further sustainable use.

"Where the patterns of behavior in the city can be analyzed in relation to the symbolic processes, the meaning of the environment, and the relationship of the individuals with others in public open spaces and with their environments".

Various studies have been carried out from different perspective highlighting particular usage of POS. Studies like the tragedy of the commons science (Hardin, 1968), urban open space in the 21st century (Ward Thompson, 2002), social ecological analysis of the loss of public properties in an urban environment (Adhikari, 2004), visual perception of public open spaces (Perovic, and Folic, 2012), public space and sense of community (Chitrakar et al., 2016), signifies the overall importance of POS. Similarly, recreation planning and design (Gold, 1980), open space management (Islam et al., 2015) such studies highlightes the importance of maintaining the POS. Furthermore, studies like study of open spaces in the context sustainable use (Khan, 2014), open space evaluation methodology and three dimensional evaluation model as a base for sustainable development tracking (Cafuta, 2015), maintaining the better urban environment and protect cultural heritage (Wang and Gao, 2012) helps to maintain city environment. However, this study focuses on spatial pattern, pathways to change and users' perception of PMC which helps to preserve these POS for beautification of city as well as human well being.

The urban green space has been changed regularly by their driving forces (Kong and Nakagoshi, 2005). Due to urbanization its pathways of change and impacts, public spaces have failed to meet people's everyday needs and aspirations (Mustard, Defries, Fisher and Moran, 2004). Therefore, POS areas are decreasing due to increasing aspiration of city life, livelihood opportunities that caused migration of rural people to city area. Due to the need of development of basic urban infrastructure in order to accommodate the migrating people, POS areas have been decreasing. On one side its size and area is decreased by different causes and on the other side some patches areas are reduced by urbanization such as road extension. So, the required minimum size of open space has been reducing and quality of life of people has been affecting negatively. There are different types of public open spaces in urban area and they are used for several purposes such as recreation, socio-economic, religious, political, disaster risk mitigation, and thus they are very important.

Due to unplanned urban growth those public open spaces are disappearing, decreasing in size, and deteriorating in quality of environment. However, there is very limited research on the dynamics of public open space. Similarly, its management aspect plays important role to change the sites. Likewise, user's attitude towards the POS is also more significant because it is the source of feedback for further development to make patches attractive and visitor friendly. But there are very few studies carried out on public open space in Nepal. However, such studies are considered indispensable for the development of infrastructure under urbanization for improving living standards, expansion of settlements, for recreational, social, economic, religious and political activities and shelter during various calamities etc. On the other hand, as an integral part of urban land use it has been managed and changed by various driving forces with different process or pathways at the initiative of the local community, municipal and the government. Though POS occupies an important share of the urban area, not enough study has been done yet. Not a single study has been carried out on the public open space in Pokhara Metropolitan City (PMC). The national urban development strategy (NUDS, 2017) of Nepal recommended that urban area should manage 60 percent built up area and 40 percent green and open space. But there is no any detail study about existing situation of POS, its changing pattern, driven factors and user perception toward the POS in PMC. Therefore, this study has been set to explore its typology, distribution, pattern, magnitude and pathways of change as well as to understand on driving factors of changes for POS and perception of visitors for the efficient management of POS in the future. In this context, it is envisaged that this study will play an important role to fill the knowledge gap on POS in PMC as well as other urban areas of the country.

1.3 Research Questions

The role of POS is highly important in urban area yet the understanding on the dynamics, its drivers, perception and management in the context of Nepal has not been researched properly. Therefore, the following research questions are formulated in the context of present study for exploring and studting the POS.

1. How are the public open spaces distributed geographically in Pokhara Metropolitan City?
2. What are the typologies of public open spaces?

3. What are the magnitude and pathways of change of POS in PMC?
4. What are the driving factors for such change?
5. How are the public open spaces managed?
6. How do users/visitors perceive public open spaces?

1.4 Objectives of the Study

The main objective of this study is to explore, analyse the spatial distribution, magnitude and pathways of changes and user's perceptions on the public open space in Pokhara Metropolitan City. The specific objectives are as follows:

1. To explore the typology, spatial distribution and pattern as well as per capita of public open space in Pokhara Metropolitan City;
2. To analyze the magnitude and pathways of change as well as its drivers; and
3. To examine the management of POS and the user's perception on the existing situation in public open space.

1.5 Significance of the Study

Public open spaces have noticeable importance in the life of the settlements (Balogh and Tracs, 2011). Pillay and Pahlad (2014) concluded that these public open spaces provide a range of benefits to communities in the form of recreation, education, relaxation and an esthetic appeal. In this context, the present study attempts to provide facts and figures about typology, spatial distribution and pattern as well as magnitude and pathways of change together with its drivers within an urban area located in mountain and hill ecological region of Nepal.

As the present study attempts to provide information about magnitude and pathways to change, and driving factors to bring change to POS that creates rapid urbanization situation in PMC. It could help planners and ecologists for future planning as well as to prevent encroachment and better management in PMC and others cities as well. There is no doubt that only after the proper understanding of the existing condition of POS, its changes over time and drivers the future intervention for sustainable city growth could be developed.

To make user friendly management of POS it becomes necessary to examine user experiences whose outcome might be milestone for supporting feedback to POS of other cities. Such understanding is necessary to develop strategies for planned development of a city. Therefore, this study could be beneficial to make cities sustainable, sound and attractive. It is hoped that the spatial planners, policy makers and architectures would be benefited from the findings of this study and could develop strategies, policies or activities for making city enlivening. The findings of this study also could help to develop strategies for utilization and management as per demand of visitors' which is prominent factor for future sustainable urbanization.

1.6 Hypothesis

The following hypotheses on the spatial distribution pattern and satisfaction of the visitors on the existing situation of POS have been formulated.

1. There is uniform distribution pattern of POS in PMC.
2. There is statistically significant association between age and satisfaction of the visitors on the existing situation of the POS site.
3. There is statistically significant association between gender and satisfaction regarding the situation of the POS site at present.
4. There is statistically significant association between caste groups and satisfaction regarding the situation of POS at present.
5. There is statistically significant association between education and satisfaction regarding the situation of POS at present.
6. There is statistically significant association between occupation and satisfaction, regarding the situation of POS at present.

1.7 Limitations of the Study

The relationship between land use of urban public open spaces and its spatial and attribute dimensions is a complex process. Therefore, the present study may not cover and address all the issues concerned to the public open space. This study is constrained by the following limitations:

The present study focuses on those sites where public access is always available and open to everyone. Hence, it does not cover the private and government or community

forest area, streets in Pokhara metropolitan city which are also considered as open space by definition. Similarly, it does not include the areas such as schools, hospitals, airports, waterworks, military bases and private ownership or vacant lands in private ownership which were identified as open spaces by the study of UN-habitat (2015).

This study is based on a one-year survey period and GIS tools are applied for mapping the POS creating point, line and polygon features of objects. Though there are various sized POS in PMC, only the public open spaces greater than 200 square meters in area have been considered for this study due to the cartographic limitations. Similarly, only one sample has been considered from each sub typology of POS to collect the detail information needed for the research. Regarding the POS visitors, no information was collected from the child (below 14 years of age) visitors.

The intent of the study is to understand the spatial distribution of POS sites by mapping the existing POS patches in the first, developing the typology according to their attributes in second, select minimum one site from the sub- typologies to explore and understand the changing process and visitor's interviews in third and finally, eight parameters have been used to analyze the perception towards the existing situation of sample patches in order to improve the quality of the public open spaces.

1.8 Operational Definition of Key Terms

Active recreation: Refers to activities such as team sports or organized sports with facilities, which require the alteration of the landscape.

Dimensions of POS: An aspect or feature of POS.

Driver (s) and driving factor (s): Synonym to refer the exogenous condition and control the dimensions of pathways, magnitude and pace. The driver is the study including all underline factors responsible for change of public open space.

Estimation of the total public space: The total areas of public open space within the defined urban boundaries.

Landscape: Landscape of urban open area is "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe, 2000 p.4).

Magnitude of change: The extent or amount of change whereas pace refers to the rate of change.

Manage POS: Refers to available provision in POS with drinking water, footpath, toilet, bench, parking, compound etc.

Natural open space: Defined as natural land left in its natural environment; it often includes wetlands, steep hillsides, environmentally sensitive areas, creek and river corridors, and woodlots.

Park: A specific-use open space area that is managed to provide opportunities for recreation, education, cultural or aesthetic use.

Passive Recreation: Refers to activities that are more of an individual activity rather than a team activity, they usually are non-motorized, non-commercial, and non-competitive requiring little to no alteration to the natural landscape i.e. walking.

Pathways: Simply refer to way of direction of change from one category of patches of public area that has changed to another category through the natural and anthropogenic process. Here the term pathway is limited to indicate only of the direction and process of change in terms of public open space.

Pattern of open space: Internal pattern of an open space in a city boundary. It includes the arrangement and layout of amenities road, accessible, and activities on space. It focuses on the morphological (functional) situation of open spaces and interrelationship within the metropolitan inhabitant. The most common of these terms include spatial distribution pattern of public open space.

Popular open space: It refers to those POS which is widely liked or well known or admired by a lot of people's sites.

Poor manage POS: Refers to provision situation in sites where hardly usable.

Well manage POS: Refers to available provision in POS with drinking water, foot path, toilet, bench, shades, gardening, children playing site, parking, light, compound etc.

Process: A process is a set of interrelated activities that interact to achieve a result. It refers to magnitude and pathways of change and driven factors for modification of open

space from previous sate such as grass land, barren land, agriculture land etc. that have been changed functionally as well as naturally and are recently used as POS.

Public open space: Simply refer publically accessible amenity urban space including park, playground, Religious site, water surface, viewpoint, cave, river srip and distinct space of the city.

Recreation: The activity that a person takes part in for pleasure or relaxation outside of the workplace. Recreation has different meanings to people, for some, it is the physical activity of hiking, climbing or playing soccer, for others it is the intellectual activity of studying nature through bird-watching or photography. Both parks and open spaces provide for active and passive recreational opportunities respectively.

Spatial dimensions: Spatial dimension is the study of how spatial units are distributed across the landscape.

Spatial form: The geometric shape of the spatial objects.

Spatial distribution pattern: The arrangement of individual object in space and geographical relationship among them.

Typology: Micro-level grouping of POS patch types based on function, form, and scale or according to POS characteristics.

Urban open space: Urban areas of protected or conserved land on which development is indefinitely set aside.

Ownership: Refers to the relationship between the use and land rights of POS.

1.9 Organization of the Dissertation

The dissertation is organized in eight chapters. The first chapter deals with the introduction of the topics that comprise of background, statement of the problems, research questions, objectives, hypothesis, significance, limitation of the study, and definition of key terms.

The second chapter presents literature review and develops a theoretical framework for investigating the existing POS. It examines the spatial pattern, pathways, magnitude of changing process its driven forces, and visitor's perceptions over POS.

Chapter three explains the research methodology applied in this study. This chapter focuses on development of typology based on the objectives of this study. Qualitative and quantitative information is used for inventory of patches and identify driving factors to change. The integrated research methodological frameworks are presented in this chapter.

The fourth chapter introduces the study area. Natural conditions, spatial and cultural dimension of urban land use of PMC are linked to POS.

Chapter five, six and seven collectively illustrate the result and discussion section of the research. The fifth chapter discusses on the typology of POS, analysis of spatial distribution pattern, dimension of POS and per capita POS.

The sixth chapter analyzes the forces that bring change in the POS and its existing condition. This chapter also covers the driving factors with changing process on the basis of sample POS.

Chapter seven presents the result of the case study survey data and tests of hypothesis. It also consists of the visitors' perception towards the POS which belongs to the third objective of this study. The analysis focuses on the general background of visitors and their perception and model formation on the basis of visitors' approach with relation to formulated hypothesis.

Chapter eight is the summary of major finding and conclusions of the study.

CHAPTER – II

LITERATURE REVIEW

This chapter is the review of the theories and relevant literatures that emphasize the typology, and people's perception and management of open space. The appraisal of literature is accomplished through the exploration of the series of internet databases and the studies of published journals, articles on the internet, books and unpublished thesis. Attempts have also been made to review the issues of research methodology and findings from the literatures.

The first section briefly presents the review of concept and theories on the research issues. The second section examines the different dimensions of the POS. The empirical studies about typology of POS, magnitude and pathways of change and user perceptions are scrutinized within third section. The management approach of open spaces is reviewed in the fourth section. The fifth section highlights the relevant open spaces study in Nepalese context. The sixth and seventh section highlights the research gap and conceptual framework of the study.

2.1 Review of Concepts and Theories on the Research Issues

Public open spaces can be studied through different approaches such as theory of spatial pattern and process, place making approaches, dimensional approach and typological concept. The brief discussions of these approaches are given below.

2.1.1 Concepts and Theory of Spatial Process and Pattern

Theories and models are very important for representation and generalization of reality in simple forms. But urban land use pattern has increased in complexity in the real world. However, some model and theories have been developed regarding the urban land use. Generally, urban area has different types of land use such as residential, commercial, agricultural, transportation, recreational etc. Among them POS is known as recreational site of urban land use which is an important land use category in urban area.

Von Thunen (1826) was the first person to recognize the grading of land use intensity on the basis of bid rent function under the assumption of a homogeneous plan. He

focused on transportation cost which is a crucial variable in the distribution of land use zones. However, he does not consider sizes, functions, and recreational zone in a region.

The central place theory of Christaller (1953) explains the spatial location, distribution and service providing activities in the urban area. In this theory, Christaller observed the spatial pattern of the distribution of central places which was based on major function or urban characteristics. Christaller focused on the spatial arrangement of central places in order to provide services to the region which develops as a hexagonal pattern. Settlement of central or higher order central places provides higher order goods and services than lower order central place that provides lower order goods and services. This theory attempts to explain the reasons behind the distribution pattern, size, and number of towns in terms of market principles, traffic principles, and administration principles in the urban regions.

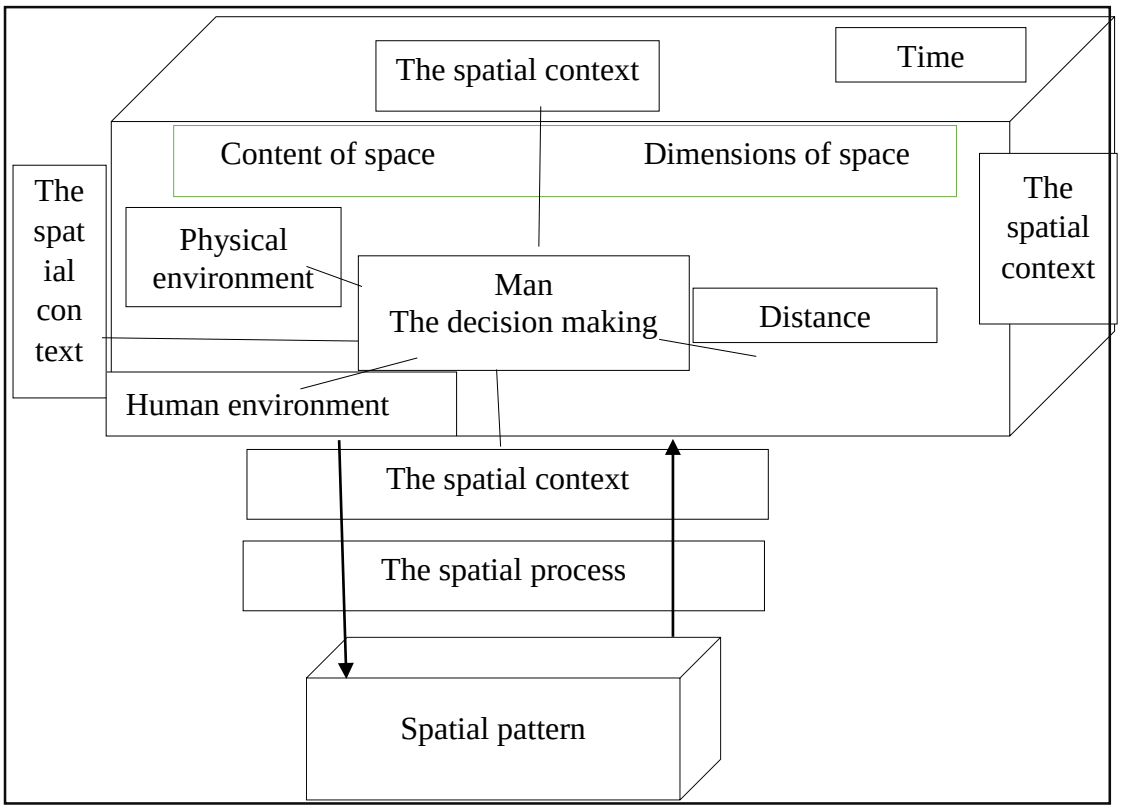
Losch (1954) support the hexagonal pattern of Christaller's central place theory but in different way. Losch focused that the actual pattern is not necessarily a neat hierarchy for centers with the same rank because central area is specialized by functions which can vary. Similarly, high order centrals do not automatically conduct all functions of lower order to peripheral small-town center. So, Losch focused on Economic Landscape in which a city rich sector and city poor sector in the distribution of central places depends on purchasing power of people and population density where the size of higher order central does not remain constant. It is changed due to the population density, accessibility, political influences, marketing system and so on. It is useful theory to measure reactive importance of market central hierarchy.

Abler, Adams and Gould (1972) in their book entitled "Spatial Organization: The geographer's view of the world" concerned with spatial structure and process, that focuses on the location and spatial interaction, diffusion process, or decision process. The location of human activities and spatial interaction are examined at the macro level with industrial, agricultural and social processes and resulting patterns are analyzed. They emphasized that the spatial organization and the decision process play vital role to change the spatial pattern of a geographical unit. They suggested analysing the spatial structure and process at the micro level where individual spatial decisions could be examined in the normative and descriptive framework. Spatial organization is a knowledgeable initiation for theoretical concept of geography and serious effort has

been made by the authors to clarify concepts related to spatial structure and organization of geographical space. The POS is spatial unit resulting spatial interaction and process of human decision in urban area.

Chapman (1979) developed a conceptual framework on people, pattern and process where he argues that the spatial pattern of geographical objects, it's from and structure changes landscape pattern. Several factors play major role to change its situation specially the spatial pattern of space is influenced and changed through the human decision or level of desire to operate by stakeholder in different time and scale. It indicates that spatial pattern is also determined or is a by-product of stakeholders' decision.

Figure 2.1*: Conceptual framework about people, pattern and process.*



Source: Adopted from Chapman (1979)

The content of space and its dimensions is operated by human decision based on physical and human environment. However, spatial pattern and process are found interdependent but space and time combination adds more of a meaning for spatial process over different kinds of landscape. He introduced a conceptual framework regarding the human decision, spatial pattern and process (Figure 2.1).

2.1.2 Concepts/Theories of Open Space Dimensions

Open space may have various dimensions which guides in planning and using pattern. Available concepts and theories of open space dimensions have been reviewed under the subheadings such as spatial, social, religious, accessibilities, aesthetic and emotional dimensions.

2.1.2.1 Spatial Dimensions

Spatial dimensions of objects are defined as an ontological base because all things locate spatially and socially in the globe. POS is spatial unit of urban social production which can be changed socially (Lefebvre, 1991). Alle (2012) indicates that spatial dimensions of public open space can be set into a vertical and horizontal dimension. Vertical dimension is concerned with physical characteristics of space, visibility, relation to site, place cognition, and horizontal dimensions refers to its link, walking way, surrounding space and spatial process. Generally, dimension shows spatial properties of space such as length, area, and volume of open space.

Cho, Poudyal, Hodges, and Tonn, (2008) conducted a study on valuing diversity and spatial pattern of open space plots in urban neighborhoods of Roanoke city of Virginia, USA. Researchers applied the hedonic price model and it is analyzed that there are several shapes and sizes of open space in an urban area. But people prefer to buy a plot around the square and smooth straight of open space area plots than complex shape due to its high land value.

Wang and Gao (2012) in a paper entitled "rethinking accessibility in planning open space argued that the accessibility of open space is very essential because it contributes to community wellbeing. The paper illustrated the relationships between public open space and accessibility through the integrative theoretical framework and two variables - social-psychological accessibility and perceived accessibility. The emphasis of the study is to integrative model and behavioral model for POS planning. POS contributes a healthier urban lifestyle, but to measure the accessibility is more complex. However, the study suggests open space accessibility is difficult to measure only from the base spatial dimensions' model and peoples' perception. Therefore, they used spatial dimensions and non-spatial dimensions. The spatial situation such as transportation facility or its attractiveness is not enough to describe its dimensions. Its spatial elements

(location, shape, size) and non-spatial (having the character of space) factors play a dynamic role to illustrate its dimensions. It is important to note that factors like near to the residents, transportation facility, peripheral situation, and urban core, etc. does not measure the accessibility of open space. Mostly it depends on people's attitude and their behaviors too. Thus, it can be inferred that its dimensional situation cannot be determined with a single objective.

2.1.2.2 Social Dimensions

Soltanian and Mohamnadi (2015) in their study outlines that urban public open spaces are available for everyone regardless of race, age, and gender representing social space for citizens and society. Alle (2012) outlined that the social dimension is related to open space recognition or its creations by people. He focused that social dimensional phenomenology is the perception of people, awareness, understanding, raising public awareness, understanding dialogue, engagement, interrelation, reaction, etc. found on open spaces. Rendell (2006) highlighted that the public open space is a place of exchange between the producer and the user, the viewer and occupier, the artist and architect by distinguishing collaboration, social sculpture and walking. Thus, social dimension can be idealized through the various characteristics taking place in POS. Morris (2003) indicated that public open space is an outdoor place where social interactions, outdoor recreational activities, and quality of life are ensured. Thus, it helps to create opportunities to meet new people and to make new friends.

More recent research outlines that social interaction and friendship is promoted in public open space by ritual attitude (Kathiravelu, 2013). The study further suggests that friendship and socialization have been significantly increased among them who come from different communities. Urban POS firstly revels to physical space and its meaning might be completed creating social interaction by urbanities

2.1.2.3 Religious Dimension

Spaces are also analyzed from the religious dimension. "Religion is the feelings, acts, and experiences of an individual's in their solitude, so far as they apprehend to stand in relation to whatever they may consider the divine" (James, 2009). From dimensional perspective, Smart (1969) mentions that religion possesses six dimensions such as ritual, mythological, doctrinal, ethical, social and experiential. Religious place includes

both spiritual and social dimensions making every member feel free from sin. Studies in the past show that most of the public open spaces are not encroached due to the religious values and fear of sin has been helped religious sites being conserved (Adhikari, 2004). This belief system itself act as a protector of the public properties.

2.1.2.4 Accessibility Dimension

The accessibility is dichotomized such as physical accessibility or locational accessibility and ownership to use accessibility. Ownership is main characteristics of POS because it should be out of tragedy of commons (Hardin, 1968) and it provides full right to everyone to use. It also highlights that the value and importance of public open space are determined with its accessibility and accessibility is the ability to reach a place with respect to another. Furthermore, accessibility is defined as the measure of the capacity of the site to be reached or to reach a different location (Rodrigue, 2009). In addition, accessibility is the quality of circulation, space connection and access right to the people along with space visibility.

According to Wang and Gao (2012) accessibility is determined by four main categories of dimensions which are enlisted as, physical dimensions (proximity, transportation, walkability, number of open space), knowledge dimensions (information about open space and activities), socio-personal dimensions (safety, shared activities, financial affordability, lifestyle, leisure time, ethnic/ cultural groups), and democratic dimensions (open to all). They focused on the relationship between accessibility and using the pattern in the context of urban open space.

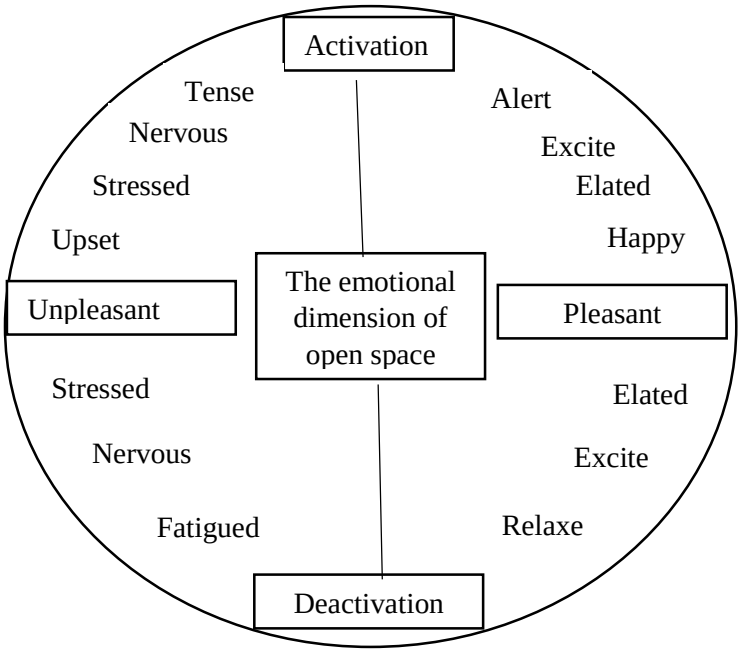
2.1.2.5 Aesthetic Dimension

A landscape should please the eye. Open spaces have many aspects, each and every aspect has its own attraction. The scenery of open space depends on its recognition through iconic dimensions. Similarly, the visibility dimension is an indispensable part of an aesthetic view. The spatial and attribute quality of an object can be assessed by the idea of the aesthetic potential function of an object and vice versa (Dewy, 2005).

2.1.2.6 Emotional Dimension

Eberhard (2007) discusses the properties of open space with emotion. He has described that emotion is the result of our consciousness unless theorization of feeling and people are aware of having emotions. According to Russel (1980), the emotional dimensions is categorized into pleasant and unpleasant senses (Figure 2.2).

Figure 2.2: *Emotional dimensions of open space*



Sources: Adopted from Russel's Circumplex model of emotions, (1980).

The essential components of the emotional dimensions of open space can be recognized as a recreational perception but sometimes it can create an unpleasant situation for an individual or in social life. Nevertheless, unpleasant situations can also be lessened by attractiveness and well management of public open spaces.

2.2 Review of Empirical Literature on the Research Issues

Attempt has been made in this section to review available empirical literatures regarding typology, changing pattern, and user perception etc.

2.2.1 Typology of Open Space

Typology is a theory of classification and combination, which is used to describe a group of objects according to the similarity of form and structure (Wang et al, 2005).

The first attempt to formulate open space typologies in modern urban studies is based on morphology (Moore and Golledge, 1996; Cavanagh, 2002). Carmona (2010) focused on the relation between urban space and social relationships, cultural norms, class formation, and political-economic power as the guided factors for open space typology. He has outlined 20 types of open space categories within four typologies on the issues of management and privatization. He focuses on positive, negative, ambiguous and private open space but claimed that these typologies are difficult to apply in multiple cultural urban contexts.

Stanley, Stark, Johnston and Smith (2012) delineates seven typologies of open spaces on the basis of mix of form, function, scale and land cover in the modern urban area. Regarding the typology, much of the theoretical work on the social, economic, political, religious significance of open spaces suffer from the lack of specificity on the spatial configuration, scale, and function. On the other hand, they argue that the development of a typology of open space can help in understanding the relationship between the physical form of the public open space and the functions it provides. Typology represents the type of open spaces regardless of inner characters of them. By using the typological process, the concept mainly focuses on the type of spaces such as squares, plazas, atrium, indoor, marketplaces, streets, residential, parks, markets, and so on (Carmona and Wunderlich, 2013).

According to Carr, Francis, Rivlin and Stone (1992) open spaces are shaped by three factors of forces: social forces (Social life and society), functional (basic needs of society) and symbolic forces (formal setting) which focuses on the typology of open space that can be classified as public parks, squares, plazas, memorials, playgrounds, community open spaces, greenways, and linear parkways, urban wilderness, neighborhood spaces, and waterfronts.

Woolly (2003) tried to justify that the domestic urban spaces were physically related and closely positioned to the user home and socially are used primarily by the family, friends, and neighborhoods. Similarly, neighborhoods open spaces are not directly connected to the home. Civic urban open spaces are those that are established within the urban context and physically far from home which mostly uses a different part of the city dwellers. She has classified open space into three types- domestic, neighborhood and commercial civic land. As per her study, open space typology is illustrated in Table 2.1.

Table 2.1: *Open space typology by woolly*

Typology	**Sub-category**
Domestic	Housing
Urban open spaces	Private Gardens
	Community Gardens
	Allotments
Neighborhoods	Parks
Urban open spaces	Playgrounds, Playing fields and sports grounds
	School Playgrounds
	Streets, City farms
	Incidental spaces and natural green spaces
Civic	Commercial- squares, plazas, water features, office
University	grounds, Health and education- hospital grounds,
Urban open space	campuses, courtyard, roof gardens
	Transportation- ports and docks, transport and waterway corridors
	Recreational- woodlands, golf courses.

Sources: Adopted from woolly, 2003

Similarly, Francis (2003) developed a typology on open space with a different form of public life. Accordingly, Francis classified 12 categories and twenty-four subcategories of open space (Table 2.2.).

Table 2.2: *Francis's open space typology model*

Typology	**Sub-category**
Public Parks	Public/ Central Park
	Downtown Park
	Commons
	Neighborhood Park
	Mini/Vest- pocket Park
Squares and Plazas	Central square
Memorials	
Markets	Farmers markets
Streets	Pedestrian side walks
	Pedestrian Mall, Transit Mall
	Traffic Restricted Street
	Town
Community Open space	Community Garden / Park
Greenways and Linear	
Parkways	
Urban Wilderness	
Indoor Marketplaces	Atrium
	Market, Downtown shopping center
Found/ Neighborhood Spaces	Everyday Spaces
	Neighborhood Spaces
Waterfronts, lakefronts,	Beaches, Riverfronts, Piers
Harbors	

Sources: Addpted from Francis, 2003

Likewise, Carr, et al. (1992) prepared the open space typology with 11 main categories and 21 subtypes (Appendix I).

2.2.2 Magnitude, Pathways and Drivers of Change

POS space is modified according to the natural process and urban development practices. Current urbanization shows radical changes to public space after the industrial revolution in both developed and developing countries. Three major trends in urban space transformation are: (1). open spaces are shrinking as the open space is used for infrastructure – house, street, transmission line development, (2). Not only shrinking but also fragmented due to the development of road network and other infrastructure, (3). Transferred ownership from public to private as it is encroached by the people (Carmona, 2010; Landman, 2016; Madanipour, 2019). Most urban spaces are affected by five major groups of driving forces which are named as socioeconomic,

political, technological, natural, and cultural activities (Burgi, Hersperger and Schneeberger, 2004). According to Madanipour (2010), the nature and character of public space are closely related to the nature and character of cities. The magnitude of change and pathway of change are also modified closely depending on the urbanization process.

Omar et al. (2015) made a study about human interaction in open spaces and highlighted that, pathways of change of POS through the human – human and human-nature interactions in the POS which played a vital role for the sustainable environment in the city life. Esbah and Deniz (2007) made a study on the effects of land use development on urban open places based on GIS tools. First, 14 different open space typologies were defined and the open spaces are delineated from the aerials and satellite images. Second, the change in the area of these patches is analyzed, the result indicated that urban open spaces are negatively affected by historic land use development. The natural and agricultural patches diminished while semi-natural or manmade open space patches increased.

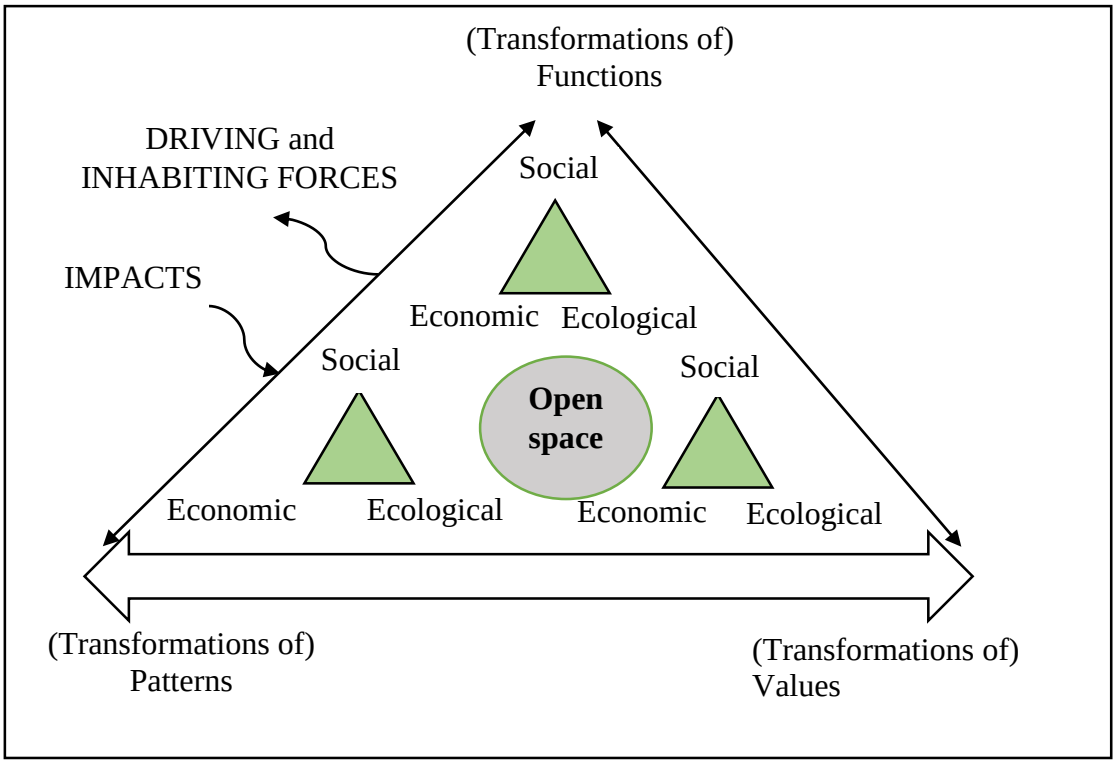
Open space is directly or indirectly related to urban land use pattern and both of these are changed by various drivers. Study made by Verburg, Ritsema, De-Nijs, Schot and Dijst (2004) stated that the main pathway of open space is changed in biophysical processes which include natural environments such as weather and climate, geomorphic process, soil types and its process, drainage pattern, and availability of natural resources. As explored by Briassoulis (2000), the socioeconomic drivers encompass demography, social, economic, political, institutional, technological change, families, various public sectors or bodies, related policy and regulation, the market condition, community concentration. Similarly, the religious drivers refer to belief, holiness, god devotion which played a high magnitude of public open space use, management and protection as devotion. Open space change may result in layout change through socioeconomic and religious drivers.

Process means a series of actions or steps taken in order to achieve a particular purpose (New Oxford American Dictionary 2nd edition, 2008). To identify a general change of open space the process can be divided into several steps which may be natural or artificial. The continuous action of a series of changes takes place differently. As open spaces are internal intelligible part of the urban area, open space has been changed along

with the urbanization process. Alle (2012) argues that the dynamic landscape approach is encouraged to explore through the cognition and process of urban people. He focuses that dynamic landscape approach and its natural conditions or features are changed by urban cultural activities or public needs. The cultural process of place becomes a space in the urban area. This thought is quite relevant for the process of urban open space creation. Regarding the spatial process, Bennett et al. (1985) suggest that its spatial dimensions are changed by time, space, and socio-economic activities of the citizen.

Bomans et al. (2010) in a paper entitled "underrated transformations in the open space using an alternative method to get an insight changed" discusses on the complex interactions between urban and open spaces and/or between different functions within the open space and are thus related to multifunctional land use. It is highlighted from the framework of the transformation of open space, mainly function, pattern, and value based on social, economic and ecological forces (Figure 2.3).

Figure 2.3: *A framework for transformations in the open space*



Source: Adopted from Bomans et al. (2010).

The process is a set of activities of mechanism that operate in some spatial order in control of geographic analysis. Broadly, geographers use spatial analysis to scrutinize the earth's process and its interaction over space area.

2.2.3 Perception of Public Open Space

Public perception refers to a belief or opinion often held by many people and based on how thing seems (Cambridge English Dictionary, 2008). Perception is the organization, identification, and interpretation of sensory information in order to represent and understand the environment of POS patches. Successful public open space should promote psychological comfort and safety (Carr et al., 1992). Differently, the public open space can, of course, be defined physically by their legal ownership and boundaries but the perception of who owns a space is also important (Woolley, 2003). Some open spaces are fully used by one person or a few individuals while other spaces are shared by people.

Regarding the perception, Day (2000) argues that the ethic of care can in fact have a positive impact on public open space by reducing the fear of crime and enhancing the perception of safety. Thus, there are several perceptions which are impressions about open space such as safety, aesthetic, source of information, place of entertainment, place of social interaction, joyful place, peaceful environment, economic, political, emotional, religious values and so on.

The evidence from research in environmental psychology and landscape studies demonstrates that people's perceptions and attitudes are influential in urban land use patterns and conversions (Balaram and Dragicevic, 2005). In the study, environmental psychology has found that attitudes toward the open spaces are constructed through a mixture of value orientations, demographics, knowledge, and context (Balaram and Dragicevic, 2005 and Sutton, 2008). The spatial location of open space, its distribution and its typology depends on public desire and feeling. But the perception of experts and policymakers can often be very different from community members those who lack training in an exact field (Kaplan, 1985; Ward Thompson, 2002).

Popoola, et al. (2016) describes the user's perception of urban parks and green networks. The study argues that there are several factors such as time, cost, access, facilities, occupation, age, sex, marital status, income which affects the user perception. Also, the poor management of parks creates a negative impact on people.

Bertram and Rehdanz (2014) made a working paper on the role of urban green space for human wellbeing in Berlin City, Germany. The major objective of this study is to

identify people's perceptions toward the green space through their wellbeing. It is a positive effect that is justified through the help of a regressing model. The finding of the study suggested that the nearer the green space like park show the positive effect so surrounding neighbors' and others user are satisfied with available green space in an urban area.

Nasution and Zahrah (2014) made a study on community perception and quality of life in Medan, Indonesia. The study is based on information of 384 questionnaires and result shows that there is a strong relationship between public open space in terms of area of management and quality of life. Accessibility, facility, management, natural environment, activity, and intensity are taken as a basis to define perception toward the open spaces.

Grobman and Shemesh (2015) concluded that public open space and human perception are determined by the relation between the open space dimensions and people's feelings. Architects and designers always try to create positive effect on the user's feelings in the POS by building the environment. The geometry of space and its connection create major emotional attraction where the aesthetic surface is found active but unpleasant surface is inactive.

2.2.4 Management Approaches of Open Space

The management of open space of urban area has enormous importance as it is the common property. The natural vacant area will be changed into public open space through the management as well as conservation practices. Hardin illustrated the problems exponentially increasing the population with their sense of freedom and selfness nature which creates a negative impact on the overall environmental situation and rapidly declines commonplace. In the words of Hardin:

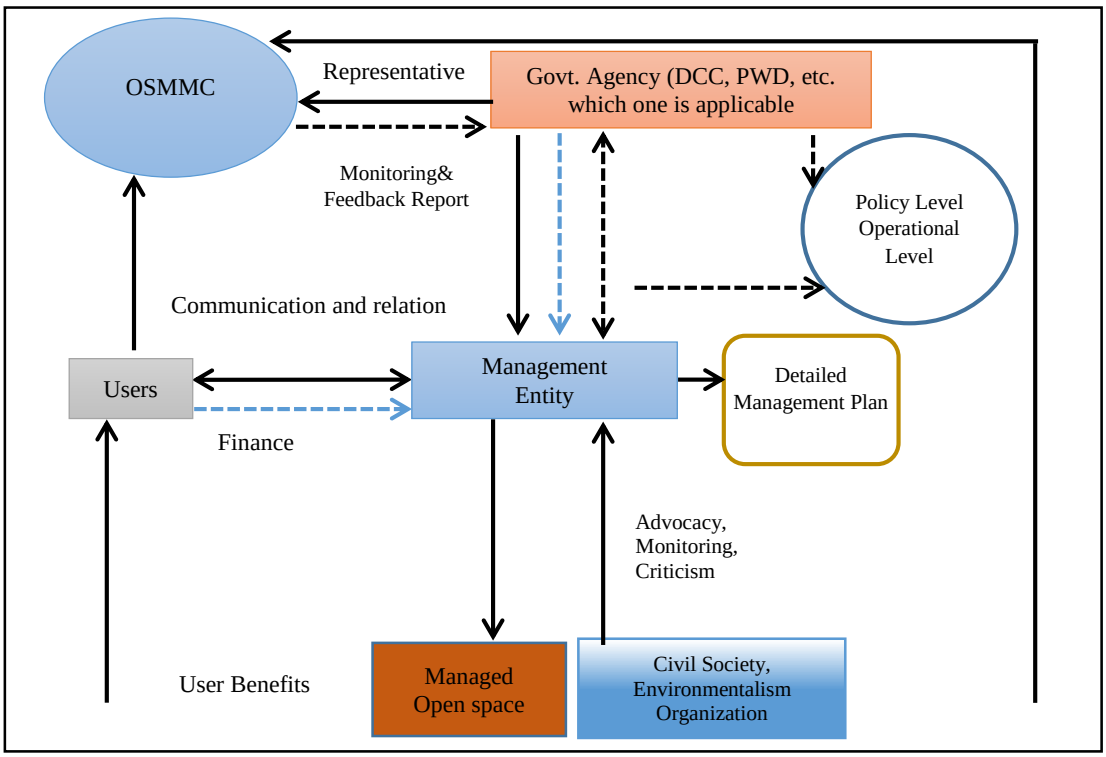
> "There is the tragedy of commons in public properties. Each man is locked into a system that compels him to increase his herds without limit in a world that is limited. Ruin is the destination towards which all men rush, each pursuing his own best interest in the society that believes in the freedom of the commons." Hardin (1968:1245)

According to Hardin, every citizen to have ample common space for used and share but deforestation, loss of resources, pollution, poor job economy, etc. are the result of the loss of common space. If accessibility is not equal to everyone in terms of the usage of the resources, then that is known the tragedy of commons. Clarifying the statement, he argued that resources should be accessible for all because the private area has no accessibility for all which has created the tragedy of commons. Further, he illustrates that parks should be accessible to all which is out of the tragedy of commons.

Broussard, Ottombre, and Miller (2008) conducted a study on attitude toward policies to protect POS in 22 counties of Upper Wash River Basin in north-central of USA. The purpose of the study was to identify local people and local government policies to protect the public open spaces. They used to stratify random sampling to collect information from 2000 adults and 218 planning commissions through the mailing reply. These data were analyzed with the help of multi-linear regression. They suggest that planners were more than three times likely to own undeveloped investment property than residents and also financial interests were a significant influence on their attitudes toward policies to protect open spaces. Indeed, the influence of local decision to protect open space and institutional supporting policy is more valuable to protect the open space resources.

Islam et al. (2015) proposed a model for open space management (Figure 2.4). The management of the open spaces is different due to ownership, spatial location and authorities. Due to lack of proper management systems, most of the open spaces face lack of safety and insecurity; along with environmental and aesthetic, managerial and institutional aspects degraded.

Figure 2.4: *Open space management model*



Sources: Islam, Mahmud and Islam, 2015.

2.3 Open Space in Nepalese Context

Traditionally in the urban areas of Nepal, open spaces were in the form of public or community spaces around the cultural and heritage sites as well as in religious clusters and pond areas. Now- a-days, these areas are converted into public parks, playgrounds, and conservation sites etc. Hence at present public open spaces include the public parks, playing field, religious sites, water bodies, viewpoints, caves, river strip, and distinct spaces.

Chitrakar (2016) has carried a study to explore the meaning of public space and the sense of community in the changing urban context of the Kathmandu valley of Nepal. The researcher applied interview method for two new residential areas in Budhhanagar Tole and Gongabu area in Kathmandu. The researcher observed that public places are an essential part of a day to day life. Urban people identified both physical and psychological benefits on the use of public space. But the feeling of the neighborhood residents did not appear satisfactory due to the lack of sustainable development of existing spaces. However, the community emphasizes to manage these spaces for

different purposes. He suggested that further urban development plans and policies should be considered for the meaningful development of neighborhoods' public space and recommended future research to identify the significant role of public spaces in community life.

Gurung (1985) carried out a study about Pokhara city in urban geography. In his PhD dissertation he stated that the functional structure of Pokhara was categorized into 13 sectios where recreactional center, open space and playground were also included which were actually coverd by grassland. This study focused that these sites were an importance part of urban land use.

Poudel (1996) did a study on tourist resources and environmental appraisal in Pokhara region, Nepal. Researcher focused on geographical aspect and explorered natural and cultural resources through the reconnaissance survey including viewpoint, park, religious site, lakes etc for the development of tourist industry.

Sharma, (2016) in his Ph. D. dissertation highlighted the open space morphology in the open spaces of the capital city of Nepal. He has attempted to inspect the open space morphology and secular open space of the capital city by comparing changes in the pedestrian public open spaces of the traditional urban square of the Kathmandu Valley. The morphology of public spaces in the valley not only produces the image of the city but also helps to maintain the socio-cultural, economic and quality of life that is associated with the city. The secular open spaces have been divided into three groups on the basis of space's physical and social attributes, and aspects. The study has focused on three open space categories such as Durbar squares, Market squares, and Nodal intersections. He concluded that the secular open spaces are created and organized by the individual behavior of citizens. The researcher indicated that these traditional and unique open spaces have been contributing as the environmental safeguards.

Adhikari (2004) carried a social-ecological analysis on the loss of public properties in urban environment of Pokhara. The study covers historical public places such as public land, *Chautara* (rest platform), ponds, wells, religious places, *Pati-Pauwa* (sheltering place). He found that the existence of 26 big sized public land which is shrinking now. He observed that 56 percent of Chautara, 92 percent of ponds, 96 percent public patches, and 72 percent of public land have been reduced during 1977 to 2003 period.

For such diminishing of public areas several factors are responsible among which urbanization and individual encroachment play vital role. He urged to protect the open spaces for public welfare in the city.

Thapa and Poudel (2018) carried a study assessing the coverage of urban green space in Butwal sub-metropolitan city. This GIS based study has tried to measure the green space available for people dwelling in the city. They found a per capita of 623 m^2 green open spaces much higher than most international standards in the area. The study emphasized that the result could help policymakers and relevant stakeholders to realize the importance of managing urban green spaces for the betterment of the urban dwellers. Manandhar and Joshi (2015) focused that public open space management is necessary to reduce the disaster risk as well as prerequisite of a smart city.

Giri, Shrestha, Parajuli and Suvedi (2008) conducted a study on citizen's perception to develop green space parks at Prithvi Narayan campus area in Pokhara. The study concluded that people have the keen interest to develop natural trail with evergreen and ornamental plants. Further, they also have the willingness to contribute physical, technical and financial support to manage green space park.

2.4 Research Gaps

The review of literatures suggests that there were researches on the open spaces with several perspectives. Several studies have been made on urban open spaces relating with environment, economic value and impacts (Madanipour, 1999; Thomas, 2008). However, it is important to understand the urban open spaces in terms of their typology, spatial distribution pattern, their magnitude and pathways of change, management efforts etc. Further, there are very few studies on spatial and attribute dimensions of public open space in urban land use particularly focusing with the issues of morphological, social, accessibility, openness, sense of safety and environmental dimension of an area. Most of the reviewed study focused on the empirical researches about perception in relation with economic value and typology of public open space but not on spatial distribution, pathways and magnitude of change and drivers, and visitors' perception on POS.

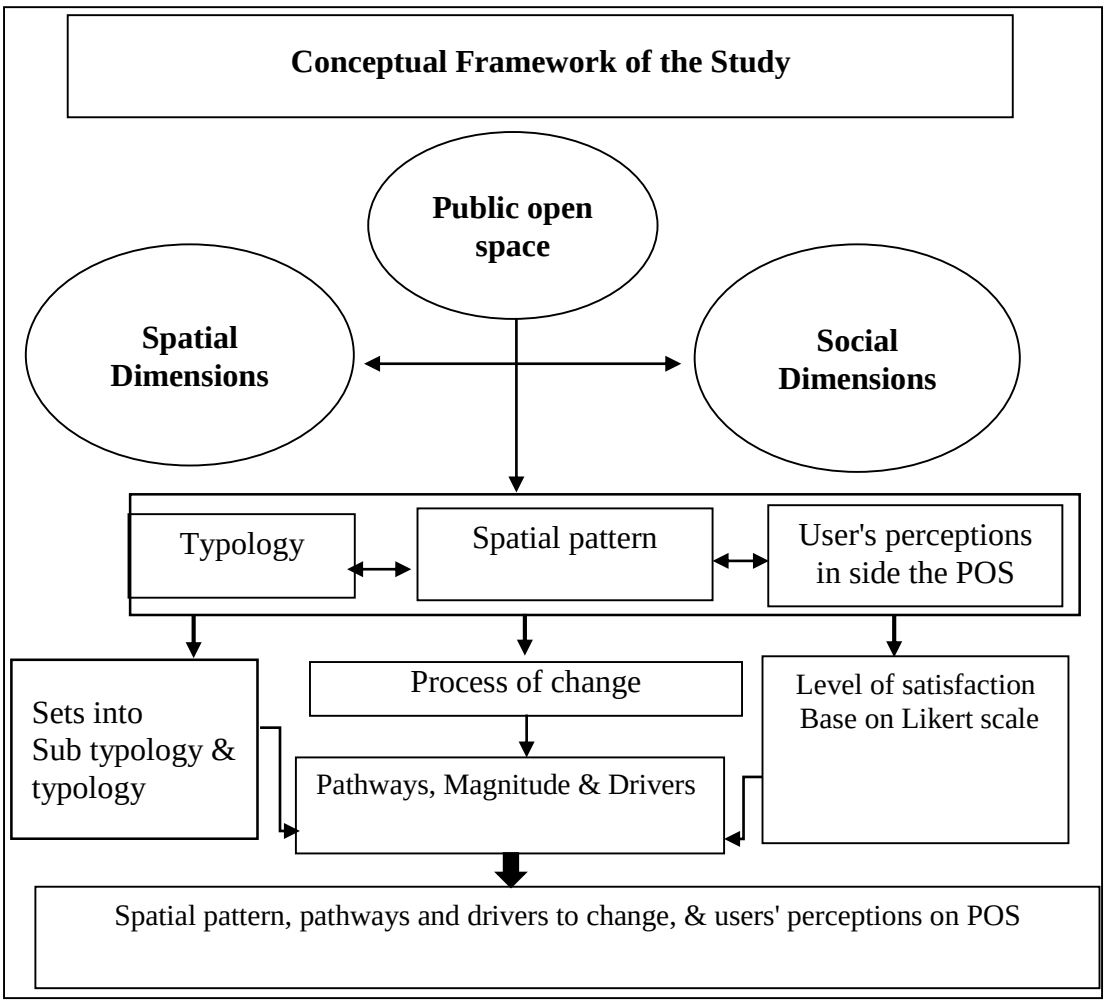
It is in this context, the present study emphasizes to explore the existing situation of public open spaces, its spatial distribution and pattern, to develop typology, examine

the process of change, visitors' perceptions as well as management aspects of POS selecting Pokhara Metropolitan City as the case study. In recent years, PMC has being undergoing massive urbanization and increased density of population. In this context, this study may play an important role to fill the knowledge gap on POS located within urban areas of Nepal.

2.5 Conceptual Framework for the Study

Based on the understandings of the review of the literatures a conceptual framework for the present study has been developed (Figure 2.5). This study covers three different components of public open space. Firstly, it discusses the existence of public open spaces and its spatial dimensions which include spatial distribution, size, shape, distribution pattern and typologies and also the social dimensions which include the use, management and level of satisfaction as perceived by the users of the public open spaces.

Figure 2.5: *Conceptual framework of the study*



Secondly, it discusses the pathways and magnitude of change in each of the open space in terms of its size, shape and the use pattern. Thirdly, it tries to identify the drivers of change in open space in the study area.

Urban public open space is conceptualized as recreaion, wellfare as well as aesthetic site of city. The key concept that have been identified in this study are spatial pattern, process of change, and user perception about the existing POS in PMC. The research established link beween theories, concept by building conceptual framework as shown in figure 2.5.

CHAPTER - III

RESEARCH METHODOLOGY

Research methodology chapter consists of six sections. The first section discusses the selection of study area. Philosophical and methodological foundation is discussed in second section while the research design has been explained in the third section. Methods of data collections are illustrated on fourth section. The data processing and analytical procedure has been outlined in the last section of the chapter.

3.1 Selection of Study Area

Pokhara Metropolitan city is one of the highly growing urban cities in mountain area of Nepal. It is linked by historical trade route and major highways (Prithvi, Siddhartha and Bhupi Sherchan). Pokhara is naturally attractive with panaromic landscape so it is internationally renowned as tourism area. The understanding of the public open spaces in Pokhara metropolitan would also help to understand the problems associated with open spaces in other metropolises, sub-metropolises and municipalities in the country. POS is an important part of city land use. However, there have been very few studies on this issue. Thus, Pokhara Metropolitan city area has been proposed for the study of POS with the objectives as outlined in 1.4 sections.

3.2 Philosophy in relation to Research Methodology

Harvey (1973) emphasized that geography must take both methodology and philosophy into account and concluded that methodology without philosophy is meaningless. Methodology deals with information collection, processing, organization as well as analysis techniques (Johnston, 1984). However, the methodology is not independent of grounds of belief or our prevailing values which exist in our society at the present time.

The research philosophy addresses the beliefs, values and principles underlying a detailed study. Each philosophy has distinct data collecting methods and analysis technics in relation to address: What is reality/knowledge? (Epistemology) and how to know it? (Ontology). Epistemology is the theory of knowledge i.e. how we know? what we know? Ontology is the philosophy about the nature of reality. In other words, ontology is content/knowledge for finding the reality, whereas, epistemology is the

pedagogy/method for finding/verifying the content/knowledge of reality (Strauss and Corbin, 1998).

Several approaches for reasoning the research results have been adopted. Frequently adopted approaches for reasoning are deductive and inductive. Deductive (theory testing) research is a study in which theory is tested by empirical observation. It is also known as moving from the general to the particular. Inductive research (theory building) is a study in which theory is developed from the observation of empirical reality. The general inferences are induced from particular instances, which is the reverse of the deductive method since it involves moving from individual observation to statements of general patterns or laws (Hussey and Hussey, 1997). It is also known as theory confirming/disconfirming approach. Deductive method is basis of the positivist/quantitative approach to research. In this approach the assumptions are inferred from a theory and examined in order to prove or disprove a theory. The inductive thought begins with observation or examination of events or specific processes in order to reach wider and more general statements based on these events or processes. The assumptions are inferred from the research results (the findings) and create a theory. This is the basis of the qualitative approach to research.

Another significant choice of reasoning in the research is subjective or objective depending upon the extent to which the researcher is involved in or has an influence on the research outcome. In subjective research, researcher plays significant role on the research outcome whereas in objective research, the researcher stands distance from or independent in the execution of the fieldwork (empirical work). The phenomenological research approach by its very nature is subjective (Aliyu et al., 2015).

Some research depends entirely upon searching and reviewing the literature on a certain subject which is known as non-empirical research. Some are empirical based on data so far collected from observation and experiences. The research work can be exploratory, descriptive, analytical or predictive based on the purpose of study. It can be qualitative and quantitative. Qualitative research is a research that produces findings not arrived by means of statistical procedures or other means of quantification (Hughes, 1990). Qualitative data can be collected through interviews, focus groups, observation, or review of documents. On the other hand, quantitative research produces data that can be statistically analyzed and whose results can be expressed numerically. Surveys using

structured questionnaires can be the major sources of quantitative data. The present research focuses on both positivist and humanistic philosophy in the process of data gathering and analysis of spatial pattern and process of POS in PMC.

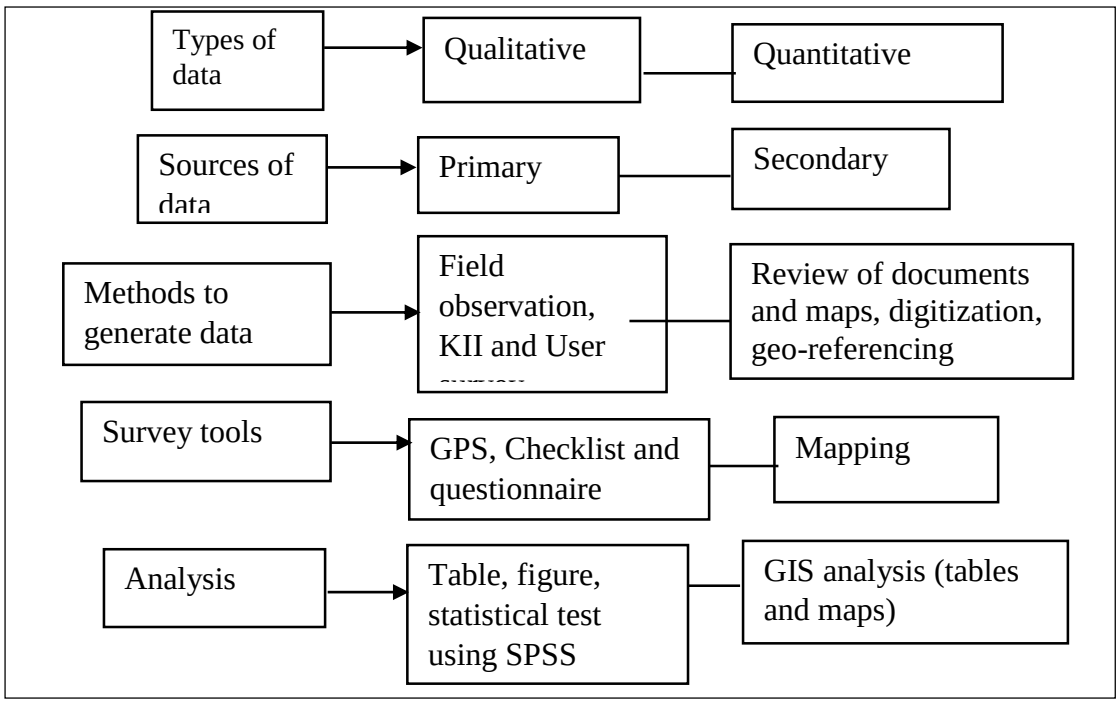
3.3 Research Design

The research strategy in this study aimed to explore and interpret the public open space by different methodological base. It tries to establish linkage between theory and acquired data. This study is a combination of descriptive and analytical research based on qualitative and quantitative data which were gathered with various procedures from different sources. This study adopts different methods to generate spatial and attribute data with the help of different tools and technology. Field study and expected number of sample were drawn and different methods and tools were used for data analysis.

Open space typology, transformation and perception theories were also followed for the reliability of findings. This research consists of what, how, or in what ways and why questions on the spatial pattern and process of POS. The 'what question' must be answered first then the answer of how and why questions can be given (Balikie, 2000). In others words, to identify the spatial pattern of POS how and why process transform its situations from previous to present states. The purpose of this consideration is to identify prevailing scenario, pathways of change of driven factors and use and management of POS framework of analysis. Figure 3.1 shows the research design developed for this study.

This research has used both primary and secondary sources of information. Secondary data were collected from government publications, academic research report and reports published by INGOs and NGOs. Similarly, relevant information published in books, journals, articles, local newspapers, and magazines were also collected for the study. Likewise, secondary spatial and attribute data were collected from Topographical Mapsheet, Cadastral map, Google earth image, Satellite image and other related published documents.

Figure 3.1: *Research design*



Similarly, the primary data were collected by field study, KII interview and visitors' survey. GPS field survey was conducted to generate the required individual spatial data of about 275 objects or patches. Table 3.1 shows the sources of data used for this research.

Table 3.1: *Types and sources of information*

Types of data	Sources of data	Acquired information	Remarks
Quantitative and spatial	Primary and secondary	Patches location, address, cadastral map plot number, accessibility, ownership, economic activity, entry fee, security, per day visitors, purpose of use	All case
Quantitative and spatial	Primary	i. To explore site conditions such as: shape and size, landforms, road accessibility, environment, vegetation, ii. Provision /infrastructure, (drinking water, sheds, toilet, benches, foot path, parking, gardening, children playing area, light, compound) main activities, number of visitors	
Qualitative	Primary and secondary	History of sample site, pathways and major driving factors to bring these changes, KII.	Sample case
Quantitative	Primary	i. Demographic and socio-economic characteristics of visitors such as address, mode of transport, accompany, purpose of visit, duration of stay. ii. Perception of visitors about accessibility, natural attraction, cultural attraction, internal layout, sanitation, safety and security, parking, surrounding environment, management, existing problems and suggestion for further management.	

The details of data, their collecting methods and used tools are given in Table 3.2.

Table 3.2: *Overview of parameters, data collecting methods and tools used*

Objectives	Parameters	Data collection Methods	Tools
1. Dimensions of public open space and its typology	Location Size Shape Distribution Spatial and socio-economic dimensions	Reconnaissance Observation (Mapping measurement)	Semi structured questionnaire, Observation sheet (Checklist) Field book Camera GPS, Google map, Cadastral map, GIS
2. Pathways, magnitude and drivers of change	Change: shape, size, use, rate of change Drivers of change (biophysical processes and socio-economic condition)	GPS survey KII Comparison of maps including google images and, review of historical documents	Interpretations time Series thematic map Cadastral map Google map Semi-structure questionnaire GIS
3. Management and user's perception's	User profile Provisions in POS Experiences in POS	Interviews (Visitors' and KII)	Structured questionnaire

3.3.1 Pre-field Survey

The first level of essential information was derived from the Topographical maps (1998) in scale 1:25000 obtained from the Survey Department, Government of Nepal. These maps were used for plotting the river corridors, natural vegetation area which was already preserved as a recreational site. Similarly, satellite image was used to find out the physiographic situation of study area. The information on slope aspect and elevation has been extracted from ASTER GDEM datasets which are freely available on earth explorer platform (USGS) with 30-meter spatial resolution and 1 by 1-degree coverage in spatial area. Likewise, cadastral maps (1975) were used to identify the legal boundary of plot/parcel for sample selected sites. The details of map and satellite image characteristics are shown in Table 3.3.

Table 3.3: *Characteristics of maps and satellite images*

S. N.	Types of maps	Resolution	Date	Data sources
1	Topographical map (Sheet no. 2883 16B &2884 13A)	1:25000	1998	Survey Department of Nepal
2	Cadastral map	1:1250	1974 & 2017	District Survey office, Kaski
3	Satellite image	30x30 meters	2016	GDEM
4	Google earth image (maps)	-	12/14/2015	Landsat/Copernicus

These maps were first scanned then geo-referenced and digitized in Arc GIS environment. GIS, an analytical tool, enables and supports an investigation of each component part or a whole and their relations in making up the (new) whole. The soft copy of urban core or built up area delineation map of PMC 2017 was also acquired from Google earth image and digitized on the basis of urban compact settlements cover area. Similarly, the built-up areas were delineated by digitizing the settlement area which was connected by road networks on google image 2015 and a population density of more than 500 persons per square kilometer. Google Earth Pro Images of 2015 was used for verification of GPS survey and patches polygon.

3.3.2 Reconnaissance Survey and Mapping

A reconnaissance survey and mapping was carried out in order to develop an inventory of POS during January to February of 2017. All ward offices were visited to obtain information on public open space as recorded. The information such as patch name, relative location, address, plot number in cadastral map, accessibility, ownership, economic activity, entry fee, security, per day visitors and purpose of use of the patches were gathered from interview with respective ward Chairman and confirmed legality of existing POS in every ward of PMC (Appendix IX).

Similarly, existing POS patches were visited and information was collected through the observation method. To identify the sites, researcher used the ward information as well as multiple sources of evidence like local persons, satellite image/Google earth image, metropolitan office etc. Every patch's boundary was generated with the help of GPS survey during the field visit. The topographical maps, cadastral map, and satellite

images were also consulted and patches boundary was delineated in the map. Based on the reconnaissance survey, and recording them on the map their location and distribution of all the POS within the study area, typology and other patch characteristics were identified.

3.3.3 Universe and Sample selection for the POS

The reconnaissance survey identified 275 patches as a universe in the study area (Figure 3.2a). Based on their similar characteristics of the identified patches eight types and 32 subtypes were delineated (Appendix II). One sample from each of 32 sub types of open space located within Pokhara Metropolitan City was selected purposively for the detailed study (Figure 3.2b). Yin (1994) also recognised that one suitable case study can be relevant to test a specific theory. The subtypology of POS was grouped based on their existing characteristics, provision, use pattern, popularity, and covered area. The 32 sample sites were the source of primary data for this research.

Figure 3.2a: *Universe of public open space and its typology*

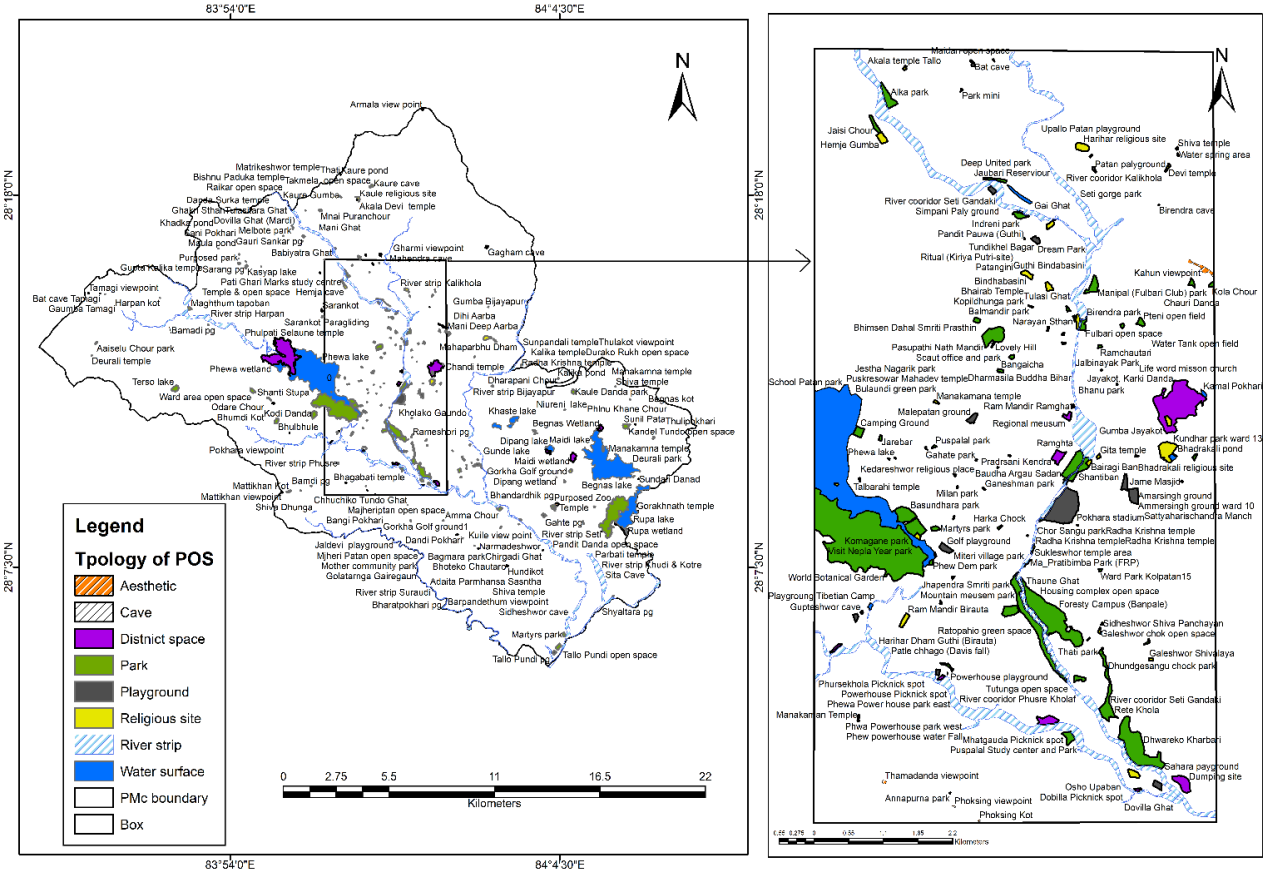
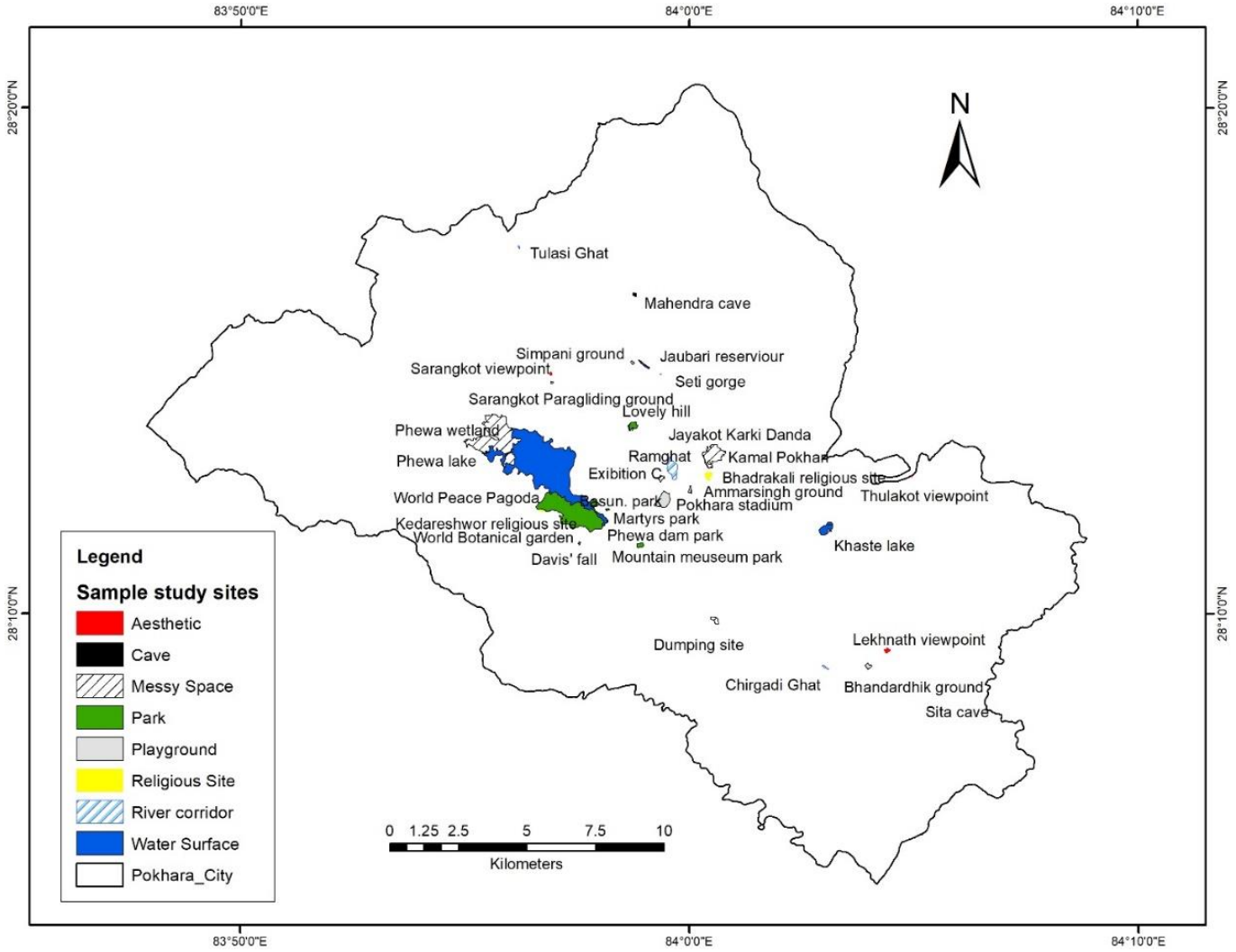
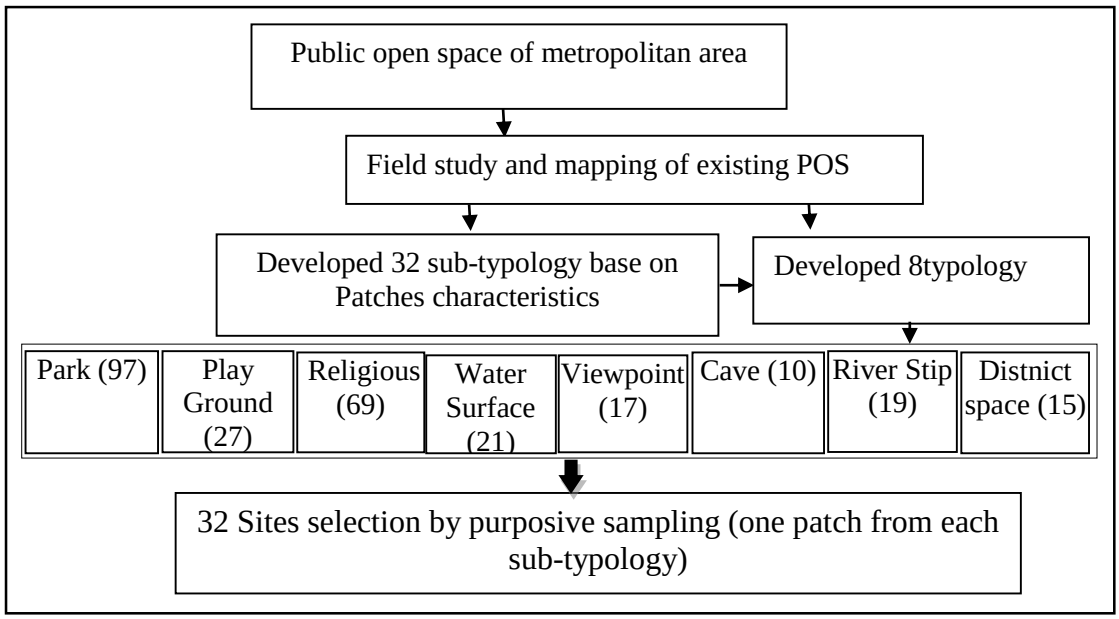


Figure 3.2b: *32 Sample site of POS*



The sampling design for the selection of 32 samples POS is shown in Figure 3.3.

Figure 3.3: *Sample selection proceedure from universe*



3.4 Methods of Data Collection

Different types of methods as per the different philosophy were adopted to collect the required data.

3.4.1 Interview Methods

An interview is one of the most commonly used primary data collection tools in qualitative as well as quantitative research. According to Punch "It is a very good way of accessing peoples' perceptions, meanings, definition of situation and construction of reality. It is also one of the most powerful ways we have of understanding others" (Punch, 2005:168).

Interview methods were conducted to collect the required information in three phases. During the first phase, Ward Chairmen were interviewed using a semi structure questionnaire to identify the existing sites and different characteristics of the POS. During the second phase an unstructured questionnaire based interviews were conducted with KII to collect required information about pathways and driving factors of change of POS. Finally, the visitors' interviews were conducted in POS for visitors' perception toward the POS. All interviews (33 Ward chairman, 10 Key Informants and

770 Visitors) were conducted in Nepali Language and audio was recorded with agreement from the participants.

3.4.1.1 Convenience Sampling for User's/Visitor's Survey

Convenience sampling is also known as accidental sampling. This sampling is appropriate where numbers of population meet certain practical criteria, geographical proximity, and availability at a given time (Dornyei, 2007). Convenience sampling helps to collect the appropriate data from such sites (Appendix II) where there is no possibility of figuring out exact number of visitors within the certain time. The convenience sampling was applied to take visitor's interviews from the selected sample site in the study area.

Before operating convenience sampling, observation and counting of the number of visitors for all sample sites were made. These sites were grouped into three categories based on the number of visitors such as below 100, 100- 200 and more than 200. The interview was conducted at least one day with visitors of those sites which have less than 100 visitors a day. Similarly, two- days kept for 100 to 200 visitors and three-days for more than 200 visitors per site. However, interviewers were selected during morning, day and evening time visitors with different gender, age and caste groups. Researcher selected assistants who completed the M. A. geography and was trained and prepared to conduct the parallel interview session at the same time with male as well as female visitors of different age and ethnic groups. A visitor was normally selected with an interval of 5 visitors but if it comes to be of same caste and same gender then interval was altered depending upon selection criteria. At least 30 samples were taken from each of the 32 sample open spaces to gather the information on visitor's perceptions on the POS. The visitors interview was conducted from November 2017 to January 2018 within 90 days.

The duration of interview was 15 to 20 minutes, and it depended upon the nature of the respondents. All the interviews were taken in the selected public open space premises. During the field work a total of 770 interviews were conducted from the 32 selected sample sites. The survey helped to know the visitor's perception on open space (see Appendix XII for the questions). It contributes to gather required information on existing situation of open space management, infrastructure development, environment

and visitor's perception toward the site that could be helpful for suitable planning in future.

3.4.1.2 Key Informants Interview

KII interviews were conducted to identify pathways of change and driving factors of POS. To understand the history and spatial process of change development, in depth interviews were conducted with the individuals (KII) who were familiar to POS. Likewise, for a comparative analysis of the past and present situation of sample site, cause of change and changing forces of the site were identified through the KII interview. The KII were taken from the people with different background such as Ward Chairman, academician, planner, manager of POS, social campaigner to promote POS, Executive member of POS management committee (Table 3.4). The interviews with the experts/social campaigner as KII focused on two main issues: a) the history of the urban POS in PMC, and b) the process of change of POS with reference to the boundary and internal layout of POS (see Appendix VIII for list of interview). Interviewees were asked to explain the driving factors which played significant role for the creation of POS.

Table 3.4: *List of experts/officials used as KII*

S.N.	Experts/ officials	Affiliation	Number
1	Academicians	University Professor (TU)	2
2	Ward chairmen	Ward No.: 5, 15 and 25	3
3	Social Campaigners	Basundhara Park	1
4	Managers	Mahendra cave, World Peace Pagoda	2
5	Members of management committee	Bhadrakali, Khaste lake	2
Total			**10**

The interviews with the KII remained open – ended and the nature of questions differed for each participant (see Appendix XI for the questions). The questions were on the using pattern, magnitude and pathways of change and management practice, further development strategy and policy about the site etc. Several issues such as past situation of POS in Pokhara and process of change of these patches, and driving factors to change were also discussed. The average length of these interviews was 30 minutes. KI interviews were taken between October to November, 2018.

3.5 Techniques of Data Processing and Analysis

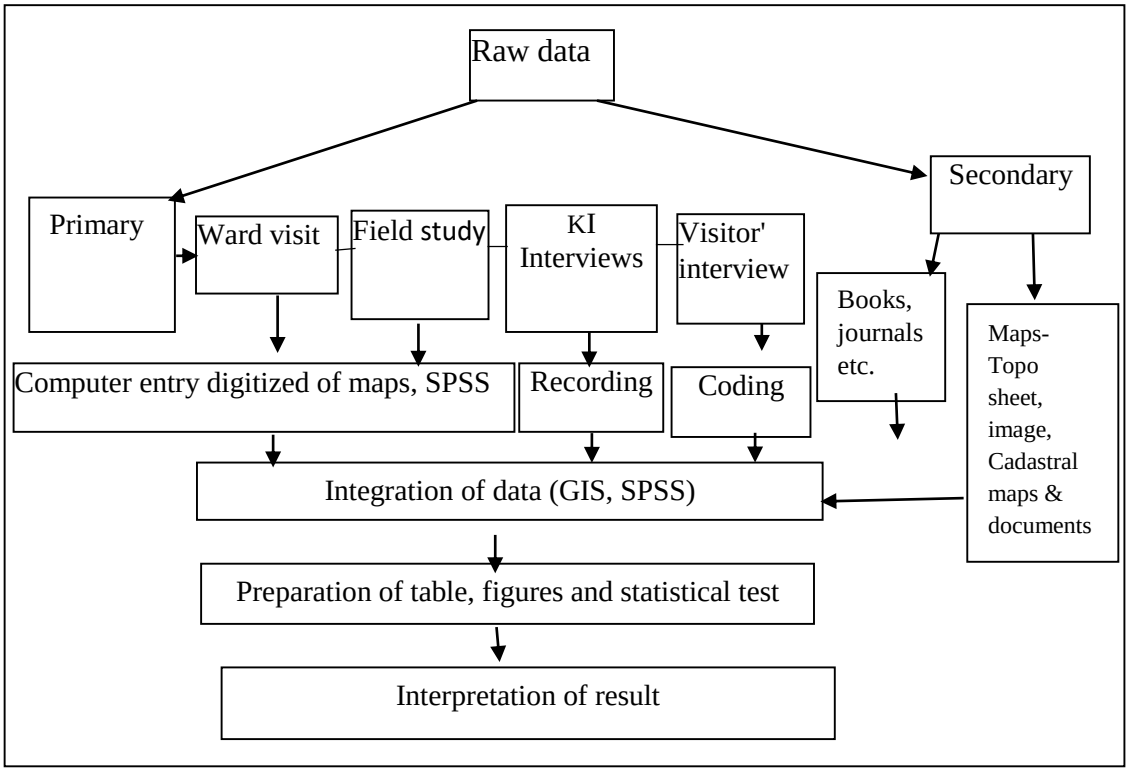
The processing and analysis of collected data to convert into information was applied for both quantitative and qualitative data. The universal approach such as description, classification and connection which was elaborated by Kitchin and Tate (2000) was adopted in creating proper sense of qualitative data. Similarly, quantitative data were analyzed using different statistical techniques.

3.5.1 Data Processing

The raw data collected through different methods were processed first. The data collected during first phase from the ward offices of PMC were coded and tabulated with the help of SPSS (Statistical Package of Social Sciences) software.

In the second phase, spatial and attribute data gathered from the field were entered into using Arc GIS software. The ASTER DEM raster mosaic images were projected from WGS 1984 World Mercator projection system to the Arc GIS environment compatible to Nepal's projection system (MUTM). All raster file extracted for the study area were made compatible for other spatial data set.

Figure 3.4: Data processing procedure



During third phase, the data collected from the KI interviews that were recorded in Nepali were transcribed in English script for purpose of analysis and interpretation.

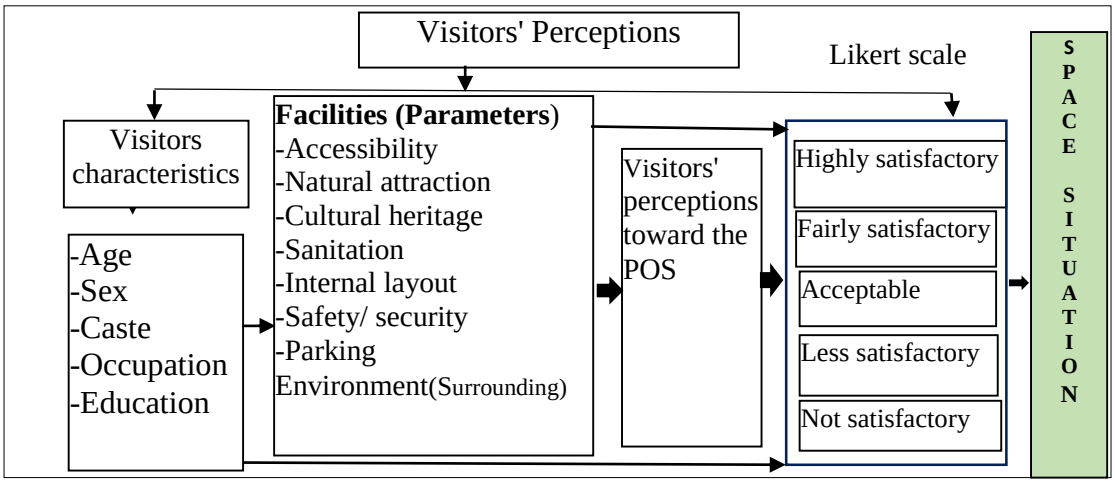
Finally, the visitor's interviewed data were tabulated in SPSS after coding the questionnaires. The data processing activities are shown in Figure 3.4

These different sources of data were coded and tabulated to prepare master table than themetic tables were sorted as required. Spatial data were digitized and analyzed to prepare different data layer. ArcGIS 10.3 was used to analyse and prepare the required maps. Tables were prepared with the information generated from different spatial data.

3.5.2 Data Analysis

The analysis of data consists of both quantitative analysis and qualitative analysis. To analyse the data gathered through visitor's survey, eight key parameters, five indicators and five visitor's categories are identified (Figure 3.5). It is assumed that, positive indicators refer the popularity and well sophistication of POS patches while negative perceptional indicators of visitors provide feedback for further space development and management.

Figure 3.5: *Visitors' perception analysis process*



Source: Adapted from Cafuta (2015) and modified by researcher.

Perceptions of the visitors have been measured from the satisfaction level of the visitors on the POS where people visit on regular basis. Visitors' perceptions have been determined on the basis of the existing parameters in POS that include complete sub typology along with Likert scale with 5 levels of the attitude of the visitors towards sample patches.

Similarly, the spatial distribution of POS in PMC is analysed with the help of NNI and Quadart anlysis while visitor's perception in POS is analyzed through the Chi square test.

i. Spatial Pattern Analysis

For spatial pattern analysis, Nearest Neighbor Index (NNI) has been used. NNI method is result of the average distance of the nearest neighbour points divided by the average distance of the random distribution model, to describe deviation degree of the random distribution (Clark and Evans, 1954). Both manual and automated calculation can be used in NNI in ArcGIS software for the expected mean Nearest Neighbour Distance (NND) is calculated as:

$$NNI = 2D \sqrt{(N/A)} \quad \textbf{...(1)}$$

Where, N= Total No of POS (Public Open Space)

D = Total Distance

The formula used to test the randomness is Clark and Evans (1954) which is given as:

$$R_n = \frac{\bar{D}(Obs)}{0.5\sqrt{\frac{a}{n}}} \text{ ... (2)}$$

Where, $\bar{D}$(Obs) = mean observed NND,

a = area under study, and n = number of points.

Similarly, average nearest neighbour ratio is computed using distance calculated as stated above and automatic index based on the average distance from each feature to its nearest neighbouring feature computed under pattern analysis.

Average Nearest Neighbour Ratio $ANN = \frac{\bar{D}_O}{\bar{D}_E}$ …(3)

Where,

$\bar{D}$o = Observed mean distance

$\bar{D}_E$ = Expected mean distance

Observe mean distance between each feature

$$\bar{D}_O = \frac{\sum_{i=1}^{n} d_i}{n} \textbf{...(4)}$$

Expected mean distance for the features given in random pattern

$$\bar{D}_E = \frac{0.5}{\sqrt{\frac{n}{A}}} \textbf{...(5)}$$

Where, no is the number of POS and A is the total area

Similarly, z-score test for cluster, random and dispersal is calculated as:

$$\text{Z Score; } z = \frac{\bar{D}_O - \bar{D}_E}{SE} \text{... (6)}$$

Where, standard error $$SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} \text{ ...(7)}$$

ii. Spatial Distribution Analysis

The spatial distribution of POS is calculated with the help of quadrat analyis. A set of quadrats covered in the study area and made overlay analysis (Rogerson, 2001). The sample number is counted on each quadrat. After statistics, the number of sample and its frequency with *m* points, compared with a completely random process to determine the spatial distribution characteristics of point mode. The result generally judged by the Variance Mean Ratio (VMR) is calculated as:

- Divide a study area into m cells of equal size.
- Find the mean number of points per cell ($\bar{x}$). This is equal to the total number of points divided by the number of cells (m).
- Find the variance of the number of points per cell, s^2, as follows:

$$s^2 = \frac{\sum_{i=1}^{m}(x_i - \bar{x})}{m-1} \text{... (8)}$$

Where x_i is the number of points in cell i.

m is the number of quadrats,

$\bar{x}$ is the mean of the number of points per quadrat,

s^2 is the variance of the number of points per quadrat,

$(x_i - \bar{x})^2$ is the cell deviate, and

VMR is the variance-mean ratio

- Calculate the variance mean ration (VMR)

$$VMR = \frac{s^2}{\bar{x}} \text{... (9)}$$

Significance Test for cluster, random and dispersal is given as:

$$z = \sqrt{\frac{m-1}{2}}(VMR - 1) \ldots (\mathbf{10})$$

Where, m = number of quadrat and VMR is calculated using the equation 9. Z-value then interpreted at 0.05 confidence interval using criteria as stated in hypothesis.

iii. Hypothesis testing

For the data analysis, SPSS is used straight forward descriptive statistics to describe the characteristics of the socio-demographic data and POS. POS visitor's experience is evaluated with their responses for patches value in relation to each sites. The level of perception of visitors are analyzed through factors of POS by using a five-point Likert scale rating from '5' for excellent or highly satisfied, '4' for better or fairly satisfied '3' for neutral, '2' for unsatisfied (less satisfaction) and '1' for the worst (no satisfaction) site. Using the mean values of the rating scale '3' is considered to be the midpoint. Thus, the value above '3' can be considered satisfactory for POS after visiting the site in terms of perception. The grade '5' and '4' indicates sites being popular and attracting visitors and those POS patches are also known as well managed sites and have greater contribution in attracting people**.** So, the relationship between visitors and existing environment of POS play a significant role to understand visitor's perception which supports in making better places according to their requirement.

A Chi-square test was applied to understand the relationship between the user demographic characteristics and POS situation. To apply the chi-square test, cross tabulation tables with socio-demographic characteristics and sample POS provision has been prepared.

The test is carried for the null hypothesis that the POS are randomly distributed in Pokhara Metropolitan City.

H_0: The distribution of POS is not significantly different than random

If the test statistic Rn value is 1, the pattern exhibits random, If the test statistic Rn is 0, reflected that POS is clustering whereas the Rn ≥ 2.15 reflected POS is regularly distributed.

To measure the perception of the visitors, Chi Square test for independence has been used. Chi square test for independence measures the association between two categorical (Dependent and independient) variable). The mentioned hypothesizes are tested by following mathematical formula. The mathematical form of Chi-Square test can be written as;

$$\text{Chi square } (\chi^2) = \sum \frac{(O_i - E_i)^2}{E_i} \quad \textbf{....(i)}$$

Where O_i = Observed frequencies and

E_i = Expected frequencies.

CHAPTER - IV

INTRODUCTION TO STUDY AREA

This chapter discusses administrative setting, biophysical condition and socio economic condition and infrastructural facilities of the study area. This chapter is divided into five subunits. The first and second units briefly present the administrative and geographical settings. The third section illustrates the social and cultural condition including population, land use, and urbanization. The infrastructure facilities are described in the fourth section.

4.1 Administrative Setting

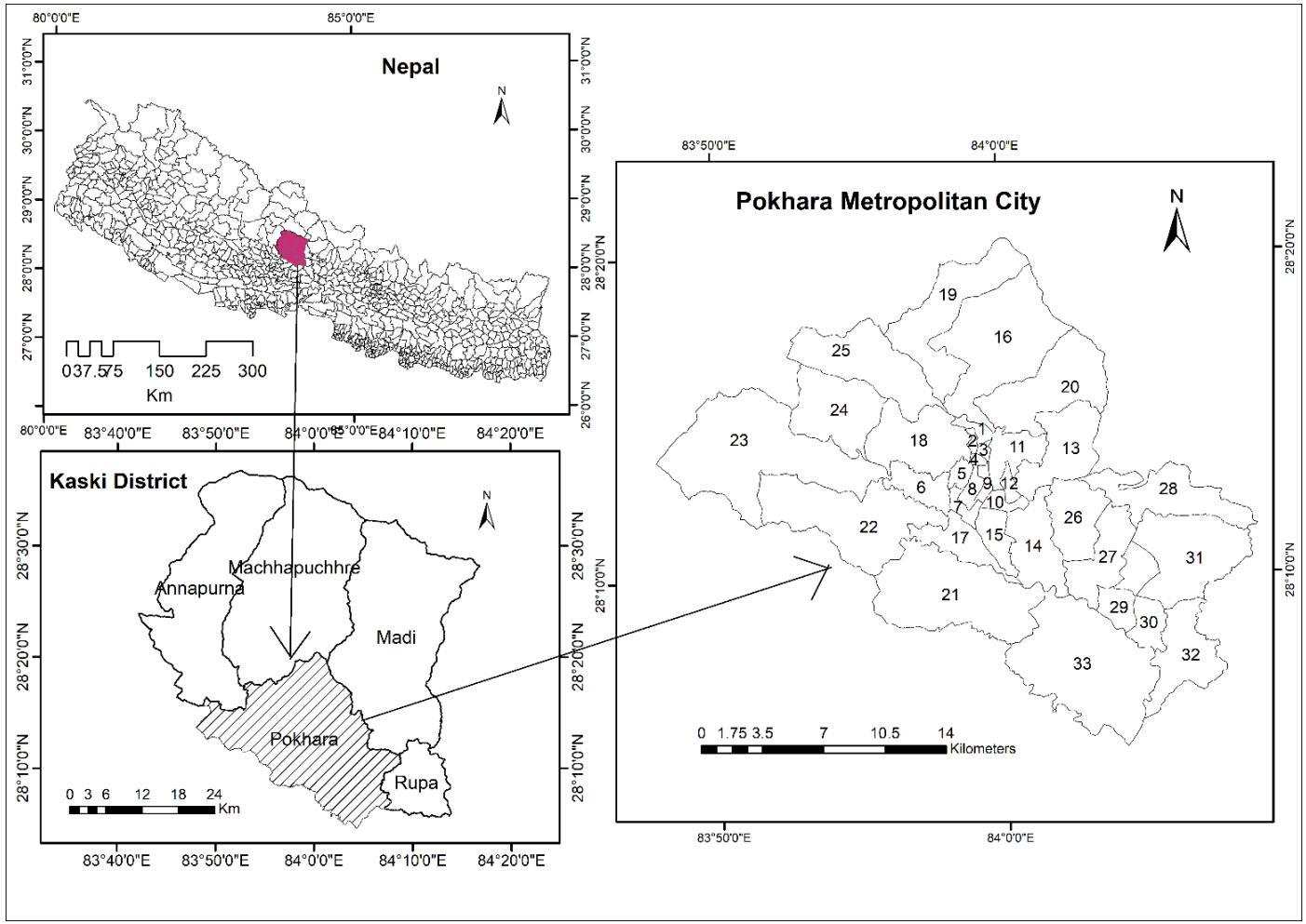
Nepal is a federal republic democratic country with seven provinces and 753 local units. The 753 units include six metropolises, 11 sub metropolises, 276 municipalities and 460 rural municipalities (Gaupalikas). The study area, Pokhara Metropolitan City (PMC) is situated in Kasi district, Gandaki province. Pokhara is also the headquarters of the Kaski district as well as Gandaki province. PMC is divided into 33 wards (Figure 4.1) and almost 500 small settlements known as Toles (PMC, 2018).

4.2 Geographical Setting

Pokhara metropolitan city is the largest metropolitan city in area and second largest city in terms of population in Nepal. It is extended between 28 º 04' 46" to 28º 20' 28" North Latitude and 83º 47' 55" to 84º 07' 43" East Longitude. The elevation ranges from 505m (Kotre) to 2470 m (Panchase hill) above mean sea level.

The metropolitan spans 33.8 km from north to south, 22.9 km from east to west. The total area of PMC is 464.24 km² i.e. 23.05 percent area of the Kaski district and 0.31 percent of total area of the country. This city is situated at the vally floor of Annapurna Himalayan range. It is encircled by green hills encompassing 9 lakes, 10 caves, Seti river gorges, several holy places, and aesthetic viewpoints which play vital role to make the city paradise.

Figure 4.1*: Location map of study area*



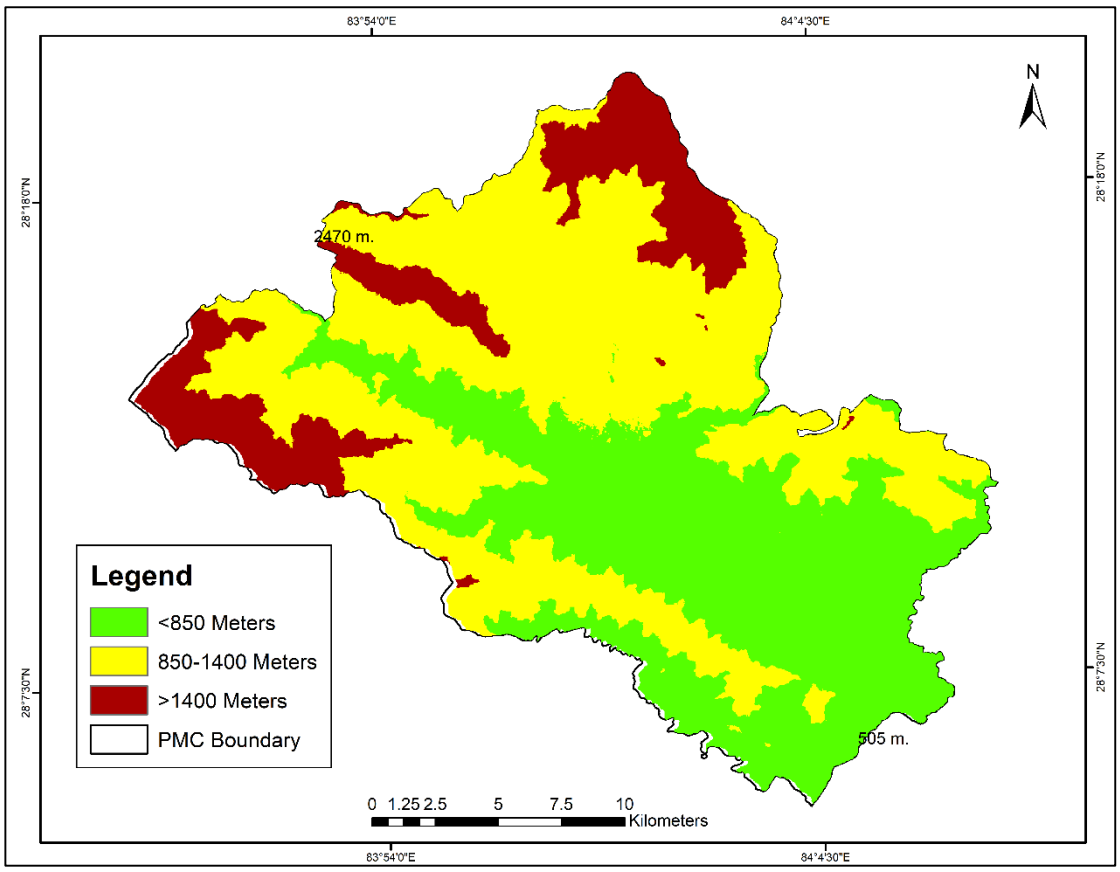
Sources: Topographical Maps (1998, 2017), Government of Nepal

4.2.1 Physiography

Pokhara metropolitan city is known for having an amazing landscape of the country. It has distinct depression features of the landscape (Gurung, 1965). The plain area is bounded with Kaskikot to Majhsthana ridge in the north, Mattikhan to Aanpu in the south, Deurali, Begnas in the east and Panchase, Kalabang in the west. Inside the plain area Banpale ridge, Rithepani, Bhandhardhik ridge, Panchvaiya ridge, and Bhadrakali are leftover hillocks on the plain. Seti river and its tributaries, river terraces are others physiographic features in Pokhara. Similarly, Mahendra cave, Gupteshwor cave, Bat cave, and Siddheswor cave are geologically mysterious landscape sites in Pokhara.

The Pokhara valley is filled with large quantities of quaternary deposits which lead to Pokhara formation (Gurung, 1969-70; Yamanaka, et al., 1982). Lower Nepal Himalaya or hilly area which was formed meta-sediment groups of the Precambrian and may be young as the Cambrian period mainly composed by Phyllite (Gansser, 1964) but the

Figure 4.2: *Elevation zones of PMC (in meter)*



Sources: https://asterweb.jpl.nasa.gov/gdem.asp

formation of Pokhara took place at about 700 to 1100 years before (Yamanaka, et al., 1982) with Gachok formation, Tallakot formation, Mardi Khola formation, and Pokhara formation are major on the basis of soil units (Yamanaka, et al., 1982; Koirala, 1998). Likewise, Phewa, Begnas, Rupa, Gunde, Deepang, Khaste, Maidi, and Niureni are formed by river blocking dammed on the margin of the Pokhara valley (Gurung, 1969-70). These lakes are integral parts of the landscape which contribute in making Pokhara more popular and attractive.

Table 4.1: *Area under the different elevation*

Physiographic unit	**Elevation (Meter)**	**Area km²**	**Percent**
Plain (Valley bottom)	<800	178.27	38.40
Low Hill	800-1400	222.14	47.85
High Hill	>1400	63.83	13.75
Total area		464.24	100.00

Sources: Figure 4.2

Figure 4.2 and Table 4.1 shows that 38.4 percent of the study area falls below 800-meter, low hill occupies 47.85 percent of the study area and the remaining 13.75 percent area with more than 1400-meter elevation known as a high hill in PMC. However, on the basis of existing relief, it can be divided into the following major types.

4.2.1.1 Plain Area

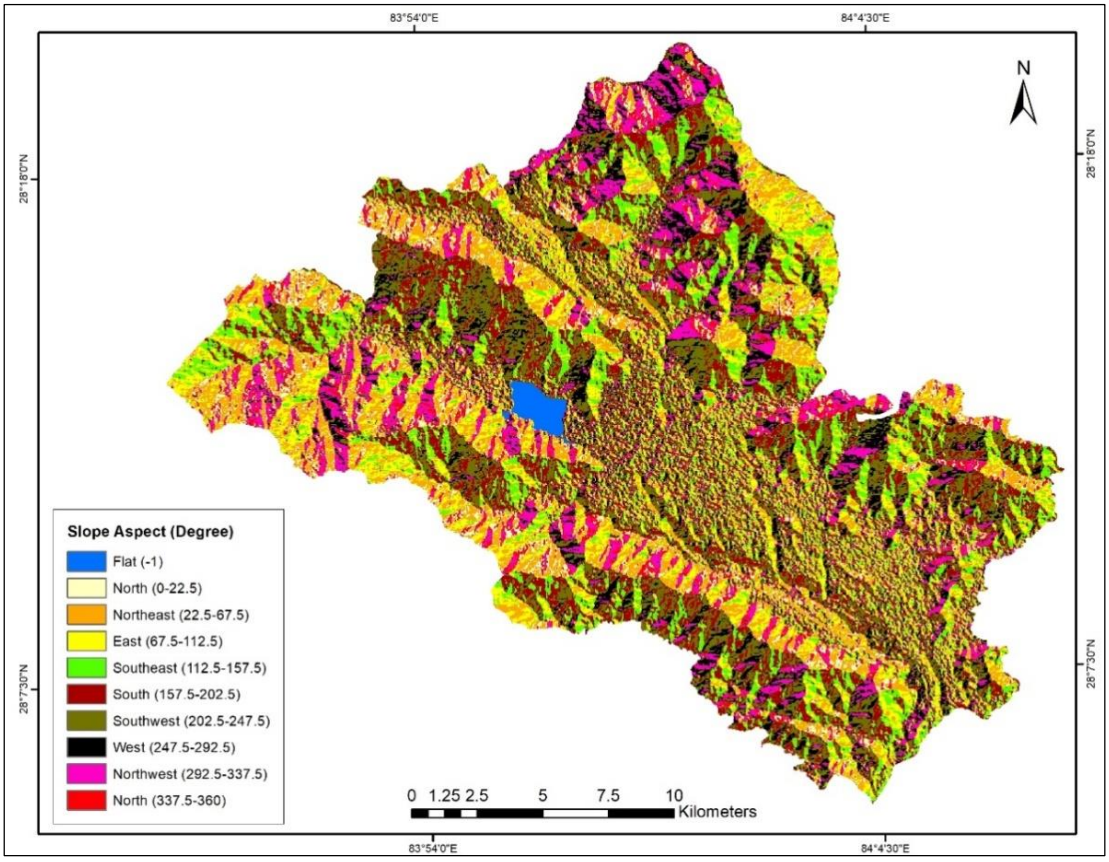
The plain landscape (Valley bottom) in PMC has covered 38.4 percent area (178.55 square kilometers). It is extended from Kali Khola, Batulechour, Puranchour, and Hemja in the north, to Maspatan, Phedipatan, and Bagmara in the south, Satmuhane, Kotre, and Tallo Pundi Tar in the east to Malepatan, Ghatichhana in the west. However, it is situated between the mid-hill range which is known as a micro valley (Shrestha and Kshetry, 2008) which was made by the Seti Gandaki river and its tributaries. The plain surface has a gradient from the south to the north part of PMC. The gradient is 18 meters per km. It is formed by glaciofluvial deposition in a different period but the last phase was several hundred years ago (Yemanaka, 1982). Pokhara plain area was formed different phases in different times with silt, sand, gravels, calcareous, and conglomerates. The last phase of landscape like a gorge, terraces were formed by Seti

Gandaki river, Khudikhola, Talkhol, Bijyapur, Phurse Khola along their course. Seti Gandaki river has played a vital role in the formation of present valley plain by continuous deposition on its bed. Pokhara valley consist of fragile floor sediments. Calcareous, boulder, gravel, sand, etc. are found in surface and in the form of thick layer, which were brought mainly by the Seti Gandaki river. Occasional flood in plain areas creates risks and hazards in PMC.

4.2.1.2 Hill

The outer part of the plain surface is enclosed by the middle hill range to some extent. The hilly features have covered 61.6 percent (286.37 square kilometers) major area of PMC. The hill ranges continuous in the southern part from Mattikhan to Aanpu Bhanjyang (Pass). But northern part discontinues along Kaskikot, Sarangkot, Armala, Kanhun, Mahabrbhudham, Argunkalika, Majthana and Begnas Kot, among these places discontinuation occurs between Sarangkot and Kanhnun hill and Aarba and Kalika ridge by Seti river and Bijayapur Khola, respectively.

Figure 4.3*: Slope aspect of the study area*



Sources: https://asterweb.jpl.nasa.gov/gdem.asp

Panchase is the highest hill on the west. Similarly, some streams and rivulets formed a small channel, cliff, gorges both sides of hill slope which provide different views around the study area. These ridge areas are the source of spring water on one side and functions as an aesthetic viewpoint for the historical Kot, green scenery on the other. These ridges are formed by crystalline, dolomite, quartzite, sand, etc. (Gurung, 1965). The average slope of these ridges is about 27°.

Slope aspect has created various microclimatic and environmental conditions. Vegetation differs in northern and southern aspects.

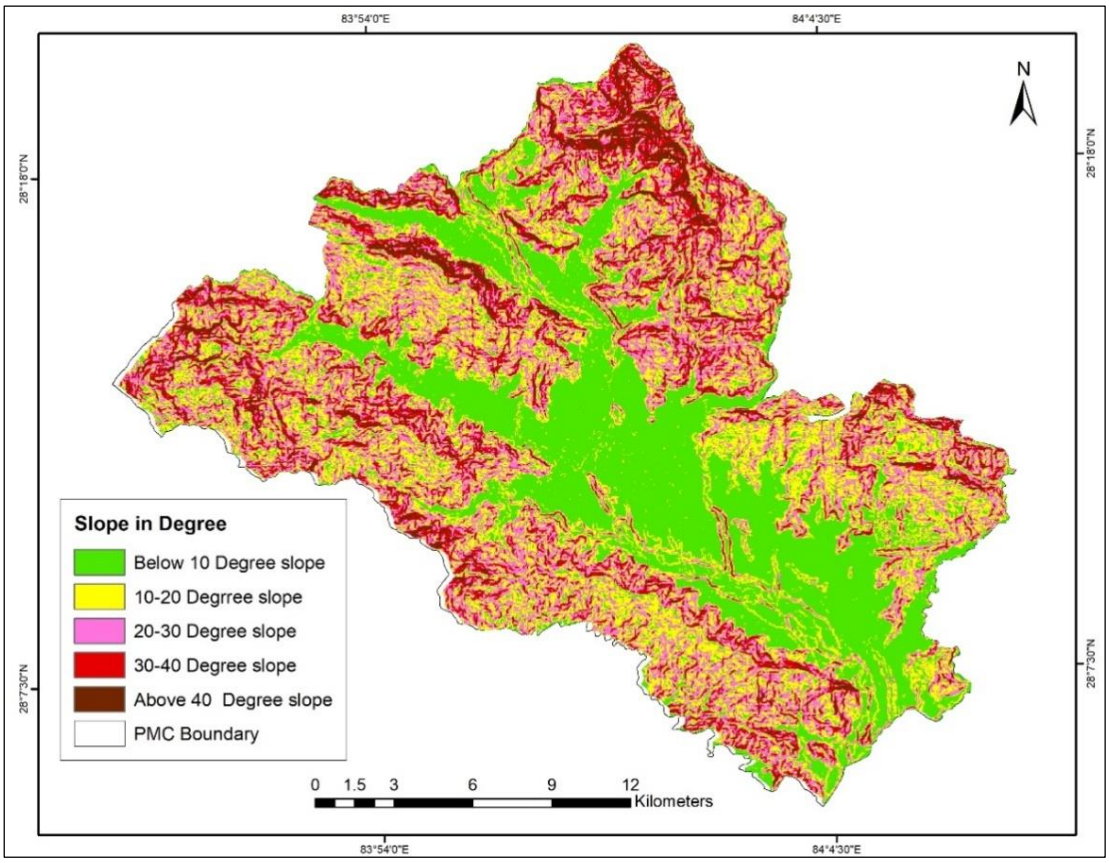
Table 4.2: *Area under the different slope aspect*

Slope aspect	Area (Square km)	Percent
Flat	3.157	0.68
North	51.809	11.16
North East	60.073	12.94
East	58.401	12.58
South East	61.651	13.28
South	70.518	15.19
South West	68.336	14.72
West	47.677	10.27
North West	42.571	9.17
Total area	464.24	100

Sources: Figure 4.3

Figure 4.3 and Table 4.2 shows that 15 percent areas face towards the south, while nine percent appears towards the north. The valley floor is extended from northwest to southeast direction and it is surrounded by hilly regions. The slope of the valley in the bottom area is less than 10 degrees which occurred to be only 30.29 percent of the area but more than 10 degrees' slope is occupied in a larger area (69.71 percent) in PMC (Figure 4.4 and Table 4.3).

Figure 4.4: *Slope of the study area*



Sources: https://asterweb.jpl.nasa.gov/gdem.asp

Table 4.3: *Area under the slope in degree*

Slope degree	Area (Square km)	Percent
<10	140.631	30.29
10-20	120.865	26.04
20-30	120.332	25.92
30-40	60.688	13.07
>40	21.723	4.68
Total area	464.24	**100.00**

Sources: Figure 4.4

Almost 31 percent area lies within the slope of less than 10 degree and halves of the areas of PMC lies with 11 to 30 degree slope. The rest of the areas (almost 18 percent) have more than 30 degree slope.

4.2.2 Drainage System

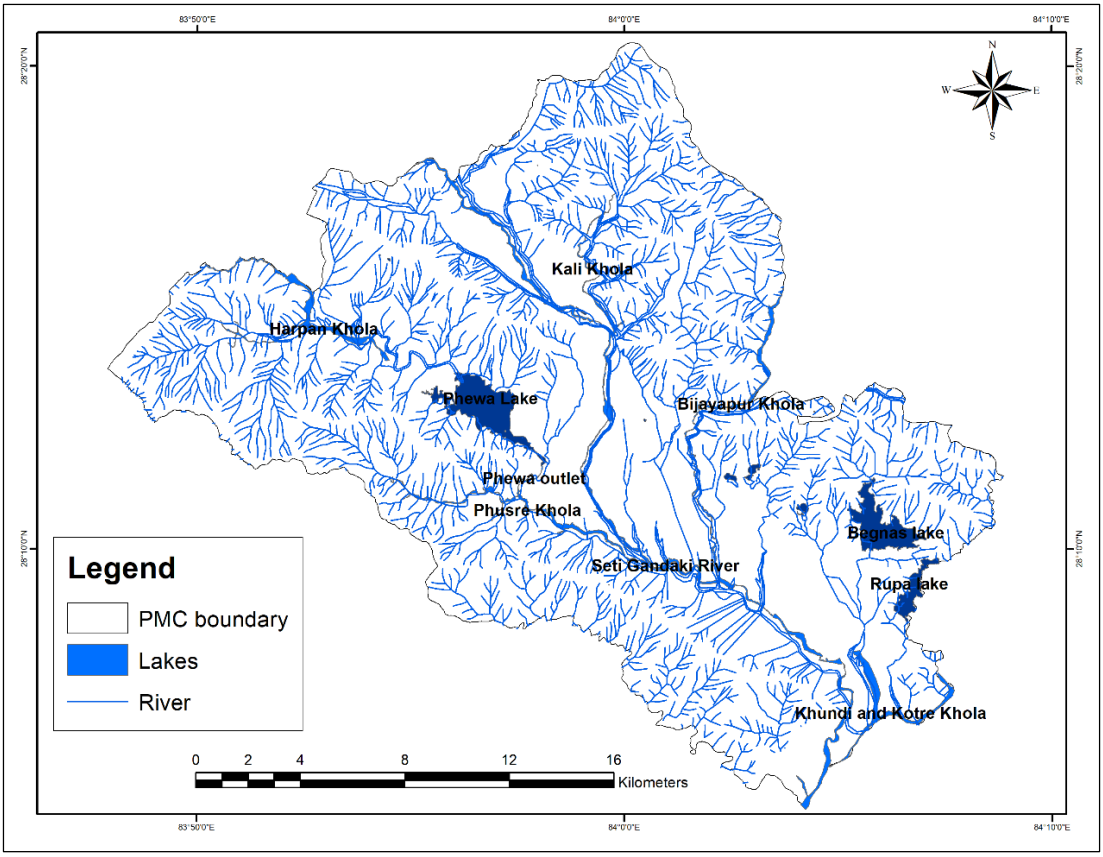
Pokhara metropolitan area is fairly rich in water resources where both permanent and seasonal rivers and rivulets flow. The Seti Gandaki is the major river whereas Phusre Khola, Suraudi Khola, Bijayapur Khola, Harpan Khola, Kali Khola, and Khudi Khola are the tributaries. Seti Gandaki river originates from the Annapurna range so it is a snow-fed river. As it comes through the calcareous mountain regions so its water color looks white due to diluting of calcareous soil and is called Seti Gandaki in local term and Suklagandaki in Sanskrit. It flows from northwest to southeast direction. The drainage system is shown on Figure 4.5.

The Seti Gandaki river flows just from the center of Pokhara city. Kali, Bijayapur stream (Khola) flows from north to south but Harpan, Phusre, Khudi, and Suraudi flow from west to east direction. These rivers and streams are faded by summer monsoon rainfall and springs. So, the volume of water is much more during the rainy season but some streams (also called Khahare in local term) are quite dry during the winter seasons. All these rivers present dendritic or radial pattern due to the topography of PMC. It has the main role in forming Pokhara valley as plain. Similarly, Seti Gandaki river has formed several gorges along its course such as K. I. Singh bridge, Narayansthan to Ramghata and Ramghat to Ratopahiro upto Dhungesangu are main amazing gorges. Gorges ecosystem is unique and peculiar but it is not widely explored yet which can be used as one of the best tourism site of the PMC.

There are about dozen lakes around the city. Phewa lake is the most popular lake which is the second largest lake in Nepal. Similarly, Begans, Rupa, Gunde, Khaste, Niureni, Maidi, Dipang, Kasyap, and Kamal Pokhari have also contributed to make the city popular. River and lakes are used as a water source but major rivers and lakes are used for various recreational activities too. Seti river bank is used for holy bathing, cemetery, etc. Similarly, other streams like Kali, Phurse, and Harpan are used for swimming, fishing, and other recreational activities. The lakes or water surfaces are also used by people for different recreational activities and having fun. Water surfaces and rivers are natural sites for recreational activities that are also listed on the public open space of PMC. It helps to prompt the tourist industry in this city. Basically, lakes are able to attract people by their natural beauty.

Seti Gandaki river has formed attractive gorge and beautiful landscapes along its course. Geologically, its corridor is much interesting and mysterious. Due to its holiness, the riverbank is used as a religious space in different rituals (Photo Appendix XVII).

Figure 4.5: *Drainage pattern in PMC*



Sources: Topographical Maps (1998) Survey Department of Nepal.

4.2.3 Climate

PMC lies under the subtropical monsoon zone. There are four seasons in the year March to May spring (pre-monsoon), June to mid-September Monsoon (summer), mid-September to November post-monsoon (autumn) and December to February winter seasons respectively. The temperature depends on the sunshine length of the day. The range of sunshine is 313 hours in the month of February and 425.75 hours in the month of July. The average sunshine hour per day in February is 10.79 hours and July is 13.73 hours. During the summer season days are lengthy and sunny so, visitors spend more time at POS of PMC. As POS is mostly used in the day time so sunshine is more favorable for the POS users.

4.2.3.1 Temperature Condition

The situation of temperature does not remain the same throughout the year. There are several weather conditions recording stations in PMC but only three stations recorded mean temperature which is illustrated in Table 4.4.

Table 4.4: *Mean temperature in PMC (2005 to 2015)*

Station Months	Begnas lake (687 m. altitude)			Pokhara airport (820 m. altitude)			Panchase hill (2470 m. altitude)		
	Max	Minimum	Daily Mean	Max	Minimum	Daily Mean	Max	Minimum	Daily Mean
January	18.71	6.5	12.605	20.6	7.17	13.89	10.37	2.16	6.27
February	21.8	9.41	15.605	23.65	10.22	16.94	13.62	3.92	8.77
March	25.54	12.63	19.085	27.58	13.64	20.61	18.19	6.20	12.20
April	28.04	15.62	21.83	30.38	16.68	23.53	21.16	9.22	15.19
May	29.13	18.72	23.925	30.69	19.05	24.87	21.20	10.59	15.90
June	29.65	21.73	25.69	31.35	21.54	26.45	21.39	12.69	17.04
July	28.68	22.98	25.83	30.7	22.56	26.63	21.98	13.32	17.65
August	29.04	22.81	25.925	30.89	22.37	26.63	22.00	12.90	17.45
September	28.89	21.92	25.405	30.49	21.34	25.92	21.34	11.40	16.37
October	26.77	17.56	22.165	28.16	17.31	22.74	19.23	8.57	13.90
November	23.25	12.48	17.865	24.49	12.38	18.44	15.53	4.68	10.11
December	19.77	8.34	14.055	21.33	8.37	14.85	11.33	2.59	6.96

Sources: Hydrology and Meteorology office, Pokhara

The temperature range was from 2.16°C to 31.35°C at Pokhara during the year 2005 to 2015. The maximum mean temperature recorded in April to June which was 26.63°C, a maximum temperature 31.35°C at Pokhara airport station and minimum temperature at Panchase was 2.16°C in the month of January. There is remarkable temperature variation between summer and winter seasons. Valley floor remains comparatively warm all over the year.

4.2.3.2 Precipitation in PMC

The annual total rainfall observed at Pokhara airport of PMC is 3481 mm. The total minimum daily precipitation was 3.13 mm whereas maximum was 905.1 mm during 2009-2018 recorded by Hydrology and Meteorology office, Pokhara. Pokhara receives more rainfall in the month of July. It is a hot and wet period of the year. During the post-monsoon season from mid-September to November, PMC has occasional rainfall with hailstone. During the winter seasons, westerly wind generates the rainfall. During

dry and cold winter, sometimes snowfalls occur at Armala and Panchase hill areas. The precipitation amount in the three meteorological stations is shown in Table 4.5.

Table 4.5: *Precipitation in PMC (2009-2018)*

	Precipitation (in mm)			Percent		
Months	**Begnas**	**Pokhara airport**	**Panchase**	**Begnas**	**Pokhara airport**	**Panchase**
January	16.89	13.03	21.39	0.53	0.37	0.79
February	23.85	25.81	24.99	0.75	0.74	0.93
March	55.49	61.53	55	1.75	1.77	2.04
April	137.6	118.79	90.46	4.33	3.41	3.36
May	284.57	258.93	239.59	8.96	7.44	8.90
June	500.71	557.79	419.97	15.76	16.02	15.61
July	849.17	905.1	738.93	26.73	26.00	27.46
August	692.27	791.29	674.16	21.79	22.73	25.05
September	494.95	555.65	306.46	15.58	15.96	11.39
October	106.92	172.15	114.68	3.37	4.95	4.26
November	10.32	17.92	2.06	0.32	0.51	0.08
December	4.3	3.13	3.06	0.14	0.09	0.11
Total	**3177.04**	**3481.12**	**2690.75**	**100.00**	**100.00**	**100.00**

Sources: Hydrology and meteorology office, Pokhara, 2019.

During the pre-monsoon season, the local disturbances like rainstorms cause irregular rainfall due to an increase in the temperature. The valley floor and hills aspect is sometimes predominated by haze. This season occasionally faces whirlwind, blizzard and hailstone mostly in the afternoon. The winter season is quite cold and dry. During this time especially on all morning most of the southeast plain is covered by fog.

4.2.4 Soil Characteristics

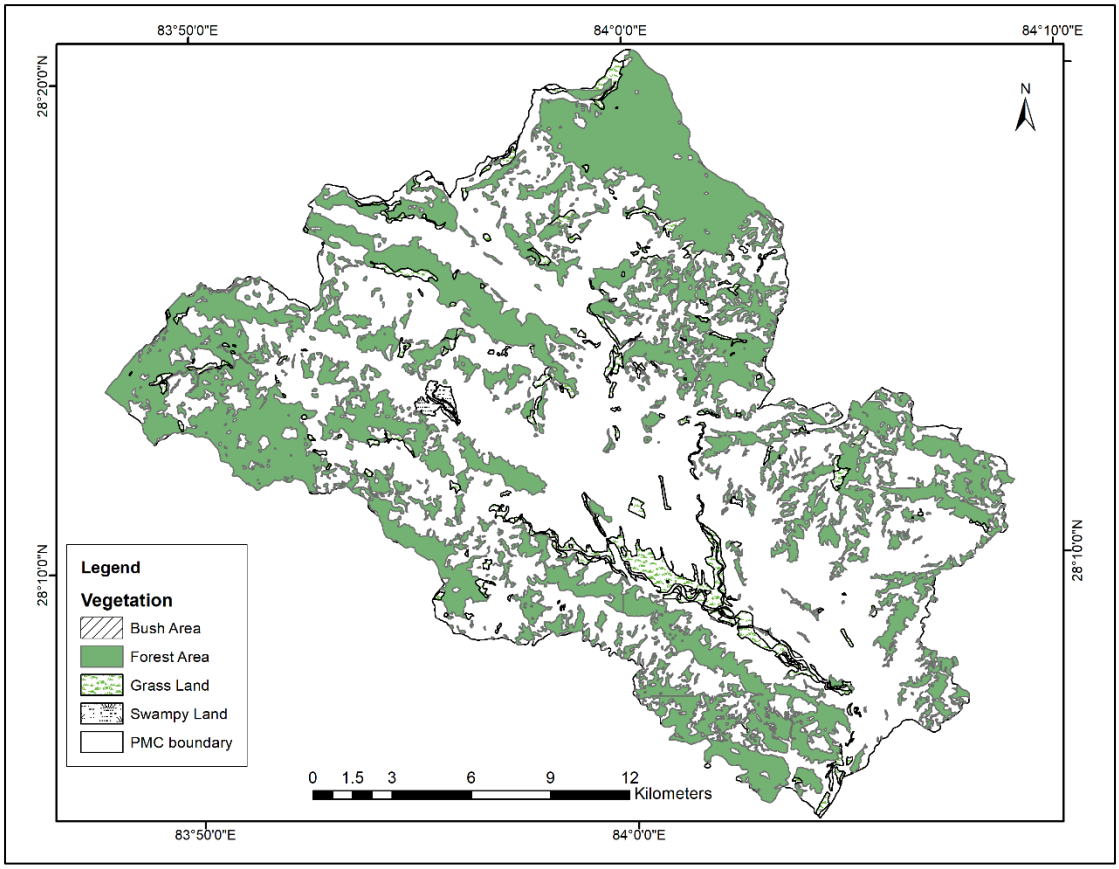
Immaturity is the chief characteristic of soils in PMC (Gurung, 1965). Soil is the source for plant nutrients supply and habitat for plants growth and development. Sarankot area has resudial soil fallowd by phyllitic rock with quarzie but sandy silty and silty sand are the major soil types are found in PMC. As regards the chemical perpoties high alkaline types in upper seti terrace and low to poor humas soil is dominineted (Gurung, 1985). Soil properties such as physical, chemical, and biological properties affect the plant growth and development. Due to the various reasons like relief features, parent materials, and denudation and deposition process different natures of soil has been formed in PMC also. The alluvial soil is also found in the river bank and basin.

Mountain boulder, conglomerate soil is deposited by the Seti Gandaki river around the plain area.

4.2.5 Natural Vegetation

The vegetation contributes to not only livelihood support; it is also a source of the beautification of landscape too. It attracts people for recreational activities mostly in the urban area. Based on height variance and aspect of slope there are innumerable types of green vegetation that are blossoming and making the area more attractive. Human life is inseparably linked with biodiversity because all nutrient cycle, ecological balance, water purification, etc. are provided by vegetation. Among the 113 types of orchid species prevalent in Nepal, 35 species of orchid including Sunakhari is available in this area (Poudel, 2017).

Figure 4.6: *Natural vegetation types and coverage in PMC*



Sources: Topographical Maps (1998) Government of Nepal, Google earth pro 2015 and field varifaction 2018.

Most of the hilly areas of PMC have government and community forest areas which contribute to the greenery scene around the built-up areas. PMC has covered

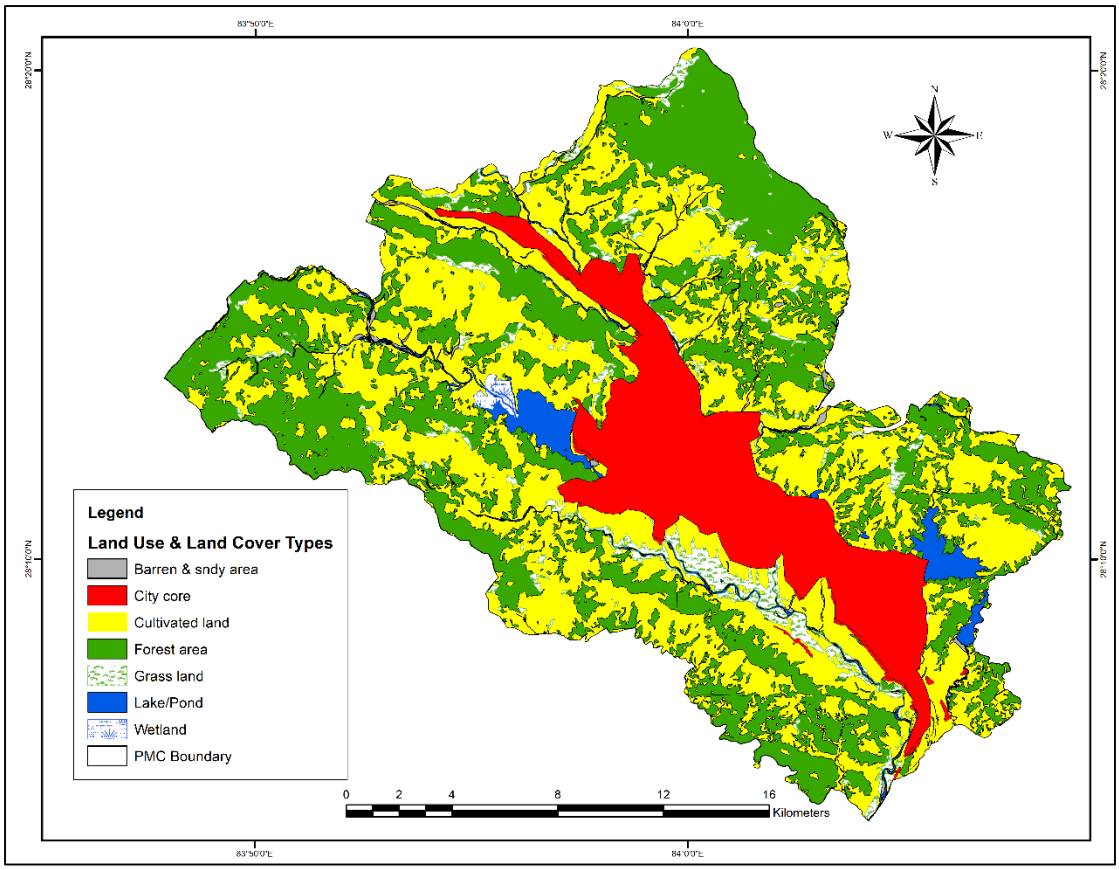
government forest, community forest, religious forest, plantation forest and conservation forest areas.

The Figure 4.6 shows that there are 439 patches of forest, 147 grassland patches, 117 bush patches and 11 orchards (Poudel, 2017). Among them, world botanical garden, Santi Ban, Bairagi Ban, Ban Pale, Bhadrakali area, Jayakot, etc. function as public open space used for recreational activities. Apart from maintaining a clean environment, vegetation has also become the main contributor to entertainment. The inner part of the world botanical garden, Shanti Ban, Banpale is used as a major recreational area in PMC. The surrounding hilly area of PMC is covered by thick vegetation which is the main reason of attraction.

4.2.6 Land Use and Land Cover in PMC

Land use means human use of land resources. It is referred to as the management and modification of its natural state into a built environment like settlement, agriculture, recreational sites, forest, industry, etc (Shrestha, and Kshetry, 2008). Due to diverse land use practices, urban land use is more complex than rural area land use. PMC has developed several urban nuclei as multiple centers which is quite allied according to its built-up area. Pokhara Metropolitan city is bounded by a core area and rural parts too (Figure 4.7)

Figure 4.7: *Land use and land cover in PMC, 2018*



Sources: Topographical Maps (1998) Government of Nepal, Google earth pro 2015 and field varifaction, 2018.

Table 4.6: *Land use land cover in PMC, 2018.*

Land use type	**Area (Square Km)**	**Percent**
Built of area	59.92	12.91
Cultivated land	198.22	42.7
Forest	159.71	34.4
Grass land	14.41	3.1
Lakes / pond	8.81	1.9
River strip	8.46	1.82
Wetland	1.87	0.4
POS and others area	12.84	2.77
Total	**464.24**	**100**

Table 4.6 revels different types land use pattern in PMC while 12.91 percent area covered by built up area while 42.7 percent area covered by cultivation, 43.4 perent vegetation, 3.1 percent grassland. However, land use situation and land cover patterns determine the shape, size, and edge of the riverbank, lakeshore, and other sloping land of vulnerability area. Similarly, road, forest area, institutional area, and POS are leading the development phases of settlement pattern and overall urban internal morphology.

4.3 Socio-cultural Condition

Pokhara city is rich in cultural diversities due to different group of people, encompassing language, religion, cuisine, social habits, music and arts. Pokhara is a city living by different caste, religions and cultural people. The population census 2011 reveals that caste (45.71), ethnic (38.92) Dalit (13.46) and others (1.9) but Brahmin. Gurung, Chhetri, Magar, Kami, Newar, Damai are the dominant castes in study area. The number of population, economic activities, educational institutions, believes systems etc. play vital role for social cultural aspect.

Among them, religious sites, museums, cultural sites are major sites to induce cultural situations. The Bhadrakali, Bindabasini, Bhairab temple, Dharmasila Buddha Bihar, Kedaresshwor temple, Jayakot monastery, Jame mosque, Talbarahi temple, World Peace Pagoda and museums, etc. reflects the religious, traditional, ritual aspects along with unique arts, architecture and traditions that are established by the different cast, religious people with their related customs in the past.

The historical perspective firstly for POS was determined by the community and it plays a vital role to impact the social, religious, economic and political change of society. So, urban POS's find the meaning and value with human presence and their activities over there. It provides social and neighborhood environments for everyone to communicate their information, perception with friendly chats and conduct social-cultural activities. It is a site for entertainment, the interaction between different persons in the urban area. Its characteristics like accessibility, visual pleasure, and connective nature help to create societies with different level and number of citizens. So, POS are those areas where the celebration is held like social- cultural, economic exchange, and political assembly occur freely. Most of the POS in PMC contribute to create social societies with people to people attachment characters. It helps to connect people from different age, sex, caste or ethnic group, class, and occupation. Similarly, it helps attach to their neighbor or social sense of place. These sites are inherently a blend of aesthetic beauties and also reflect the past situation of civilization. Thus, these sites are able to attract many visitors' in PMC.

4.3.1 Population Growth, Distribution and Density

The urban population has been rapidly increasing in the last 5 decades. In PMC the population is increased by natural process and immigration from the other parts of the country. The spatial pattern of population distribution in Pokhara metropolitan city differs from place to place. The distribution is characterized by agglomeration, linear pattern and disperses pattern. The Table 4.7. shows the growth of population in PMC.

Table 4.7: *Population growth in PMC*

Year	Population	Area (km)	Growth rate (Percent)	Density (Per square km)
1954/55	3755	24.05	-	156.16
1961	5413	24.05	5.0	225.11
1971	20611	24.05	18.0	857.15
1981	46642	55.66	8.5	837.98
1991	95268	55.66	8.5	1711.61
2001	156312	55.66	6.4	2808.34
2011	255465	55.66	6.34	4589.74
2017	413934	464.24	5.49#	891.64*

Sources: CBS, Nepal and district profile, Kaski, 2017.

Sources: https://www.macrotrends.net/cities/23352/pokhara/population, 2017

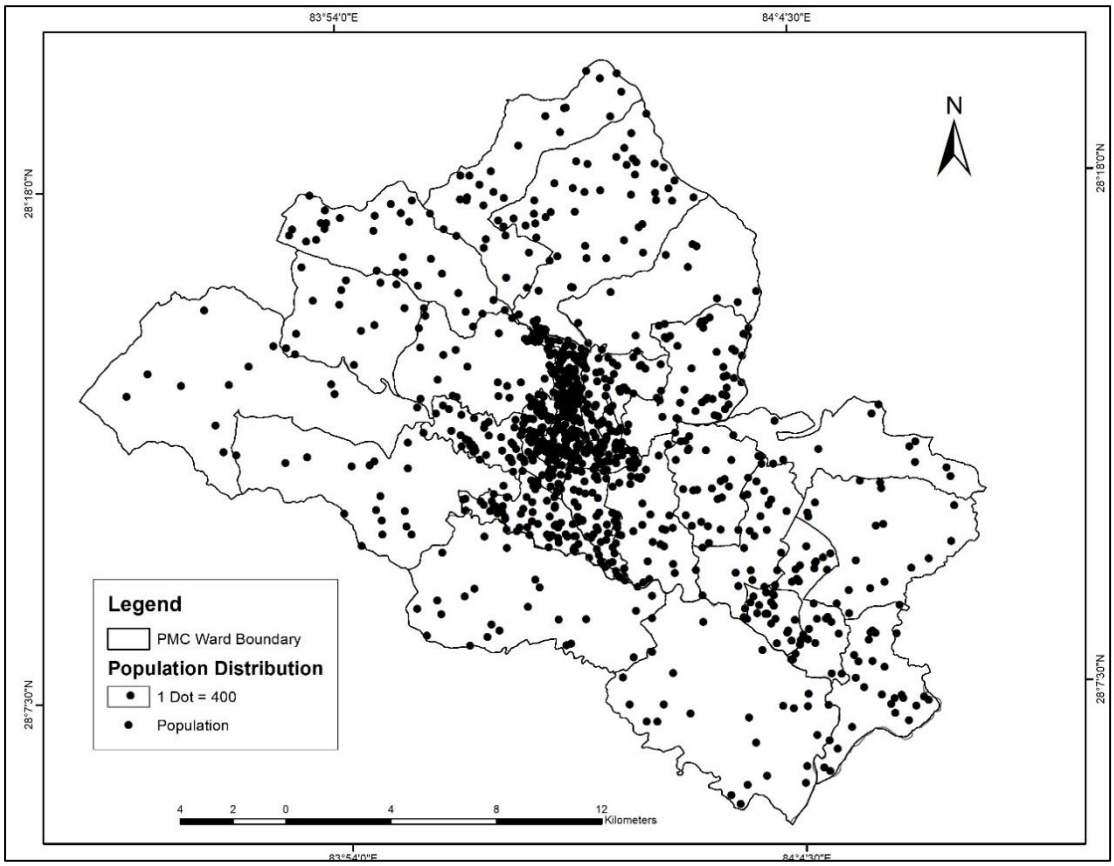
*The number of population has been increasing but increasing density is recorded in 2017.

Due to change in urban facility, administration center and extension of city area in different phases the area as well as the population of PMC has increased.

The uneven nature of topography and nature of urban growth has a direct impact on population distribution. The population distribution is not similar in all areas; the valley floor is densely populated whereas urban fringe and ridge areas are sparsely populated. Pokhara lies in the northern temperate zone so settlement in the hill area is characterized along the southern facing slopes based on sunshine. Generally, agglomeration is found in central valley floor and western part from the Bijayapur stream but the eastern side has a linear pattern and the urban fringe and its surrounding hilly area have dispersed pattern of population distribution due to sloppy land scape.

However, some sites or patches around the city like Hemja, Begnas lake, Bhandardhik, Gagangaunda, Khudi, etc. also are found to be urban agglomeration. The spatial population distribution is presented in Figure 4.8. (Appendix III)

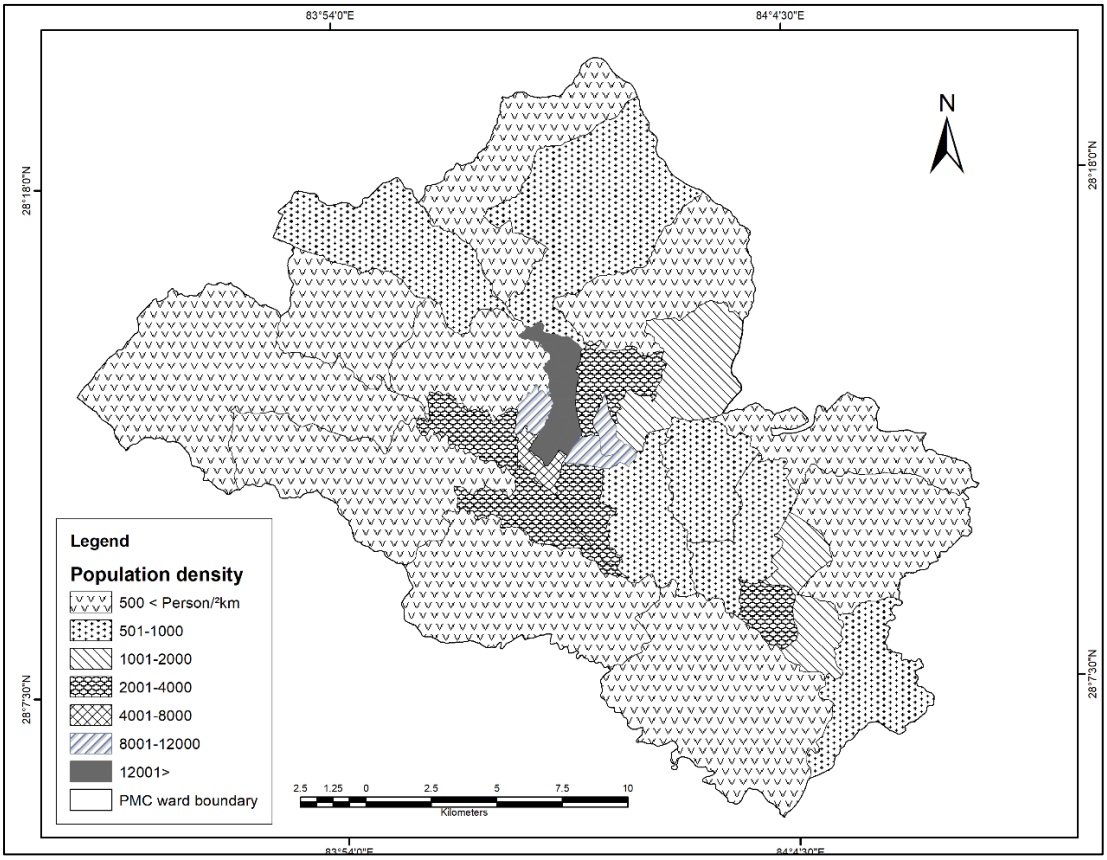
Figure 4.8*: Ward wise population distribution in PMC, 2017*



Map sources: Topographical Maps (1998) Survey department of Nepal and CBS 2011).

According to the national population census 2011 (B.S. 2068), the total population of PMC is 413934, out of which the number of the females is 48.58 percent and the number of males is 51.42 percent. Due to immigration and naturally high birth rate the population growth rate is increasing day by day. Although the overall population growth of the country is 1.37, Kaski district has 2 percent (2011, CBS) while PMC has 5.27 percent (Municipality profile, 2018) growth rate. The higher population growth rate in PMC is mainly due to higher migration rate from outside. The population and number of households in the wards are shown in Appendix III.

Figure 4.9: *Density of population by wards in PMC*



Sources: National population census 2011 and Kaski District Profile, 2017.

The average urban population density in the country was 138 per km^2 while the population density of PMC was 866.74 per km^2 in 2011 census. Figure 4.9 shows that the density of the population in PMC which is highest in ward number 4 (17862.88 per square km) and the lowest in ward number 23 (102.74 per square km). The average population density in PMC was 891.63 per square km. The data shows that high density areas have less POS and less dense areas have more POS.

4.3.3 Urban Form and Urbanization

The urban form or city dimension has complex physical as well as a social system. The whole urban form is guided by physical form and administrative boundary. However, city morphology is influenced by the segmentation of different patches in the name of physical, socio-cultural or recreational spaces which reflect human civilization too. Therefore, an urban form has been combined with multi-use of land. The plain area is almost covered by building, road, and other urban configurations. The entire area has

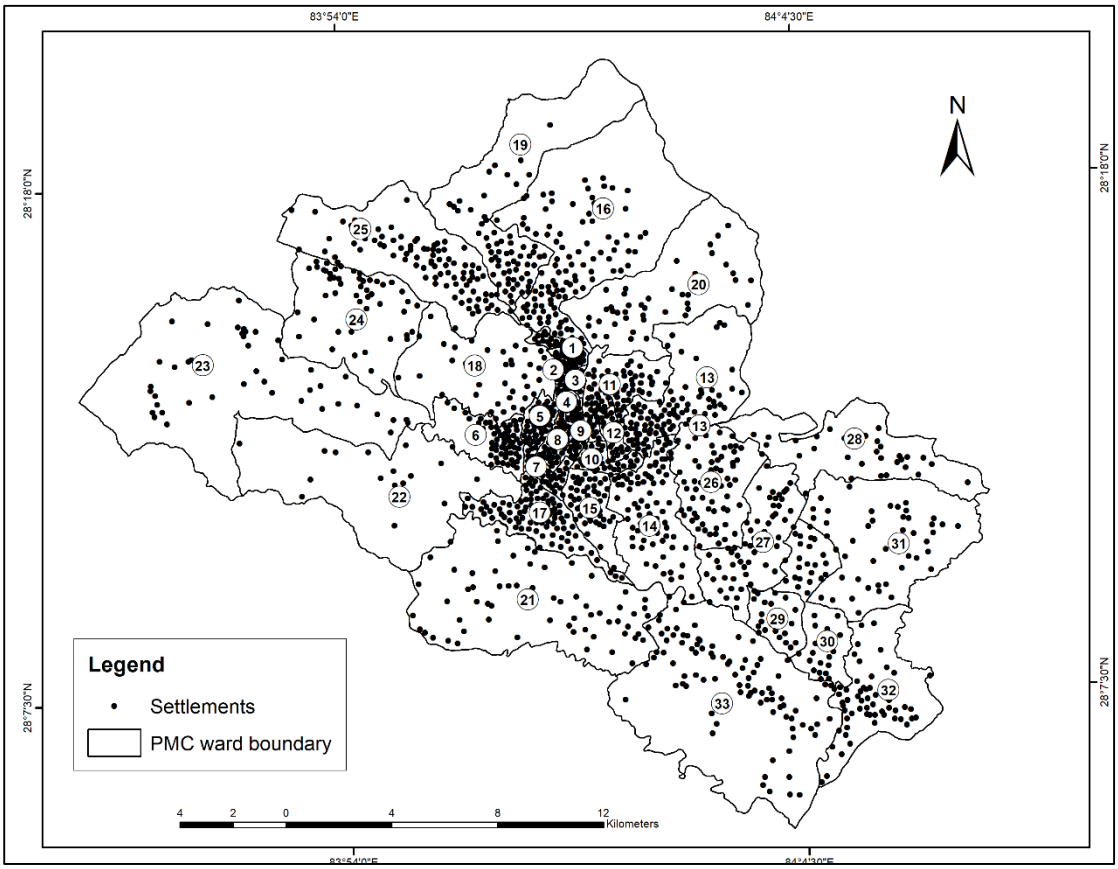
been developed without proper planning, due to haphazard urban development, the urban area has become congested and lacks the attention of stakeholders.

Pokhara has almost six decades long urban history. The urban population data have been found since 1951 B.S. (while the national census started since 1881 A.D.) Before 60 years Pokhara was a small market center with few settlements like Nalakomukh, Sanghukomukh, Gaudakomukh, Baidam, Pardi, Masbar, and Bindabasini area. Other large parts of Pokhara looked like open areas. After eradication of Malaria, and declaration of the municipality along with declaration of Pokhara as headquarters of Kaski district, Gandaki zone and western region and construction of Prithvi and Siddhartha highway, rapid urbanization started (Shrestha, and Kshetry, 2008). Similarly, with the establishment of colleges, hospitals, industrial states and development of urban infrastructures, immigration of people from surrounding hill regions increased. As a result, the number of population increased rapidly. The Pokhara urban area has been expanded from time to time and presently (2017) its surrounding Village Development Committees and Lekhnath municipality have been merged and formed Pokhara Metropolitan city. Therefore, the urban growth of PMC is contributed mainly by three causes such as the natural increase of population, population increase due to immigration, and reclassification of urban area or inclusion of peripheral settlements. The PMC falls under the rapid urbanization area of the country.

The urbanization process in PMC started after the development of Prithvi highway and Sidhartha highway which assisted to connect Pokhara city with Capital city and Terai region, respectively. However, from time to time the areas of PMC are frequently changing and increasing due to political decisions. So its area has expanded and wards have been extended from 13 to 18 wards in 1995 to 27 wards in 2014 and 33 wards in 2017 after annexation of Lekhnath Municipality in to PMC (Table 4.7). Until five decades ago, there were scattered settlements and there were 26 plots of big open space which was called Patans (Flat open land area) was used for playground, security training field, and grazing area. Some of these Patans are Bhimkali Patan, Malepatan, Bajhapatan, Majheripatan, Lampatan, Gairapatan, Chhorepatan, Kolpatan, Phalepatan, Gharipatan, Dhungepatan, etc. (Adhikari, 2004). By now, all Patans have changed into built-up areas. The urban settlement is known as a development process of human beings for their basic requirement and sophistication (Rao, 2014). The settlements of PMC have been increased rapidly by the last five decades (Adhikari, 2004). The

settlements have been developed with various clusters and disperse patterns. There are 107810 houses within 500 settlements (Tole) in PMC (PMC, 2017).

Figure 4.10*: Distribution of settlements in PMC*



However, the plain area is dominated by cluster and adjoining urban fringe or urban areas have irregular or uneven distribution of human settlements. The distribution of settlement is shown in Figure 4.10. The settlement's distribution pattern looks similar in the hilly and plain areas but the number of houses is more compact ones.

4.4 Infrastructure and Facilities

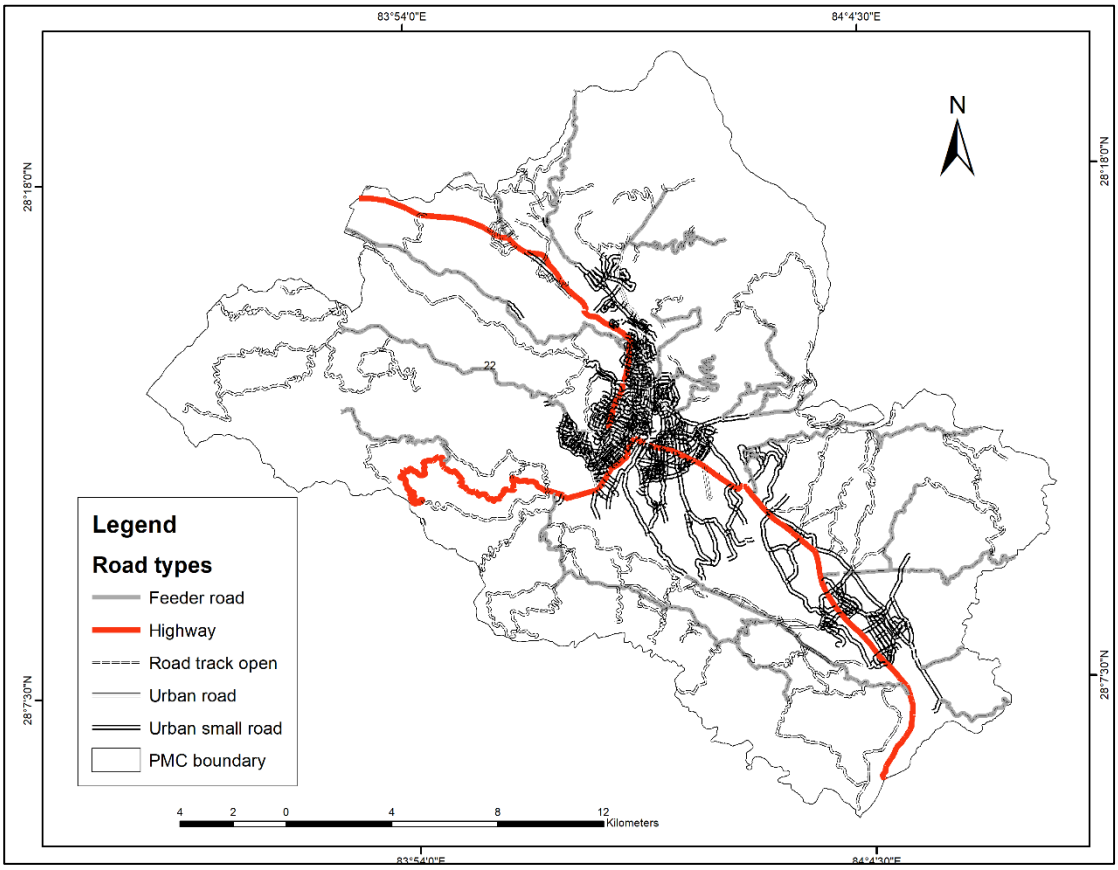
There are several types of infrastructure and facilities in PMC. Among them, drinking water, road, electricity, and communication are the main facilities of urbanities. These facilities are measured in terms of access and volume.

4.4.1 Road Networks

Pokhara metropolitan city is connected to several parts of the country by three highways such as Prithvi highway to the capital city in the east, Sidhartha highway to Butwal in the west, Bhupi Sherchan highway to Banglung in the northern part of PMC. The study area has been categoried as an urban road and feeder road which are then connected

with various settlements to urban centers as well as POS patches. Similarly, other link roads connect to the urban periphery. Likewise, around the built-up area, people use .

Figure 4.11: *Road network in PMC*



foot trail to travel, particularly in the hilly landscape of PMC. The total length of the motorable road is 510 km with 2151 segments (2016). The road and its spatial distribution pattern is presented in Figure 4.11. These different types of roads are linked to airport as well as POS. Road accessibility is essential to use the POS. Most of the POS patches are connected to different categories of motorable road in PMC.

4.4.2 Others Facilities

The physical and social service sectors are being developed and are expanding in PMC. The basic necessities such as health, education, drinking water, communication, electricity, and other essential infrastructures of the city are considered. There are two governments and 23 private hospitals providing health facilities in Pokhara. there area 200 community and private schools, 20 campuses, and two universities have been formally providing general and vocational education. Likewise, more than 75000

households (92 percent) have drinking water facilities. Several banks and cooperatives provide financial services to the people. With the expansion of the mobile phone, the communication has become convenient. Presently, the condition of urban utilities is increasing regularly.

CHAPTER - V

TYPOLOGY, SPATIAL PATTERN AND PER CAPITA OF PUBLIC OPEN SPACE

This chapter examines the typology and spatial characteristics of existing public open spaces and per capita in the PMC. It consists of five sections. The first section discusses the POS and their typology. The spatial distribution and pattern of POS are discussed in the second section. Similarly, dimensions of POS are described in the third section. The fourth section presents per capita POS. The last section of this chapter concludes with the chapter summary.

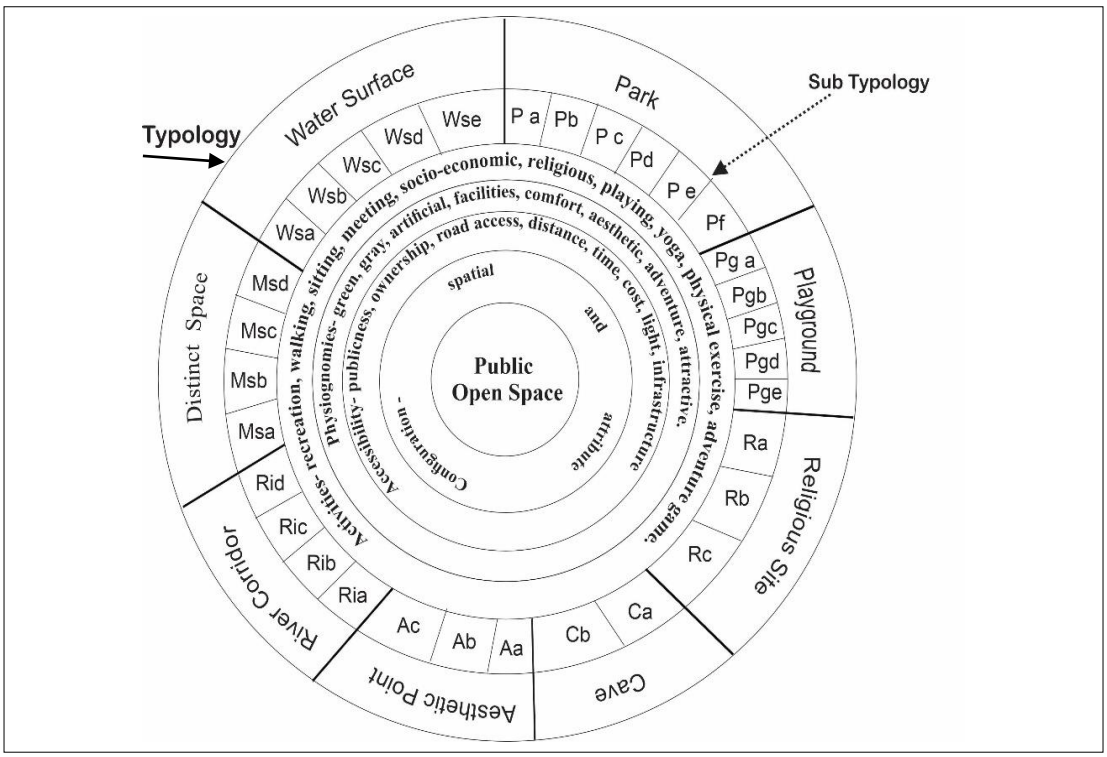
5.1 Public Open Spaces and their Typology

The public open spaces of Pokhara metropolitan city vary in nature. All together there are 275 public open spaces with eight types (parks, playground, religious site, water surface, viewpoint, cave, river strip and distinct space) have been identified. On the basis of POS's spatial pattern, social and economic dimensions, infrastructure development or layout, management and using practices, eight major typologies are developed (Table 5.1a. and Figure 5.1). Each specific type covers several sub-typologies. For example, the *park* POS have sub-types as 1) mini parks, 2) green parks, 3) formal garden parks, 4) memorial parks, 5) institutional parks and 6) purposed parks. In this way, all eight types of POS have 32 sub-typologies (see Appendix II, and XIII for detail). The POS have different shape and size which are under use with various purposes.

Table 5.1a: *Typology and Sub-typologies of POS in Pokhara Metropolitan City*

Code	Sub-typology	Code	Sub-typology	Code	Sub-typology
1.Park -P Pa	Mini park (23)	3.**Religious site** -R*) Ra*	Formal garden (7)	**6.Aesthetic Point** -A*) Aa*	Popular with high altitude (1)
Pb	Green park (9)	Rb	Green space (10)	Ab	Aesthetic viewpoint fewer visitors (8)
Pc	Formal garden (6)	Rc	Open field (52)	Ac	Viewpoint few visitors (8)
Pd	Memorials (4)	**4.Water surface** -*Ws)*Wsa	Lakes popular (3)	**7.River strip** -Rc*)* Ria	Recreation (4)
Pe	Institutional park (5)	Wsb	Lakes (7)	Rcb	Holy Bathing and ritual (4)
Pf	Purposed park (50)	Wsc	Ponds (8)	Rcc	Multi use (4)
2.Playground -Pg*)* Pga	Well managed (3)	Wsd	Waterfall (2)	Rcd	Cemetery (7)
Pgb	Managed (3)	Wse	Reservoir (1)	**8.Distnict space**- Ms*)Msa*	Wetland (5)
Pgc	Partially managed (12)	**5.Cave** -*C)* Ca	Popular (3)	Msb	Socio- economic site (2)
Pgd	No manage (8)	Cb	Less popular (7)	Msc	Dumping site (1)
Pge	Adventure (1)			Msd	Recreational sites (7)

Figure 5.1: *Typology and sub-typologies of public open space in PMC*



Sources: Field survey 2017/2018

Note: The Figure in parentheses mention the number of POS in each category

The POS are categorized according to their spatial characteristics, utilization, and management practices. (Table 5.1a and Figure 5.1)

Figure 5.2: *Types of POS and their area in percent.*

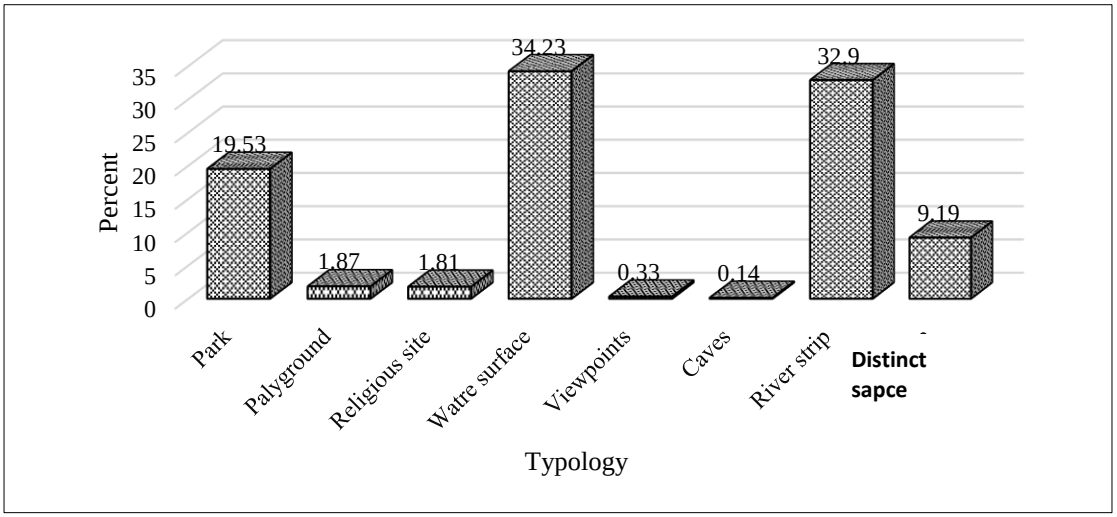
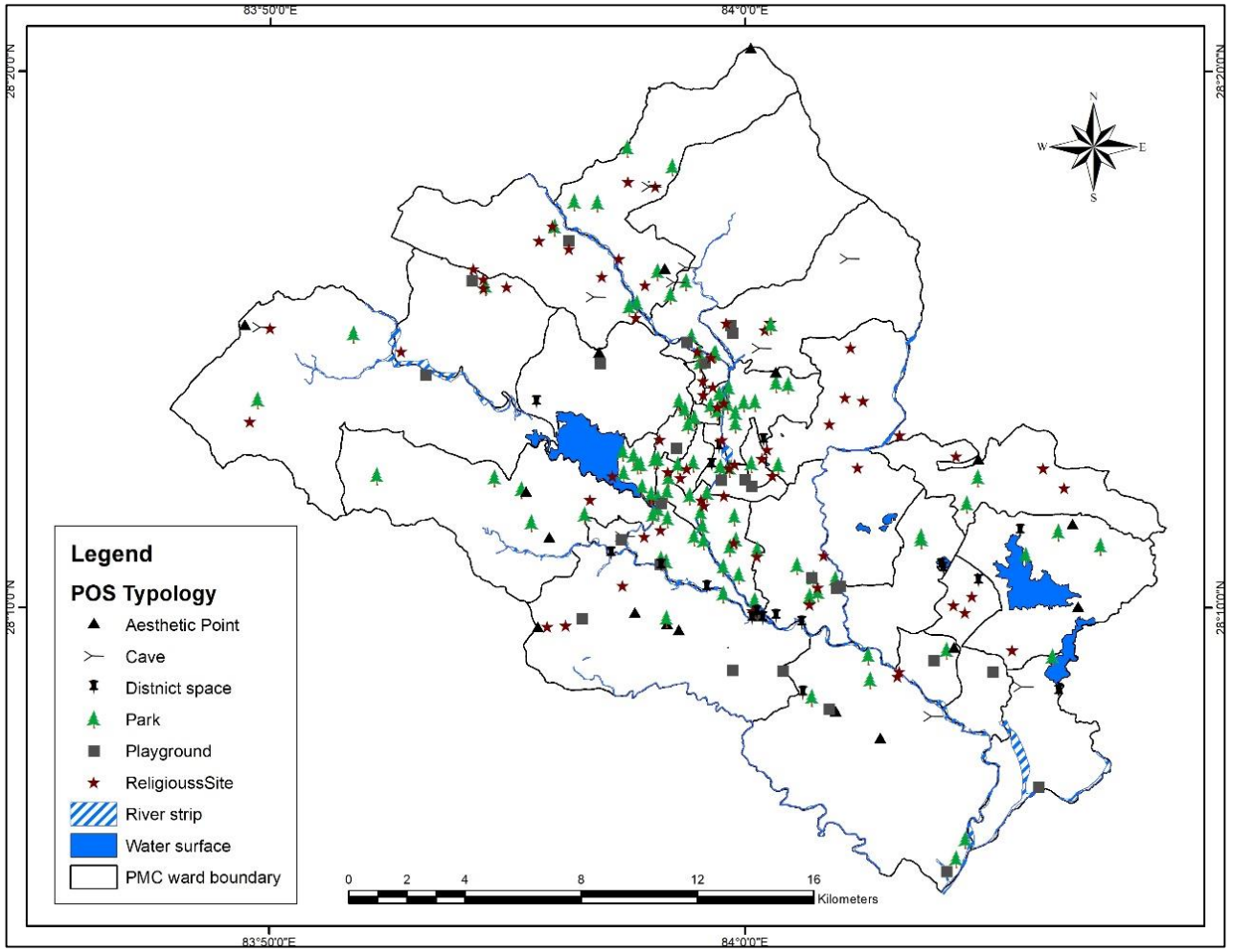


Table 5.1b shows the typology, sub-typology, its number and covered area. In terms of covered area, water surface covers one-third portion of the total areas covered under all POS (Figure 5.3). Similarly, river strip also covered one third parts of the POS. While 97 patches of parks cover only 20 percent of the total areas under POS in PMC. It shows that water surface and river strip types is more dominant in terms of area. The characteristics of each major typology are briefly discussed below:

Figure 5.3: *Typology of POS in PMC*



Source: Field Study 2017/2018

Table 5.1b: *Typology, sub-typology and area of POS in PMC*

Typologies	S.N.	Sub typology	Number of Patches	Area (Hectares)	Percent
1. Parks	1	Mini parks	23	4.4555	0.17
	2	Green parks	9	331.101	12.86
	3	Formal garden parks	6	12.916	0.50
	4	Memorials parks	4	3.503	0.14
	5	Institutional parks	5	37.113	1.44
	6	Purposed park	50	113.622	4.41
		Total	97	502.7105	19.53
2. Playgrounds	7	Well managed	3	25.006	0.97
	8	Managed	3	5.407	0.21
	9	Poor managed	12	13.829	0.54
	10	No managed	8	3.299	0.13
	11	Paragliding ground	1	0.555	0.02
		Total	27	48.10	1.87
3. Religious sites	12	With formal garden	7	4.707	0.18
	13	With green space	10	17.479	0.68
	14	With open space	52	24.446	0.95
		Total	69	46.632	1.81
4. Water surface	15	Popular lake	3	838.059	32.56
	16	Less popular lake	7	38.95	1.51
	17	Pond	8	1.548	0.06
	18	Reservoir	1	1.937	0.08
	19	Waterfall	2	0.576	0.02
		Total	21	881.07	34.23
5. Viewpoints	20	More popular	1	0.641	0.02
	21	Popular	8	3.491	0.14
	22	Less popular	8	4.454	0.17
		Total	17	8.59	0.33
6. Caves	23	More popular cave	3	1.725	0.07
	24	Popular cave	7	1.936	0.08
		Total	10	3.66	0.14
7. River strip	25	Recreation	4	274.781	10.67
	26	Religious Bathing/ ritual	4	21.277	0.83
	27	Cemetery	7	7.16	0.28
	28	Multi-use	4	543.733	21.12
		Total	19	846.95	32.90
8. Distinct spaces	29	Dumping site	1	4.473	0.17
	30	Recreational site	7	41.079	1.60
	31	Exhibition and museum	2	3.756	0.15
	32	Wetland	5	187.186	7.27
		Total	**15**	**236.49**	9.19
	Grand Total		**275**	**2574.20**	**100.00**

Sources: GPS Survey, Google Map, Cadrastral Map and Filed Survey, 2017/2018

5.1.1 Parks as POS in PMC

Parks are the most popular POS in the city that has different features with different characteristics. PMC has 97 parks in total including small parks, Botanical gardens, green parks, etc. These parks occupy 19.53 percent (502.71 hectares) areas of the total POS in PMC. These parks can be divided into six categories based on their characteristics. PMC has formal gardens, green parks, memorial parks, mini parks, institutional parks, and purposed park areas. People utilize these parks for different purposes like family gatherings, social activities, political activities, religious activities, economic activities, morning walks, etc. The sub typology of park, location, areas and uses are shown in Figure 5.4 and Table 5.2.

Figure 5.4: *Park and its sub-typology*

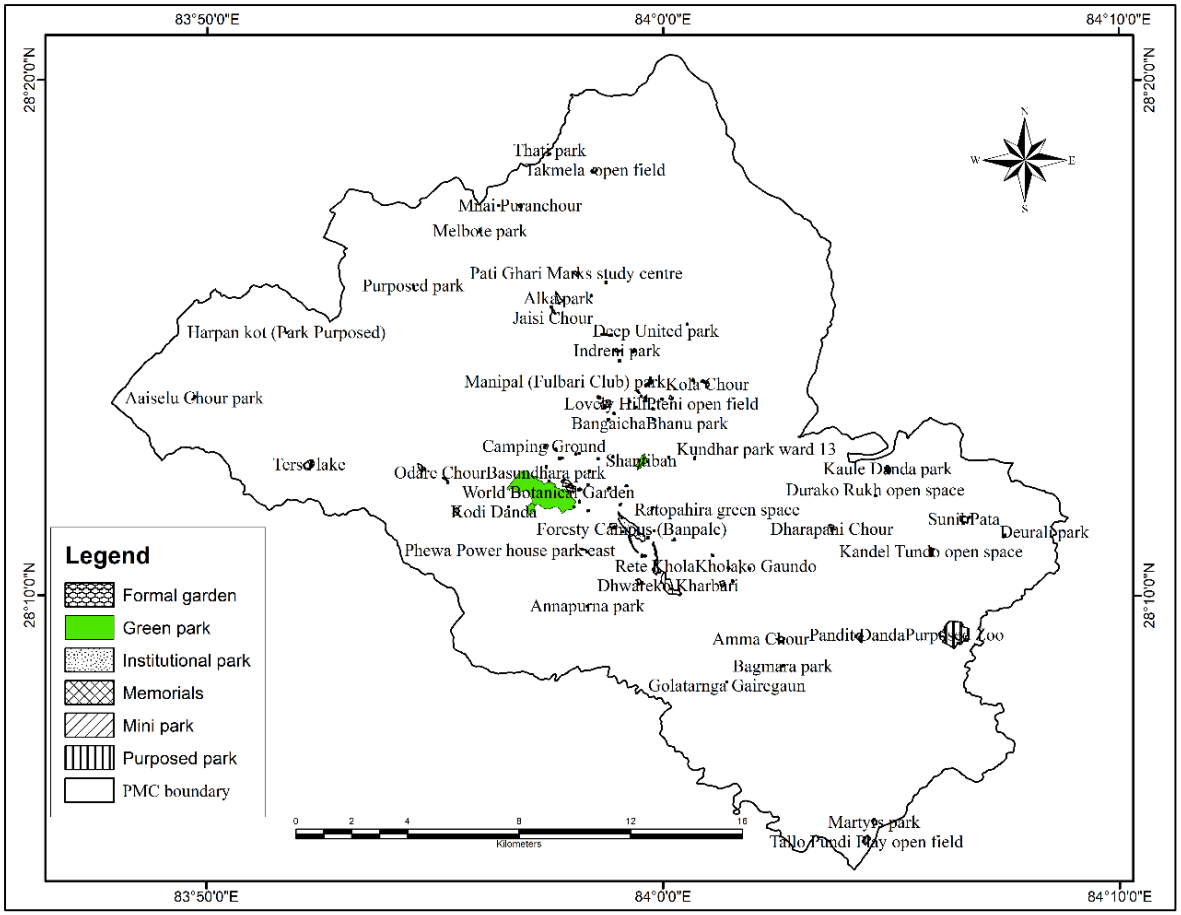


Table 5.2: *Sub-typology of Park*

Sub-Typology	Number & area	Name of major public open spaces	Uses
Mini parks	23 (4.45)	Annapurna park, Balmandir park, Bhanu park, Birendra park, Deep United park, Dhundgesangu chock park, Dream Park, Ganeshman park, Housing complex open space, Jalbinayak Park, Jarebar, Kopildhunga park, Kundhar park ward 13, Milan park, Miteri village park, Mother community park, Patangini, Phew Dam park, Phewa Powerhouse park west, Puspalal park, Sattyaharischandra Manch, School Patan park, Thati park, Visit Nepal Year park	Recreation, meeting, waiting, Meditation, leisure time spent etc.
Green parks	9 (331.10)	Bairagi Ban, Bhimsendahal Patisthan park, Indreni Park, Kandel Tundo, Manipal, Purposed Zoo, Ratopahiro, Shantiban, World Botanical Garden	Recreation, picnic, walking, Jungle safari
Formal gardens (parks)	6 (12.91)	Bangaicha, Basundhara park, Galeshwor park, Komagane park, Machhapuchre, Manohar park	Recreation, yoga, meeting, walking, cultural activities.
Memorial parks	4 (3.50)	Jhapendra, martyrs park, Sahid Chock park, Sahid park, Sahid memorial park	Recreation, meeting, walking
Institutional parks	5 (37.11)	Camping Ground, Forestry Campus (Banpale), Harka Chock, Mountain museum Park, Tutunga open space	Camping, sightseen, cultural & economic activities
Purposed parks*	50 (113.66)	Aaiselu Chour park, Amma Chour, Bagmara park, Bhoteko Chautaro, Bhulbhule, Bulaundi green park, Chauri Danda, Chor Sangu park, Deurali park, Dharapani Chour, Dhwareko Kharbari, Durako Rukh open space, Fulbari open space, Gahate park, Golatarnga Gairegaun, Harpan Kot, Jaisi Chour, Jestha Nagarik park, Kaski Kot park, Kaule Danda park, Kholako Gaundo, Kodi Danda, Kola Chour, Lovely hill, Maidan open space, Majheriptan open space, Majheriptan open space (Phalepatan) Marks study center, Melbote park, Mnai Puranchour, Odare Chour, Pandit Danda Park, Pati Ghari, Phewa Power house park east, Phlnu Khane Chour, Pteni open field, Puspalal Study center and park, Raikar open field, Ramchautari, Rete Khola, Scaut office and park, Seti gorge park, Sunil Pata, Takmela open field, Tallo Pundi open field, Terso lake, Thati park, Ward area open space, Ward Park Kolpatan, Water spring area, Water Tank open field	Proposed park used for different recreational activities
Total	**502.71**		

Source: Field Survey, 2018

*Metropolitan purposed these site to develop park.

Note: The Figure in parentheses is the covered area of POS.

Especially, it is found that those parks that are located closer to densely populated areas or busy traffic roads as neighborhood or mini-parks with proper management sites have been intensively utilized. In terms of visitor's experiences, open spaces with the compound wall are more appropriate than open spaces nearer to the footpath.

The parks have been using in different ways. Besides the use as recreational activities some of the parks are also determined by local authority and interest of the local community purposes like trade fair, cultural programme etc. World Botanical Garden, Jayakot, Shantiban, Basudhara Park, Komagane park, Martyr's park, Puspalal park, Ganeshman park and Phewa dam park are the major and famous parks located in PMC.

5.1.2 Playground as the POS

There are different categories of playgrounds in PMC. These sites occupy 48.10 hectares (1.87 percent) of total POS in PMC. It is a place of recreation, physical wellbeing and occasionally it is used for socio-economic activities and gathering of people for political discussion. In PMC there are 27 patches which have public access

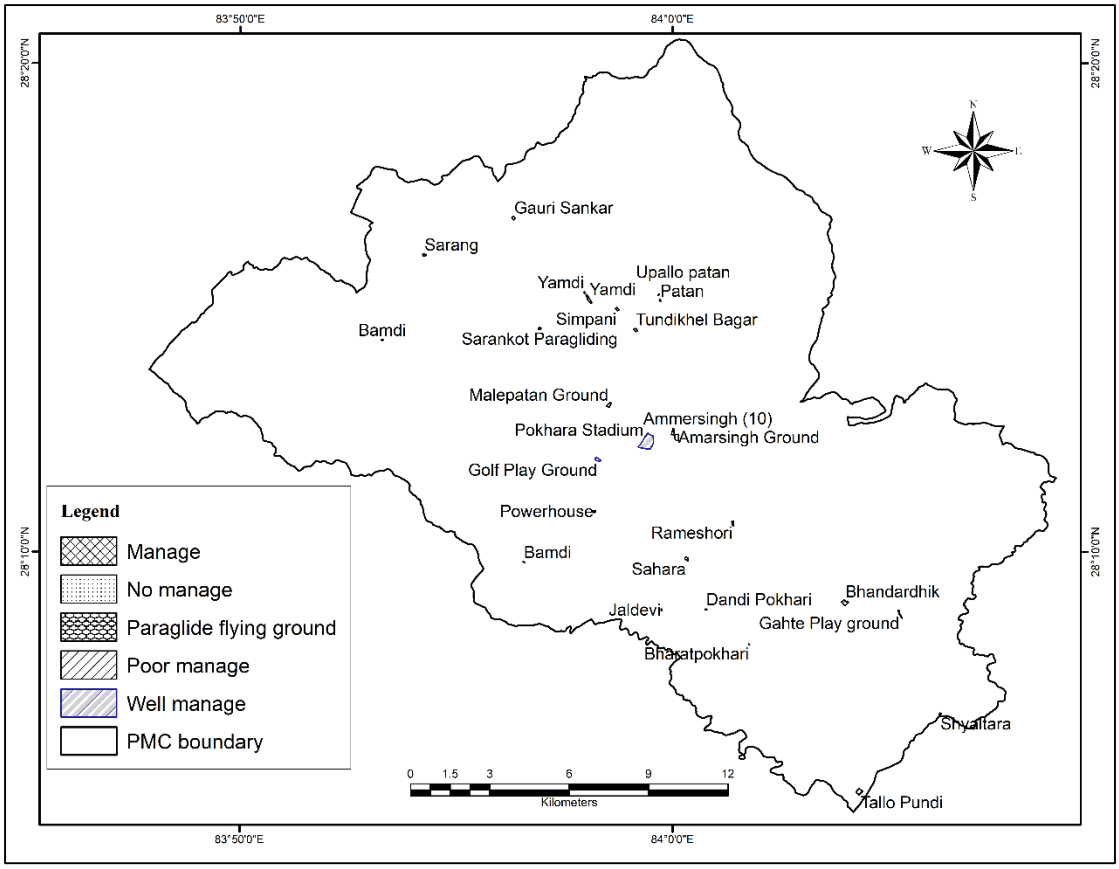
Table 5.3: *Categories of playground*

Sub-typology*		**Number & area (ha.)**	**Name of major public open spaces**	**Uses**
Management aspect	Well managed	3 (25.006)	Pokhara Stadium, Himalayan Golf course, Pardi golf ground	Indoor-outdoor, national & international games
	Partially managed	3 (5.407)	Bhandardhik, Bijayapur Golf ground Bijaypur, Sahara playground.	Outdoor games
	Poorly managed	12 (13.829)	Amarsingh ground (10), Amarsingh ground (12), Bamadi, Bharatpokhari Gahte Gaurishankar, Jaldevi, Malepatan, Rameshori, Sarang playground, Tallo Pundi Tundikhel Bagar.	Games (volleyball, football etc.)
	No management	8 (3.299)	Bamdi, Dandi Pokhari, Patan, Powerhouse, Simpani, Tibetian Camp, Shyaltara, Upallo Patan	Occasional use for volleyball, football
	Adventure (Paragliding ground)	1 (0.555)	Sarangkot.	Use for flying paraglide

Source: Field Survey, 2017/2018

- Playground are catogoried base on their management situation.

Figure 5.5: *Location and types of playgrounds by management*



as playgrounds. Among them, Pokhara stadium is the largest in size and is used for various games. Due to the lack of available playing field, people also use river terraces as playgrounds. However, existing playground typology is categorized into five subdivisions such as public playground with well management, partially managed playground, poor managed, non-managed playground, golf course and adventure ground like paragliding spot (Table 5.3 and Figure 5.5).

Among these playgrounds, almost 11 percent patches are well managed (Parafeet, Parking, drinking water, restroom, shed, compounded), 11 percent are partially management Drinking water, restroom, compounded) and 45 percent are poorly managed (Compounded, plain ground only) playgrounds. Similarly, 29 percent of the playground sites are used without management (hardly use for playing).

5.1.3 Religious Sites as POS

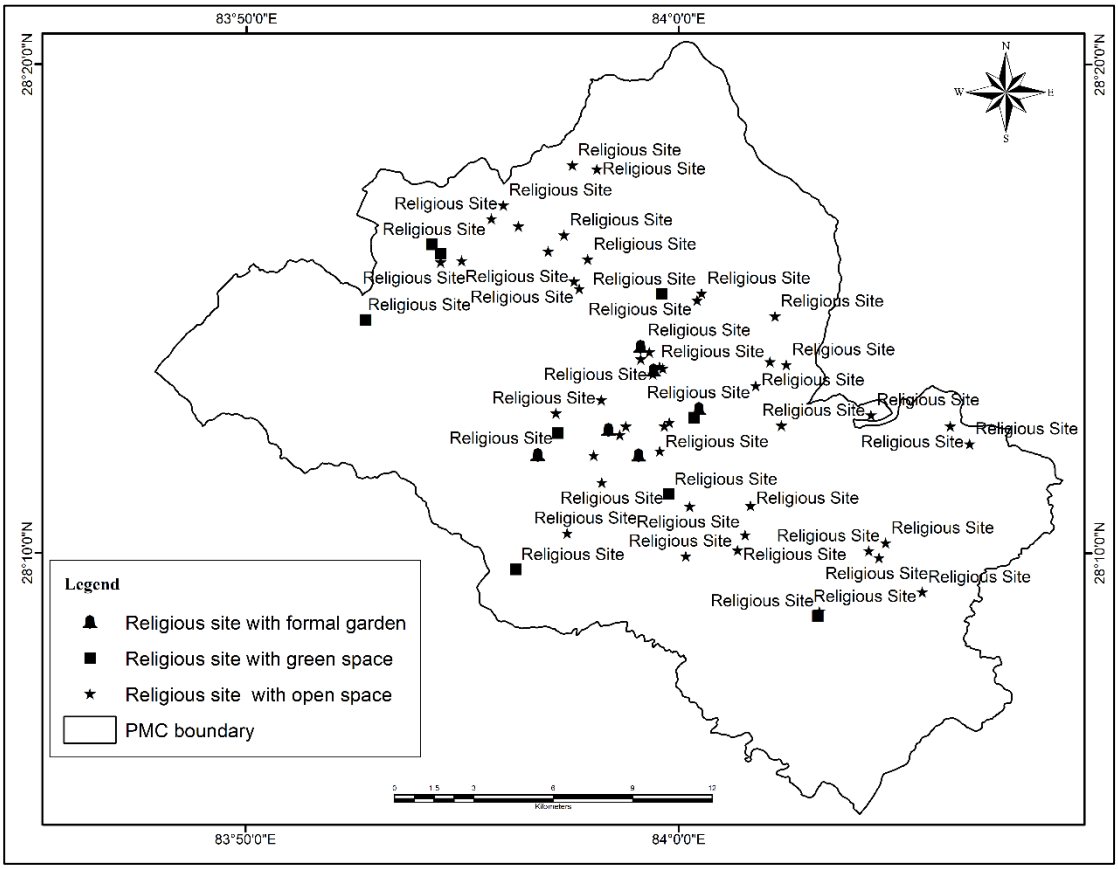
PMC has 69 religious sites and are used as open space. Hindus, Buddhists, Muslims, and Christian are using these sites for their religious purposes.

Table 5.4: *Characteristics of religious POS*

Sub-Typology	Number & area (ha.)	Name of major public open spaces	Uses
With formal garden	7 (4.707)	Bindabasini, Dharmasila Bhuddabihar, Matepani Gumba, Puskareswor Mahadev, Rammandir/ Shivalaya Ramghat, Radhakrishna temple, World Peace Pagoda	Worship, recreation, cultural activities
With green space	10 (17.479)	Bhadrakali, Ghakristhan, Gorakhnath, Gupta Kalika, Harhar Gupha, Magthum Tapoban, Mahaprabhudham, Jantikiche stone, Shidshwor Siva Panchyan, Shiva Mandir (Shiva Temple).	Worship, cultural activities, yoga
With open field (space) only	52 (24.446)	Akala Devi temple, Akala temple Tallo, Baudha Argau Sadan, Gaumba Tamagi, Bhagabati temple, Bhairab temple, Bishnu Paduka temple, Chandi temple, Danda Surka temple, Deurali temple, Devi temple, Dihi Aarba religious site, Galeshwor Shivalaya, Gita Mandir, Gumba Bijayapur, Guthi Bindabasini, Harihar Dham Guthi (Birauta), Hemja Gumba, Jame Masjid, Kalika temple, Kaule religious site, Kaure Gumba, Kedareshwor religious place, Life word mission church, Manakamana temple Malepatan, Manakamana temple Bayale, Manakamna temple Mohoriya, Manakamna temple Kalika, Mani Deep Aarba, Matrikeshwor temple, Mattikhan Kot, Narayan Sthan, Narmadeshwor temple, Osho Upaban, Pandit Pauwa (Guthi), Parbati temple, Pasupathi Nath Mandir, Phulpati Selaune temple, Radha Krishna temple, Radha Krishna temple, Radha Krishna temple, Radha Krishna temple, Rammandir Birauta, Ritual (Kiriya Putri-site), Shiva temple, Shiva temple, Shiva temple, Sukleswhor temple, Sunpandali, Talbarahi temple, Shiva temple, Ward office and temple.	Worship, yoga

Source: Field Survey, 2017-2018

Figure 5.6: *Sub-typology of religious sites*



These religious sites occupy almost two percent area of total POS of PMC. Most of the religious places in PMC have been managed and maintained with gardening. Religious POS such as Bindabasini, Bhadrakali, Talbarahai, Kedaresowor, World Peace Pagoda, Rammandir, Sunpandali and Matepani Gumba are famous because it is believed that these religious sites comprise super divine power. The religious typology has been divided into three subdivisions such as religious formal garden, holy place with green space and open religious sites.

Table 5.4 and Figure 5.6 show sub typology of religious sites and their areas. Temples, monastery or *Stupa* are situated at various places but church and mosque are very limited on number in comparison to temples and monasteries. Seti Gandaki river is also known as a holy river where followers takes religious bath in the water for the purification of soul during different rituals.

5.1.4 Water Surfaces as POS

Water surfaces are also considered an important part of urban POS. Pokhara is known as Lake City because it has almost a dozens of lakes and several artificial ponds. Water surfaces in PMC are popular for natural vibes and entertainment purposes. These sites occupy 34.23 percent of total POS in PMC.

Phewa, Begnas, Rupa, Maidi, Deepang, Khaste, Niureni, Gunde, Kaysep, Kamalpokhari, are major water surfaces in lake forms. Among them Phewa, Begnas and Rupa are the most popular destinations for visitors. There are some water ponds basically around the urban periphery. The water surface public open space can be categorized into five groups such as natural lakes with large visitors, natural lake with fewer visitors, the artificial ponds, waterfalls and the reservoirs. It provides the environment for the visitors to carry out recreational activities.

Table 5.5: *Characteristics of water surface POS*

Sub-Typology	Number & area (ha.)	Name of major public open spaces	Uses
Lake popular	3 (838.059)	Phewa, Begnas, Rupa.	Recreation, aesthetic water fun
Lake less popular	7 (38.95)	Dipang, Gunde, Kamal Pokhari, Kasyap, Khaste, Maidi, Niureni.	Water fun
Major Ponds	8 (1.548)	Banjhi Pokahari, Bhadrakali pond, Kalika, Kaure, Khadka, Maula, Sani Pokhari, Thulipokhari.	Domestic use by local people
Reservoir	1 (1.937)	Jaubari	Sightseen
Waterfall	2 (0.576)	Devid fall, Phewa powerhouse.	Recreation

Figure 5.7: *Sub-typology of water surface*

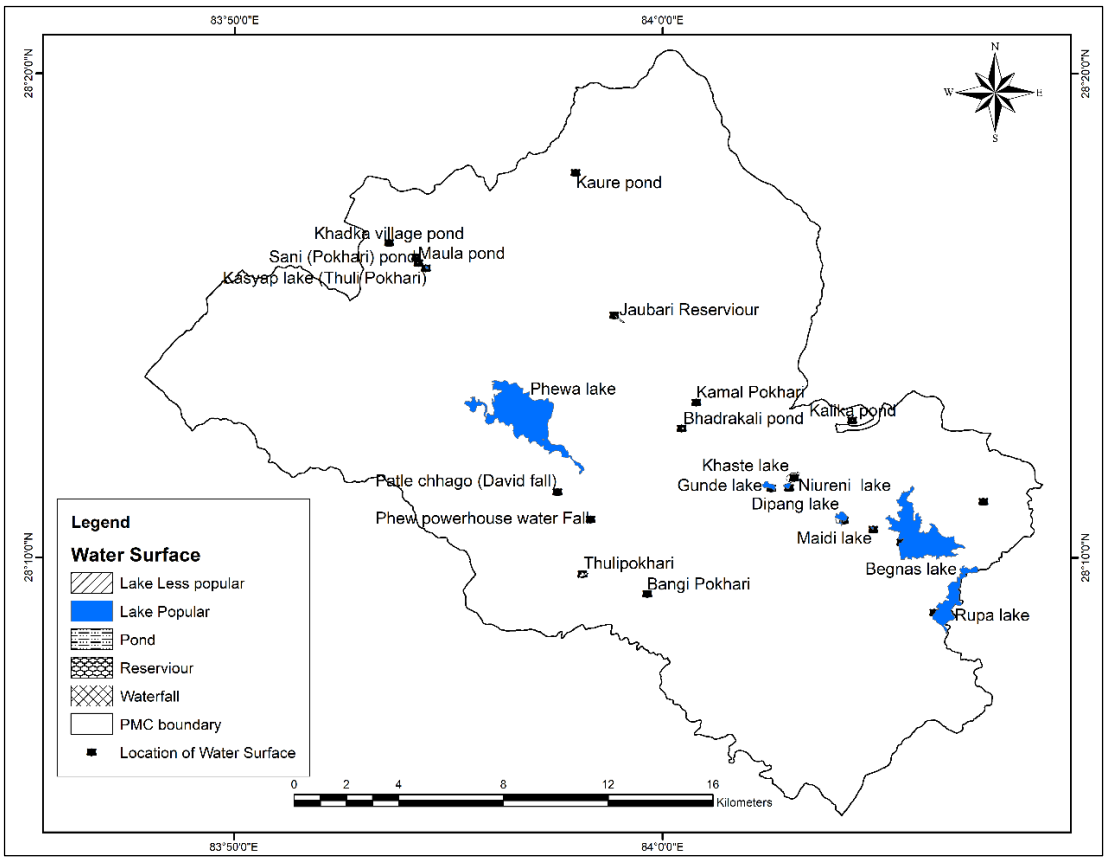


Table 5.5 and Figure 5.7 show the sub types of water surface POS and their areas. Among these Phewa and Begnas lake are very popular for recreational activities such as swimming, boating, fishing, sighseeing etc. Due to difference in size of the lake, its surrounding, boating facilities and road access the number of visitors are also different among the lake of PMC.

5.1.5 Aesthetic Viewpoints as POS

The physical terrain of PMC is uneven. PMC has a lot of small and high hills. Many small and high hills are being used as the viewpoints. On the aesthetic viewpoints visitors can observe the panoramic view of snowcapped mountains, lakes, and greenery of hills as well as beautiful Pokhara valley. The rapturous vision of the snow-clad Himalayan range, beauty of lakes and urban settlement, sunrise and sunset and natural vibes are prime attractions from these viewpoints. Sarangkot, Kanhu Danda, Mattikhan, Phoksingkot and Pumdikot are popular aesthetic viewpoints as POS among the visitors. These sites occupy 8.59 hectares of total POS areas in PMC. This typology is divided into three sub-typology based on visitor's flow and its popularity such as a viewpoint

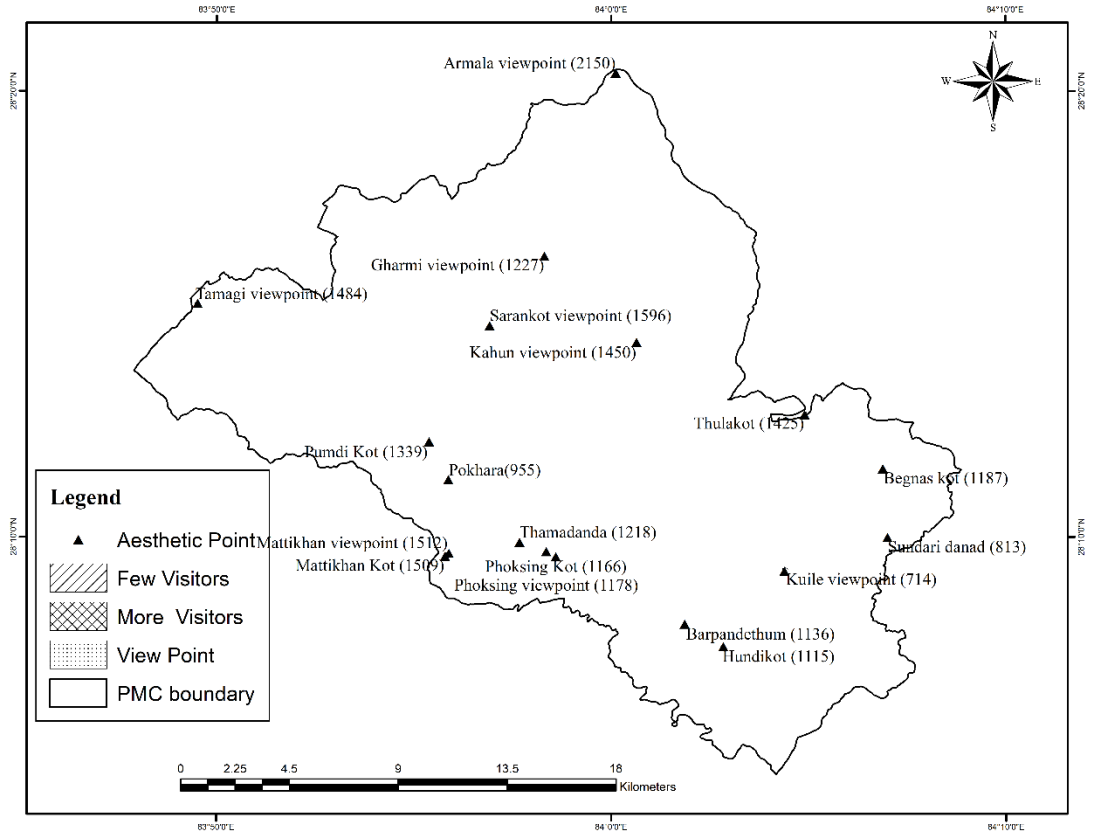
with more visitors, a viewpoint with fewer visitors, and hills without visitors (Table 5.6 and Figure 5.8).

Table 5.6: *Characteristics of aesthetic viewpoints as POS*

Sub-Typology	Number & area (ha.)	Name of major public open spaces	Uses
Very popular	1 (0.641)	Sarangkot,	Closed view to Himalaya, view of sunrise and sunset, and Pokhara valley.
Popular	8 (3.491)	Gharmi, Kahun, Kuile Danda, Mattikhan, Phoksing Kot, Pokhara viewpoint, Sundari Danda, Thulakot.	Surrounding view, lake view and mountain views.
Less popular	8 (4.454)	Armala, Barpandethum, Begnas, Pumdikot, Hundikot, Phoksing viewpoint, Tamagi, Thamadanda,	Surrounding views and panaromic views of Himalayan range.

Source: Field Survey, 2017-2018

Figure 5.8: *Location of aesthetic viewpoints as POS in PMC*



The Table 5.6 and Figure 5.8 show the distribution and area covered by viewpoints as POS. Sarangkot, Kahun Danda, Phoksing Kot, Mattikhan hill, Thula Kot, and Sundari Danada are used widely as viewpoints in PMC among which Sarangkot is the most famous one for its good view on Pokhara valley and close view of Macchapuchhre, Annapurna Himalayan range and Phewa lake view. The situation of view point, its surrounding views, road access play vital role to pull and embrace the visitos.

5.1.6 Cave as POS

Several natural caves are found in PMC. The cave constructed in PMC are found to be formed by dissolving lime stone due to rain water. These sites have occupied 3.7 hectares of total POS in PMC. Due to its nature, caves have significant recreational value. Gupteshwor cave and Mahendra cave are the major examples of the study area. However, caves have various sizes and typology.

Figure 5.9: *Sub-typology of cave*

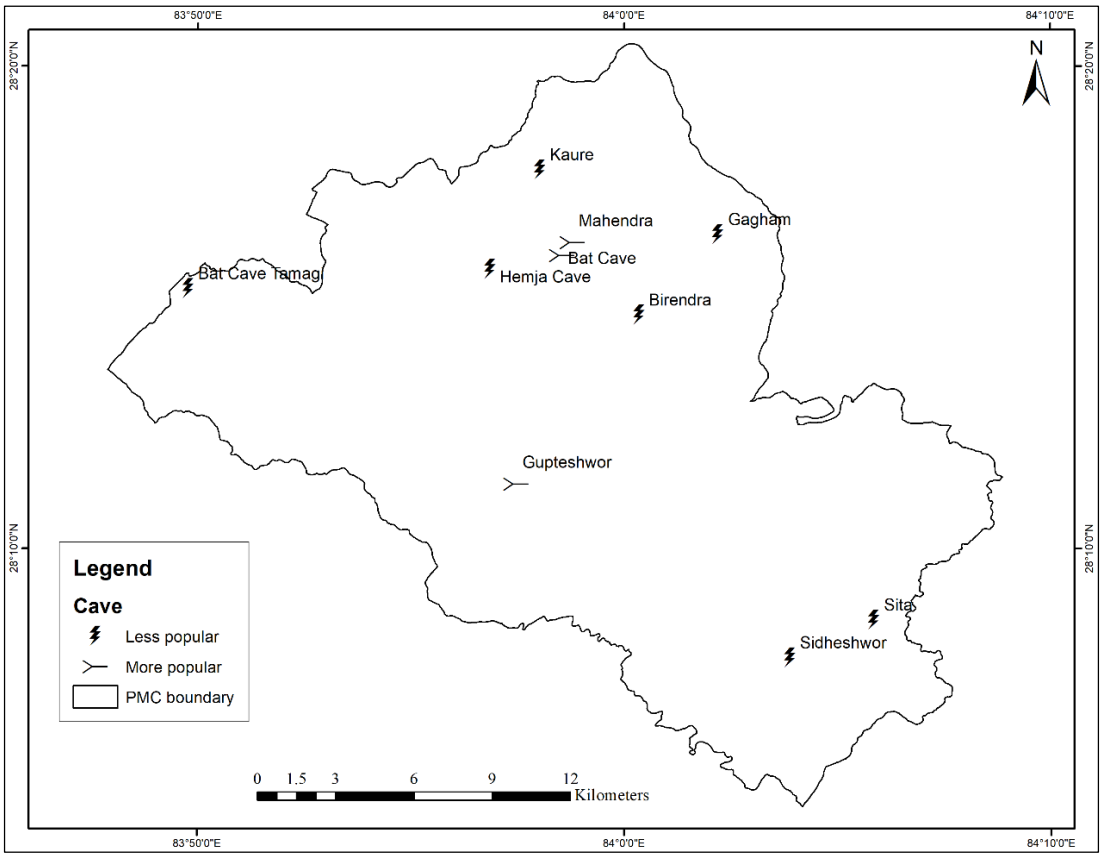


Table 5.7: *Sub-typology of cave*

Sub-typology	**Number & area (ha.)**	**Name of major public open spaces**	**Uses**
Popular	3 (1.725)	Gupteshwor, Mahendra, Bat cave	Recreation, picnic, observation, worship
Less popular	7 (1.936)	Belghari, Birendra, Gagham, Hemja, Sidheshwor, Sita, Tamagi.	Recreation, Observation

Source: Field Survey, 2017-2018

The Table 5.7 and Figure 5.9 show the characteristics of caves as POS in PMC. Among these caves, Gupteshowor cave is more specifically the flow of the underground stream channel from the Botanical garden area. used for multiple purposes such as geological observation, religious purposes, landscape and expedition. Most of the cave open spaces have only one opening for its entry and exit but Gupteshwor cave is exceptional with both side openings. The attractions of all these caves are as recreational and aesthetic point of view.

5.1.7 River Strip as POS

Most of the worlds' cities have been developed along the river side. The configuration of rivers usually results in being equivalent to linear parks (Silva et al., 2006). A river strip (Corridor) includes the width of the channel in which water flows and is typically expanded to account for the extensive influence of the watercourse into the surrounding landscape. PMC is developed along the periphery of the Seti Gandaki river, Bijayapur and Phusre, Harpan streams. Seti Gandaki river has a diverse morphology-steep cliff with deep gorges and opening with terraces. Some sites of river banks such as Ramghat, Tulasighat, Sitapailaghat, Dovillaghat, Gaighat, Tulasitra Ghat, Chirgadi Ghat are used for bathing purpose during the festivals and rituals. The eyesight level situation of vegetation in the riverside with water is more attractive and feels safe (Kalpan et al., 1985). Some sites of Seti river banks like Ramghat, Tulasighat, Sitapailaghat, Dovillaghat, Tulasitra Ghat, Chirgadi Ghat are used for a cemetery. These major rivers and streams occupy 32.90 percent of the total areas of the POS located in PMC.

Table 5.8: *Characteristics of river strip as POS*

Sub-typology	**Number & area (ha.)**	**Name of major public open spaces**	**Uses**
Recreation	4 (274.781)	Harpan, Kalikhola, Khudi Khola, Seti gorge.	Swimming, fishing, recreation.
Holy Bathing and religious	4 (21.277)	Gaighat, Ramghat, Thaune Ghat, Tulasi Ghat.	Holy bathing, ritual activities and cemetery
Cemetery	7 (7.160)	Babiya Tara Gaht, Chirgadi Ghat, Chhuchiko Gaundo Ghat, Dovilla (Mardi), Dovilla (Phusre), Mani Ghat, Tulasitra Ghat.	Cemetery
Multi use	4 (543.733)	Bijayapur, Phusre, Seti Gandaki, Suraudi Khola.	Rafting, swimming, fishing, rock climbing, green belt

Sources: Field Survey, 2017/2018

Figure 5.10: *River strip as POS*

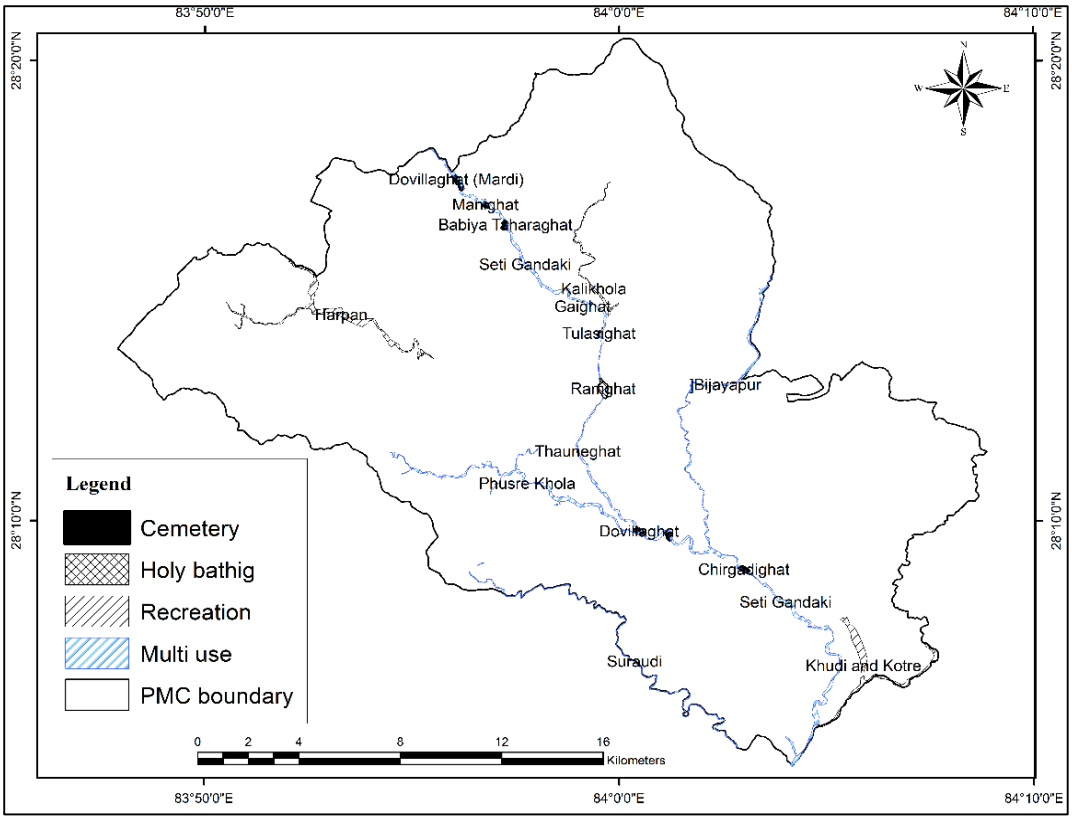


Table 5.8 and Figure 5.10 shows the characteristics and use of river strip as POS. This types of POS can be categorized into four types such as recreational, aesthetic, religious, and cemetery uses. River strip covers physical features like river bed, gorge, terrace, cliff, white water, meander and greenbelts.

5.1.8 Distinct Public Open Space

Distinct open spaces are the area that has public, community and private ownership. but not allowed to use for all as a public open space. As reported by the ward offices, there are 15 sites of distinct spaces. These are categorized into four types. Those are wetland (Phewa, Rupa, Gunde, etc.) sites that are important from the socio-economic and ecological point of view along with exhibition center, museum and, others as a recreational area such as Mahatgaunda, Phewa Powerhouse, and Begnas lakeside. Though dumping sites can be taken as open spaces on the urban area they have been used to dispose of the garbage daily produced by the urban inhabitants. All these sites occupy 9.19 percent areas of the total POS.

Figure 5.11: *Categories of distinct space*

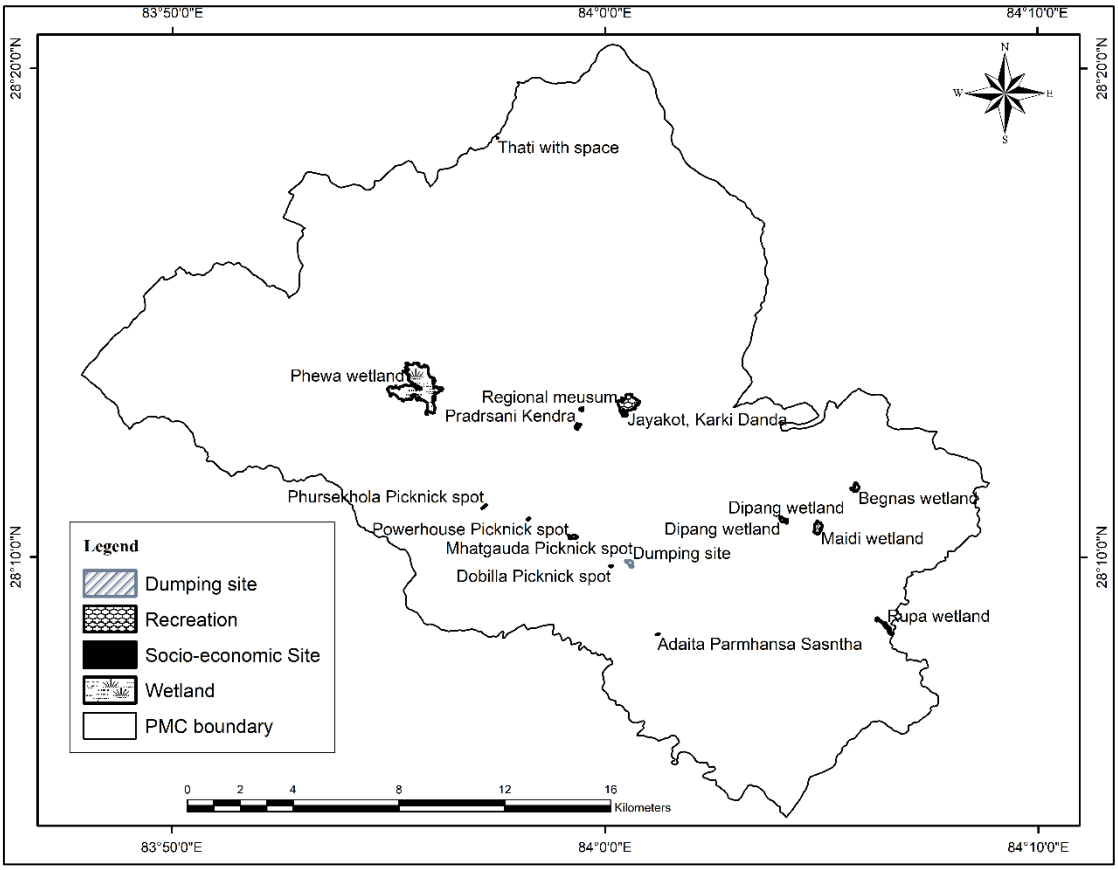


Table 5.9: *Characteristics of distinct public open space in PMC*

Sub-Typology	Number & area (ha.)	Name of major public open spaces	Uses
Wetland	5 (187.18)	Begnas, Dipang, Khaste, Maidi, Phewa, Rupa.	Biodiversity
Socio-economic site	2 (3.75)	Pardarsani Kendra (Exhibition center), regional museum	Business and cultural activities
Dumping site	1 (4.47)	Bachhe Buduwa	Dumping of urban wastes
Others recreational sites	7 (41.07)	Aditiya Parmhamsa, Dobilla, Jayakot, Mahatgaunda, Phurse Khola, Power-hose, Thanti.	Picnic site, walking, meditation etc.

Source: Field Survey, 2017-2018

The Table 5.9 and Figure 5.11 shows sub types of distinct spaces which are used for various purposes. Due to different nature the wetland, and dumping sites are used different way while others sites are giving prefere for recreational activities. Most of these sites are found unmanaged but still people are using these patches due to lack of available POS patches within PMC.

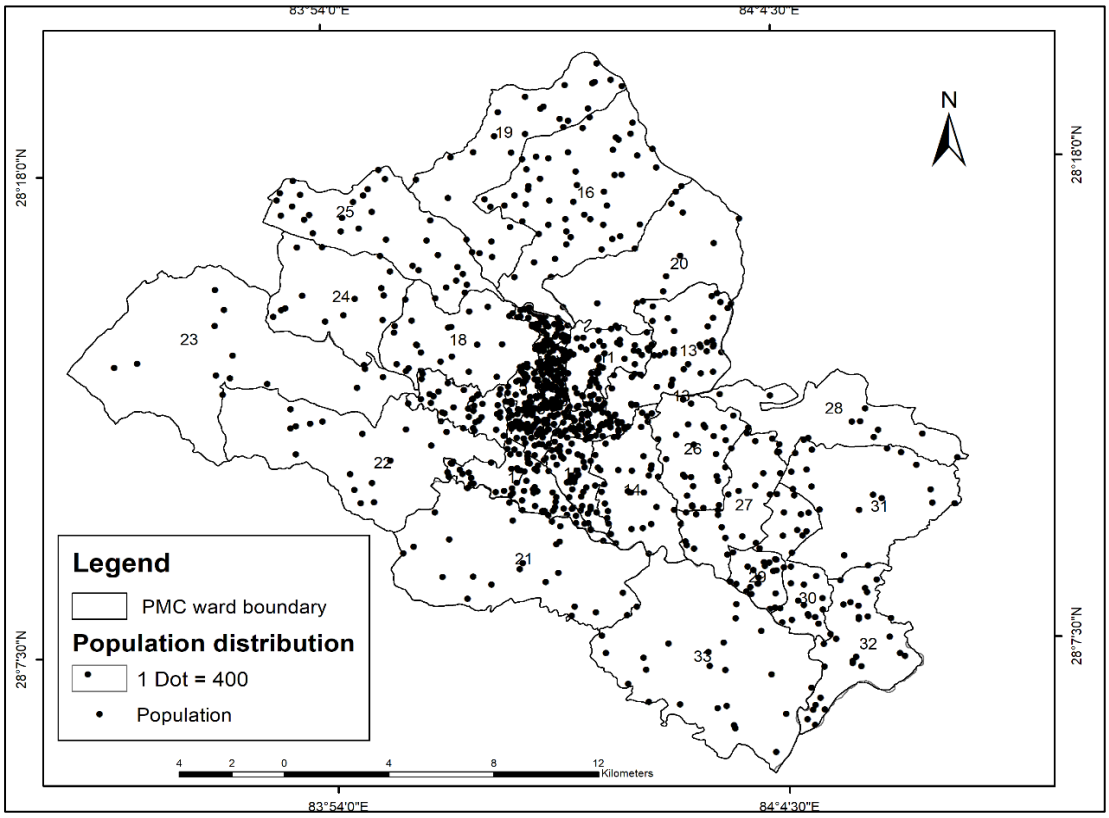
5.2 Spatial Distribution and Pattern of the POS in PMC

The distribution of POS in PMC is not uniform. All the 33 wards of PMC don't have the similar kind of POS facilities and access. The unequal distribution of POS has created an unequal per capita ratio. Spatial arrangement of public open space in PMC has been analysed through Nearest Neighbor Index and quadrat analysis.

5.2.1 Spatial Distribution of the POS

Although, POSs are significant parts of the urban land use yet the distribution of POS are not uniform in all wards. According to KII, such uneven distribution of open spaces

Figure 5.12*: Ward-wise distribution of POS in PMC*



among the wards in PMC is the result of a lack of proper urban land use planning and encroachment of public open spaces for urban development and individual use. Some wards have 25 POS while some wards only have one. Some wards have areas of 559 hectares within POS while some wards have less than one hectare area (Table 5.10 and Figure 5.12).

Table 5.11 shows the ward-wise distribution of open spaces in PMC. The number of open space is ranged from only one to twenty-seven patches among the 33 wards in PMC. Similarly, the population ratio is also found different. PMC has an average POS ratio per thousand populations of 6.219 hectares while ward number 2 has only 0.016 hectares. According to the minimum standard of WHO (9m² per person's x 1000 of populations= 0.9 hectares) seven wards have less than minimum requirement of POS. The ward number 4 has per thousand populations of 0.016 hectares' area whereas ward number 31 has 75.7 hectares. However, people may use POS of another ward that is convenient to them. The lack and unavailability of POS can have negative impact on the overall urban environment, the quality of life of city dwellers and disaster risk management area. Therefore, those wards having area less than minimum, set by WHO,

it is necessary for the concerned stakeholders to emphasize on expanding the area of POS.

With the aid of ArcGIS 10.3 software, NNI of PMC is calculated. The results obtained from statistical calculations are shown in Appendix XVI. The distribution pattern of POS in PMC is found to be evenly distributed. Considering the hypothesis testing, the calculated z-value 9.51 is greater than 2.58, which indicates that the spatial distribution of POS is towards the clustered pattern.

Table 5.10: *Ward-wise distribution of POS and covered area*

PMC Ward	Patch Number of open spaces	Ward area (Hectares)	Public open space Area (Hectares)	* POS with river strip Area (Hectares)	POS covered area - Percent	Population	Ward area in Hectares/ per 1000 Population	POS area in Hectares/ per 1000 Population
1	8	154.54	6.009	14.187	9.18	16065	9.62	0.883
2	3	60.14	1.476	1.476	2.45	8837	6.81	0.167
3	7	63.49	3.336	6.879	10.83	9462	6.71	0.727
4	1	51.05	0.406	0.406	0.8	9275	5.5	0.044
5	4	178.42	2.369	2.369	1.33	15412	11.58	0.154
6	12	633.48	438.9	438.906	69.28	15253	41.53	28.775
7	6	197.59	0.483	0.483	0.24	13649	14.48	0.035
8	4	176.49	0.416	0.416	0.24	26717	6.61	0.016
9	4	122.46	10.572	18.711	15.28	16892	7.25	1.108
10	7	195.84	41.934	41.934	21.41	18924	10.35	2.216
11	10	697.89	11.443	36.941	5.29	16432	42.47	2.248
12	3	140.13	6.62	7.433	5.3	11870	11.81	0.626
13	12	1540.12	51.866	60.122	3.9	17132	89.9	3.509
14	12	1338.47	9.614	43.283	3.23	13562	98.69	3.191
15	13	512.61	69.049	80.482	15.7	17773	28.84	4.528
16	7	3473.7	5.234	35.928	1.03	21751	159.7	1.652
17	25	790.1	20.499	88.762	11.23	27614	28.61	3.214
18	4	1779.24	9.213	63.744	3.58	8781	202.62	7.259
19	13	2456.67	12.624	48.736	1.98	10721	229.15	4.546
20	8	2297.73	4.757	19.7	0.86	4022	571.29	4.898
21	14	3595.72	7.472	59	1.64	9090	395.57	6.491
22	9	3215.21	192.929	197.918	6.16	7391	435.02	26.778
23	7	4786.05	162.427	176.63	3.69	4932	970.41	35.813
24	11	1852.67	5.251	85.802	4.63	5892	314.44	14.562
25	13	2241.59	8.284	42.102	1.88	12454	179.99	3.381
26	4	1215.37	25.082	39.783	3.27	11607	104.71	3.428
27	4	1225.02	17.192	31.147	2.54	9736	125.82	3.199
28	8	1760.46	4.168	6.601	0.37	4727	372.43	1.396
29	6	422.42	10.945	19.116	4.53	9120	46.32	2.096
30	5	941.74	14.308	27.314	2.9	10930	86.16	2.499
31	10	2450.23	558.712	558.712	22.8	7378	332.1	75.727
32	3	1503.19	9.835	187.67	12.48	10727	140.13	17.495
33	10	4425.15	18.633	131.507	2.97	9806	451.27	13.411
Total	268	46494.98	1742.06	2574.2	5.54	413934	112.32	6.219

*There are 7 river strips covering 832.141 hectares' area

Note: All together there are 275 patches in PMC (Appendix XIII.) but some patches are divided by ward.

Source: Field Survey, 2017-2018, CBS, 2011 and Survey Department of Nepal, 2017.

5.2.2 Spatial Pattern of POS in PMC

The spatial pattern exhibited by the entire POS which were spread all over the municipality was examined using the GIS software. The Figure 3.2a reveals that the

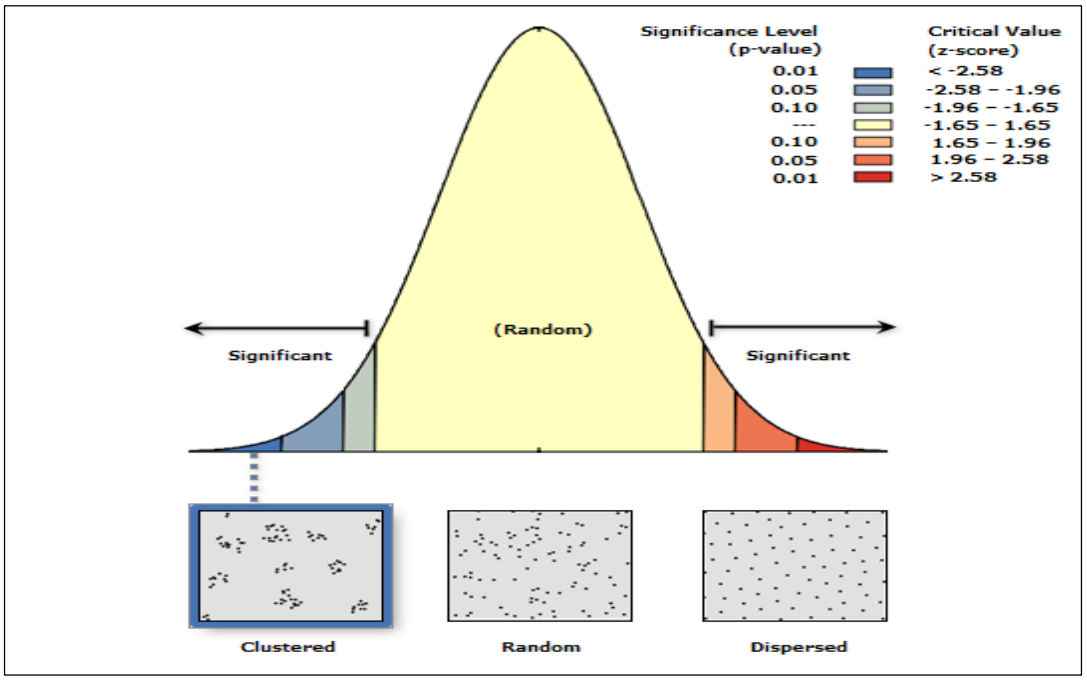
PMC has 275 POS sites. Analysis has been made through the Nearest Neighbour Index and quadrat analysis to evaluate the spatial pattern of the POS within PMC.

Analysis Based on Nearst Neighbour Index:

The value received from NNI, its result is presented based on metropolitan and typology. Its spatial pattern is shown in Figure 5.13a, Figure 5.13b. and Figure 5.13 c.

The ArcGIS automated calculated result: Average Nearest Neighbour Summary

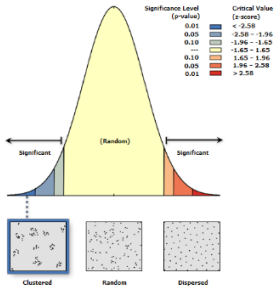
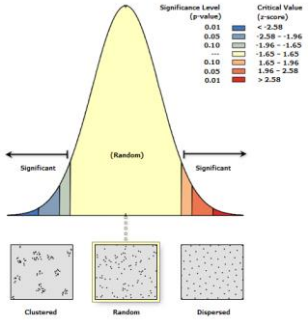
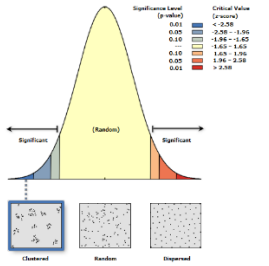
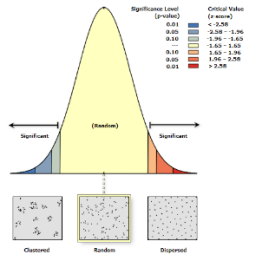
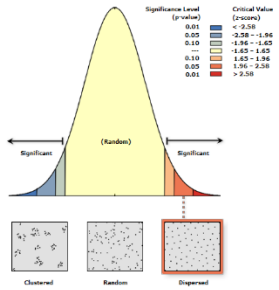
Figure 5.13a: *Spatial pattern of POS in PMC*

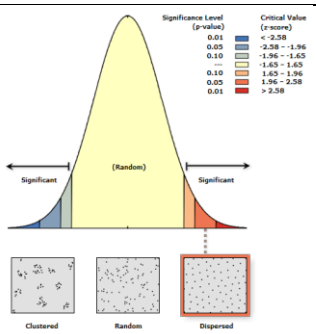
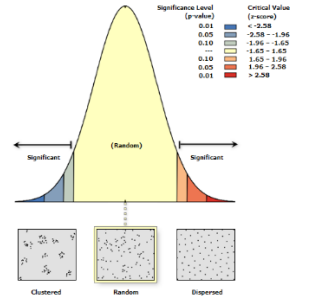
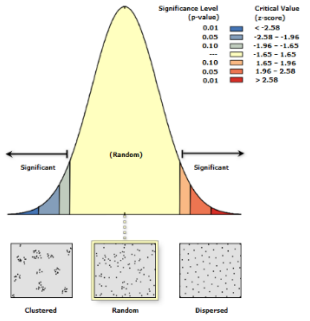


Given the z-score of POS -12.6539806367, there is less than 1 percennt likelihood that this clustered pattern could be the result of random chance. (Appendix XVI_a). Similarly, the NNI calculated from the ArcGIS result shows 0.601131. So, the spatial pattern of POS in PMC is likelihood towards the cluster pattern. But typology wise pattern of POS is diverse. It is a significant part of urban land use which is found in all wards in PMC.

The spatial patterns of POS as per typology are analyzed through the NNI and are illustrated as follows:

Figure 5.13b: *Spatial distribution of POS in PMC*

Typology	Figure	Distribution Pattern
Parks		Given the z-score of park -4.69423187981, there is a less than 1% likelihood that this clustered pattern could be the result of random chance. (Appendix XVI_b).
Playground		Given the z-score of playground 1.62623757189, the pattern does not appear to be significantly different than random. (Appendix XVI_c).
Religious sites		Given the z-score of religious site -4.12759555412, there is a less than 1% likelihood that this clustered pattern could be the result of random chance. (Appendix XVI_d).
Water surface		Given the z-score of water surface -0.0781258935341, the pattern does not appear to be significantly different than random. (Appendix XVI_e).
Viewpoints		Given the z-score of view point 2.27184476266, there is a less than 5% likelihood that this dispersed pattern could be the result of random chance. (Appendix XVI_f).

Cave		Given the z-score of cave 2.36255343429, there is a less than 5% likelihood that this dispersed pattern could be the result of random chance. (Appendix XVI_g).
River strip		Given the z-score of river corridor site 1.09142109687, the pattern does not appear to be significantly different than random. (Appendix XVI_h).
Ditinct space		Given the z-score of distinct space 0.165092710817, the pattern does not appear to be significantly different than random. (Appendix XVI_i).

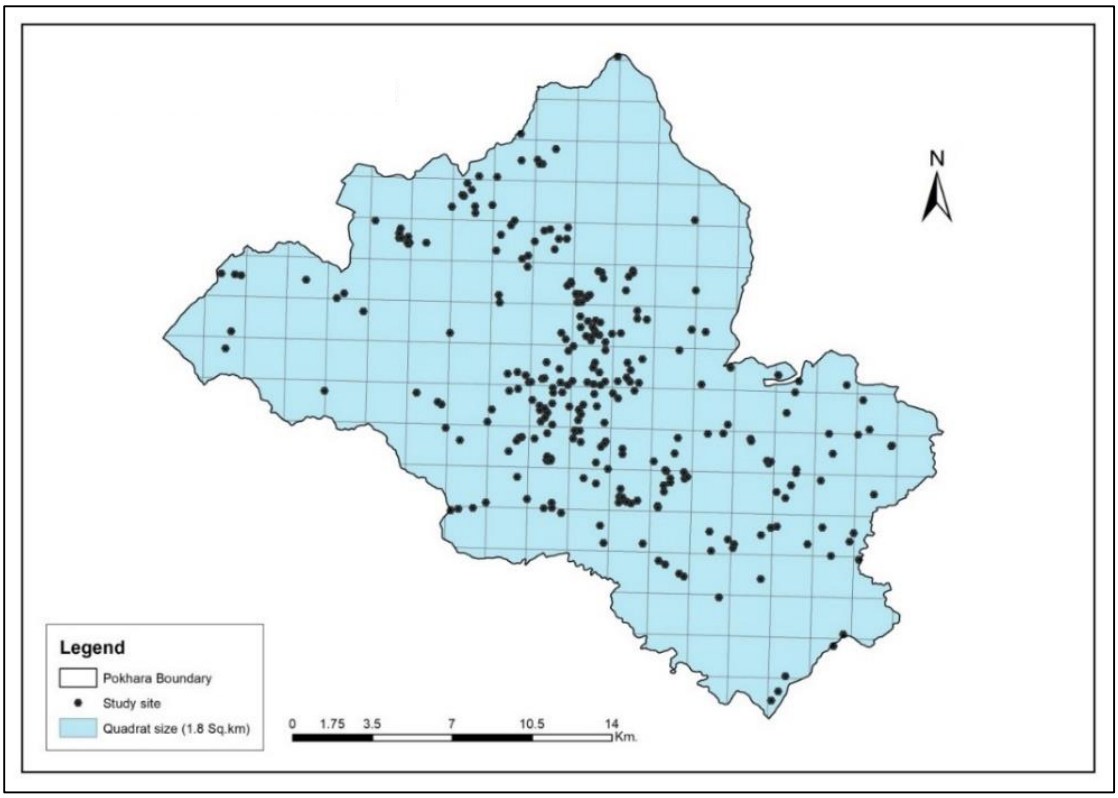
(Religious site, Water surface, Viewpoints, Cave, River strip, and Distinct space)

On the basis of NNI analysis, the spatial distribution pattern of POS is found to be cluster whereas typology wise the distribution pattern is different such as for parks and religious sites the distribution pattern is cluster, viewpoints and caves are of uniform pattern, playgrounds, river corridor sites and distinct spaces are also toward the uniform pattern while water surface is toward a random pattern (Appendix XVI_a to XVI_i).

Analysis Based on Quadrat Analysis

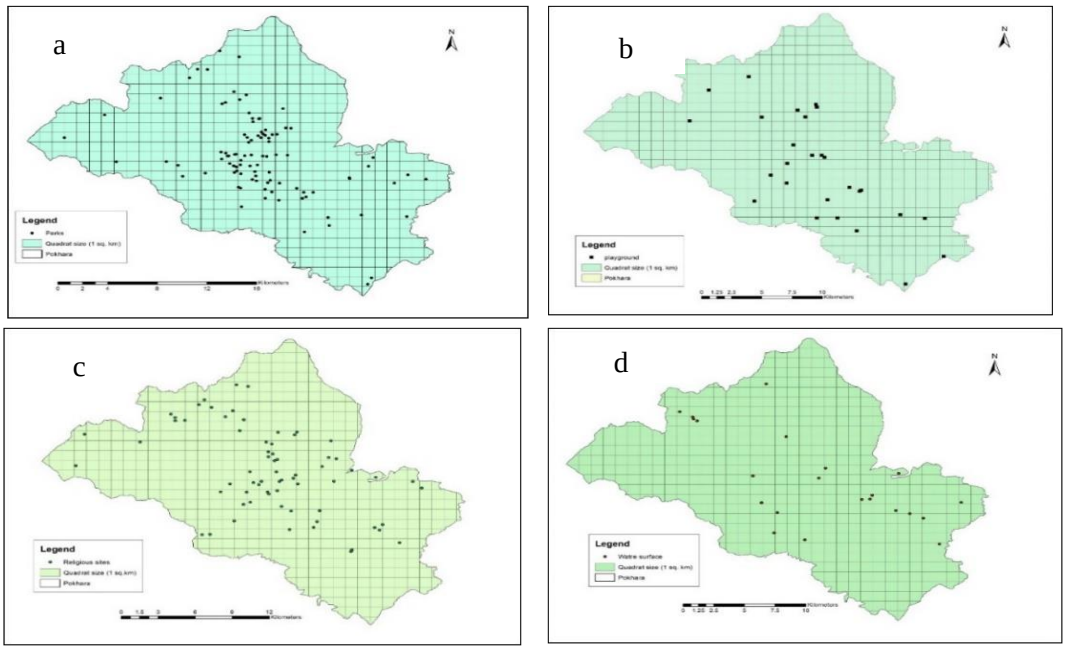
The quadrat count statistical analysis was computed to determine the pattern of POS distribution in the study area. The number of POS per unit area was determined by imposing 1 km^2 size quadrats on the POS map of Pokhara Metropolitan City. The variance and the variance mean ratio (VMR) were calculated for the data (Appendix XV_a). The result yields a VMR value of 2.752. Since the calculated value is greater than 1.0, this reveals that the distribution pattern of POS in PMC is clustered (Figure 5.14a).

Figure 5:14a: *Quadrat of spatial pattern of POS in PMC.*



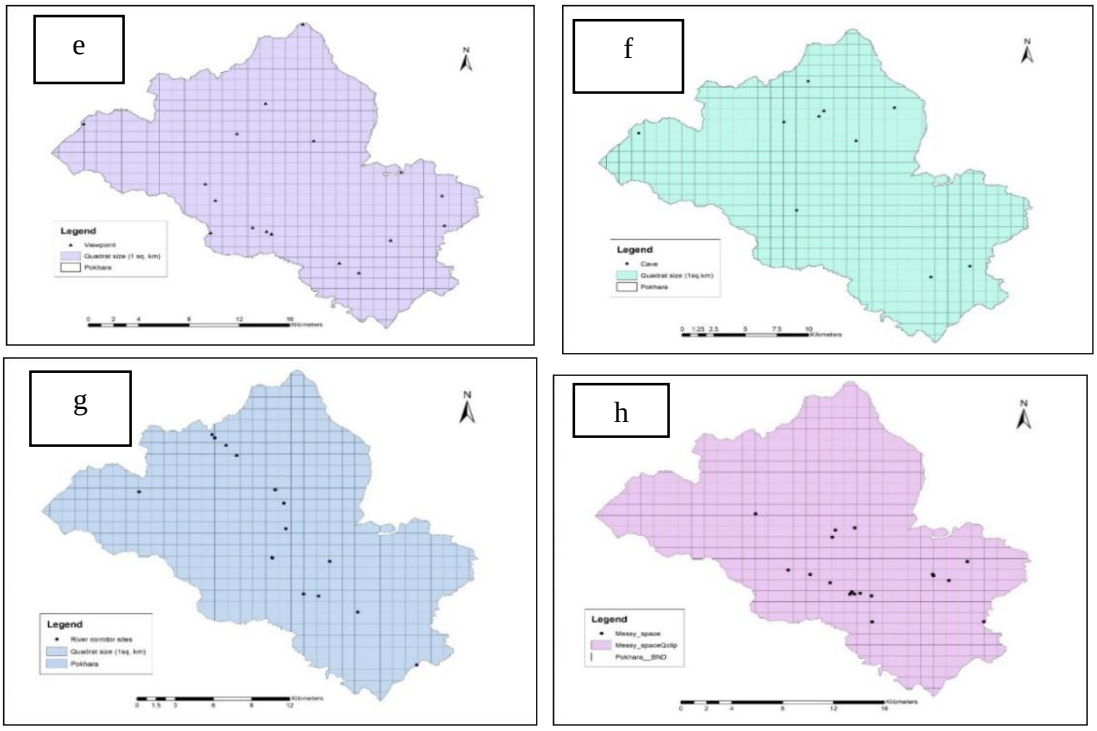
The distribution of public open spaces could be analysed through its pattern, accessibility and categories.

Figure 5:14b: *Quadrat of spatial pattern of POS by typology.*



a. Parks b. Playground c. Religious site, d. Water surface

Figure 5:14c: *Quadrat of spatial pattern of POS by typology.*



e. Viewpoint, f. Cave, g. River corridor sites, h. Distinct space

Due to the urban spatial variables, it plays the foremost role in the city area. However,

The POS is not distributed uniformly. The spatial distribution of POS is illustrated in Figure 5.14b and 5.14c. Every open space has a particular spatial feature, so these patches have different nature, orientation, shape, and size in PMC. On the basis of Quardrat analysis, the spatial distribution pattern of POS is found to be cluster in pattern. Among the POS typologies only playgroundis is in clustered pattern while park, religious sites, water surface, views points, cave, river strip and distinct space are found as uniform or regular in patter. However, both NNI and Qadrat analysis result show that the spatial distribution pattern of POS in PMC is Cluster. The larger number of POS is found in the middle part of the Metropolitan area (Appendix XVI_a to XVI_i).

5.3 Dimensions of the POS

The dimensions of public open space are important as it indicates the status of space, their inner construction and their interconnections. The present study has attempted to analyze the spatial dimensions, socio-economic dimensions, environmental and security dimension in order to understand its configuration for planning and use. The dimensional aspects of POS have been analyzed in the following ways:

5.3.1 Spatial Dimension

POS in PMC has different shapes and sizes. They are not equal. Some of the POS is situated on flat land while some of them are in slopping land and a few are situated at the top of the hills. Some patches are situated at river strips and are still being utilized. In general, the spatial dimension aspect is presented in the number of POS by size, landforms in Table 5.11 and Figure 5.15.

Table 5.11: *Spatial characteristics of POS and their utilization*

Category/Attribute		Parks	Playground	Religious Site	Water Surface Viewpoint	Cave	River Strip	Distinct Places	Total	Percent
Size	Tiny (<1 ha.)	57	15	53	13	15	8	6	5	172	62.55
	Small (1-10 hectares)	35	11	16	3	2	2	5	7	81	29.45
	Medium (10-50 ha.)	3	1	0	2	0	0	2	2	10	3.64
	Large (>50 ha)	2	0	0	3	0	0	6	1	12	4.36
Landforms	Plain	56	23	40	19	0	0	0	3	141	51.27
	Sloping	41	4	29	2	17	10	19	12	134	48.73
Total		97	27	69	21	17	10	19	15	275	100

Sources: Field study, GPS survey 2017- 2018 and Google earth pro, 2015

Figure 5.15: *Spatial characteristics of POS and their utilization*

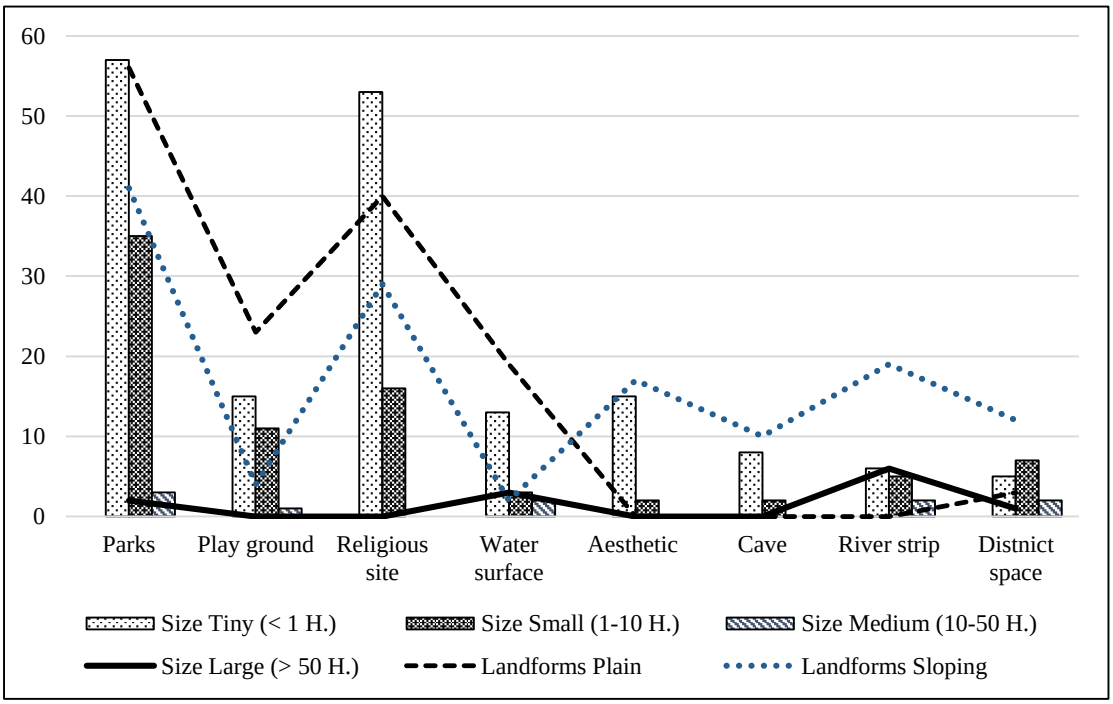


Table 5.11 and Figure 5.15 show that only 4.36 percent patches have more than 50 hectares whereas 29.45 percent patches have 1-10 hectares range and 62.55 percent are

tiny in size with less than 1 hectare. Similarly, 51 percent patches are located in the valley floor and the remaining 49 are found on sloping features (Appendix XIII).

5.3.2 Socio-economic Dimensions

The social-economic dimensions of POS included ownership, use, economic activities and management. The number of POS by accessibility, ownership, management, and users is given in Table 5.12 and Figure 5.16.

Table 5.12: *Socio-ecomomic characteristics of POS*

Category/Attribute		Parks	Playground	Religious Site	Water Surface	Viewpoint	Cave	River Strip	Distinct Places	Total Patches
Public Access	Open	93	26	65	20	16	10	19	11	260
	Closed	4	1	4	1	1	0	0	4	15
Ownership	Government	84	22	65	21	17	10	19	15	253
	Community	6	1	4	0	0	0	0	0	11
	Institutional & Private	7	4	0	0	0	0	0	0	11
Management	Managed	41	10	46	4	4	3	0	3	111
	Poorly/ No managed	56	17	23	17	13	7	19	12	168
Number of visitors		5772	3716	2861	3106	1932	1199	3180	2690	24455

Sources: Field study, 2017-2018

Figure 5.16: *(a) Accessibility (b) Ownership (c) Management (d) POS User*

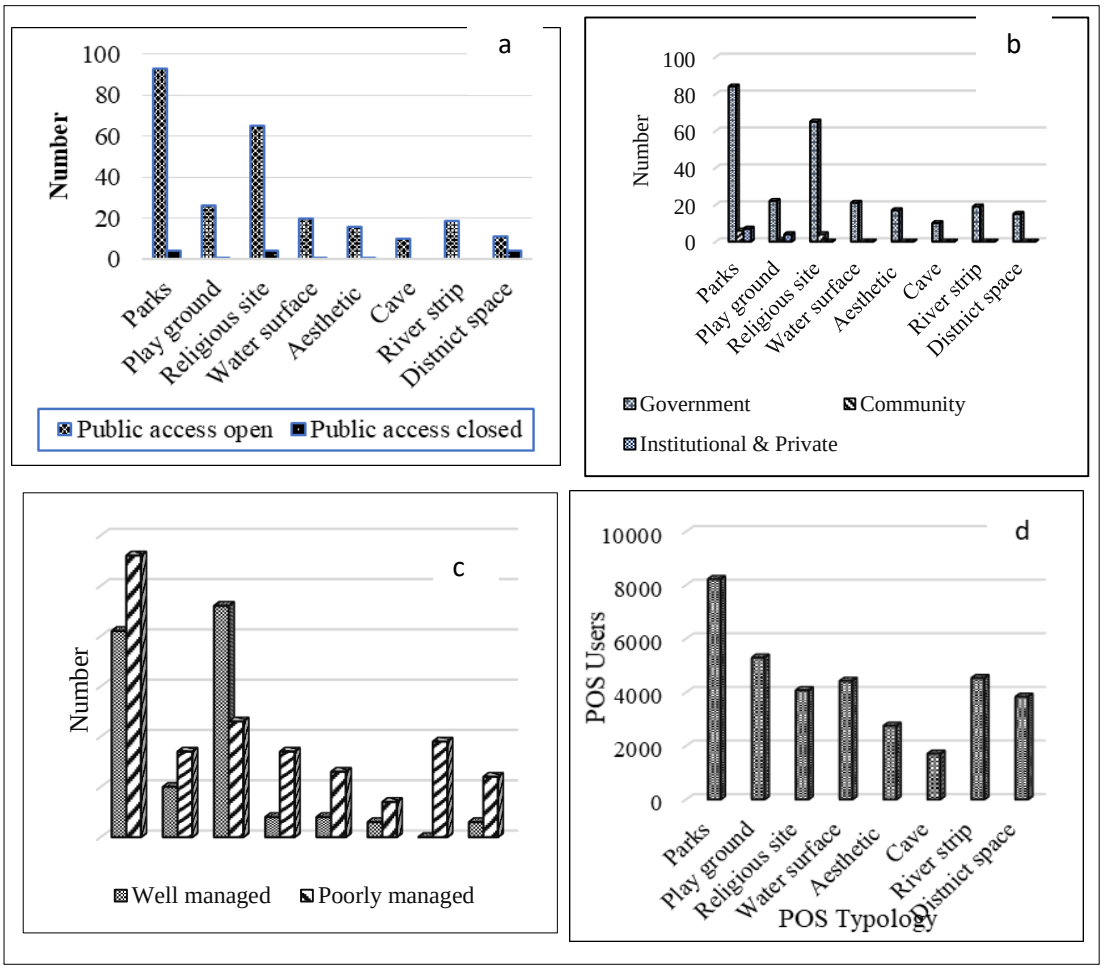


Table 5.12 and Figure 5.16a shows that. 94.5 percent patches reported by the ward office are open to all. Similarly, 92 percent patches are under the government ownership, only 4 percent patches are under the community and rest 4 percent is held by private ownership. Regarding the management situation Figure 5.16b, only 40.63 percent of total number of POS is found well managed whereas 59.64 percent is in a natural situation. POS are essential parts of an urban area because about 24455 people use them in a day.

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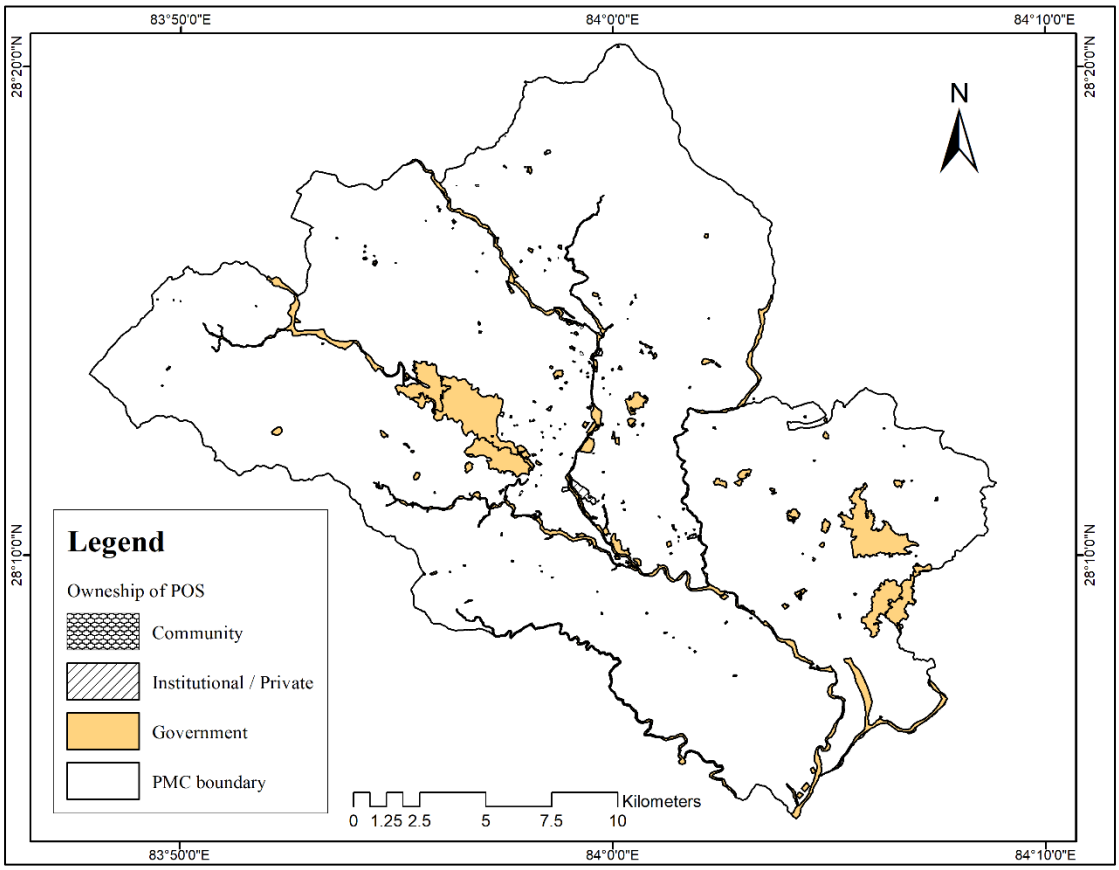
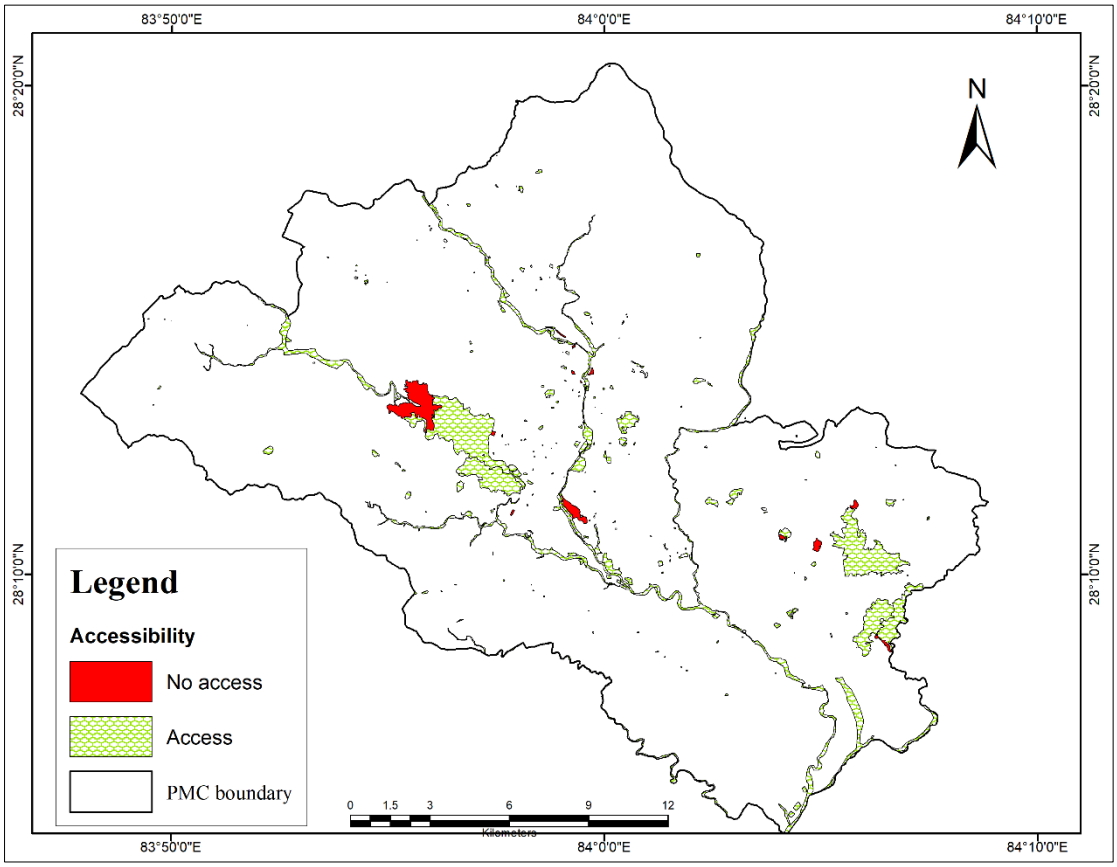
Figure 5.17*: Ownership of POS*



Source: Field Survey, 2018

Table 5.12 and Figure 5.17 shows that among the POS, 94.5 percent patches are listed in government ownership, 4 percent are under community and Guthi (certain community), and remaining 4 percent patches are under the control of institutions and private ownership. The ownership under the institution along with the right to be used by people is 3.82 percent. Private patches are also included along with golf playground occurring to be only 0.18 percent of POS (Appendix XIII).

Figure 5.18*: Accessibility of POS*



Source: Field Survey, 2018

It seems that the government-owned POS is fully accessible for the citizens.

Some POS have great economic importance as they have regular income. These POS contributes in generating employment opportunities to the concerned people. However, some sites are economically not viable.

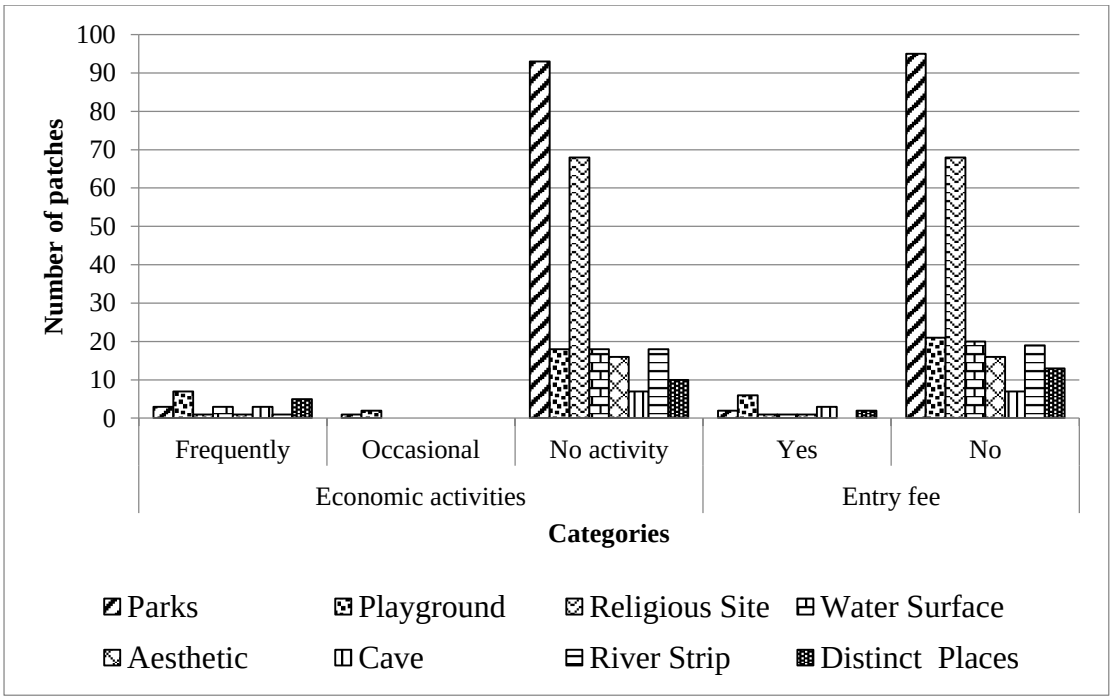
Table 5.13: *Number of POS and their economic dimensions*

Category/Attribute		**Parks**	**Playground**	**Religious Site**	**Water Surface**	**Aesthetic**	**Cave**	**River Strip**	**Distinct Places**	**Total**	**Percent**
Economic activities	Frequently	3	7	1	3	1	3	1	5	24	8.73
	Occasional	1	2	0	0	0	0	0	0	3	1.09
	No activity	93	18	68	18	16	7	18	10	248	90.18
Total		**97**	**27**	**69**	**21**	**17**	**10**	**19**	**15**	**275**	**100**
Entry fee	Yes	2	6	1	1	1	3	0	2	16	5.82
	No	95	21	68	20	16	7	19	13	259	94.18
Total		**97**	**27**	**69**	**21**	**17**	**10**	**19**	**15**	**275**	**100**

Sources: Field Survey, 2017/2018

Table 5.13 and Figure 5.19 reveals that only 24 patches (8.73 percent) are found to have some economic activities, but 259 patches (90.18 percent) have no economic activities. Only from 16 POS (5.82 percent) entry fee from the visitors is collecctd.

Figure 5.19: *Economic dimensions of POS*



5.3.3 Environmental and Security Dimensions

Sanitation, security, and greenery have been taken as environmental and security dimensions (Table 5.14 and Figure 5.20a).

Table 5.14: *Characteristics of security dimensions of POS*

Category/Attribute		Parks	Playground	Religious Site	Water Surface	Viewpoint	Cave	River Strip	Distinct P...	Total	Percent
Sanitation	Clean	79	22	67	9	17	7	10	12	223	81.09
	Not clean	18	5	2	12	0	3	9	3	52	18.91
	Total	**97**	**27**	**69**	**21**	**17**	**10**	**19**	**15**	**275**	**100**
Security	Safety	40	12	49	7	7	3	0	4	122	44.36
	Not safety	57	15	20	14	10	7	19	11	153	55.64
	Total	**97**	**27**	**69**	**21**	**17**	**10**	**19**	**15**	**275**	**100**
Vegetation	Plant covered	18	0	11	0	1	1	4	1	36	13.09
	Bush	38	0	10	0	5	3	1	7	64	23.27
	Gardening	4	0	14	0	0	0	0	0	18	6.55
	No vegetation	37	27	34	21	11	6	14	7	157	57.09
	Total	**97**	**27**	**69**	**21**	**17**	**10**	**19**	**15**	**275**	**100**

Sources: Field Survey, 2017/ 2018

Figure 5.20a: *Environmental and security dimensions of POS*

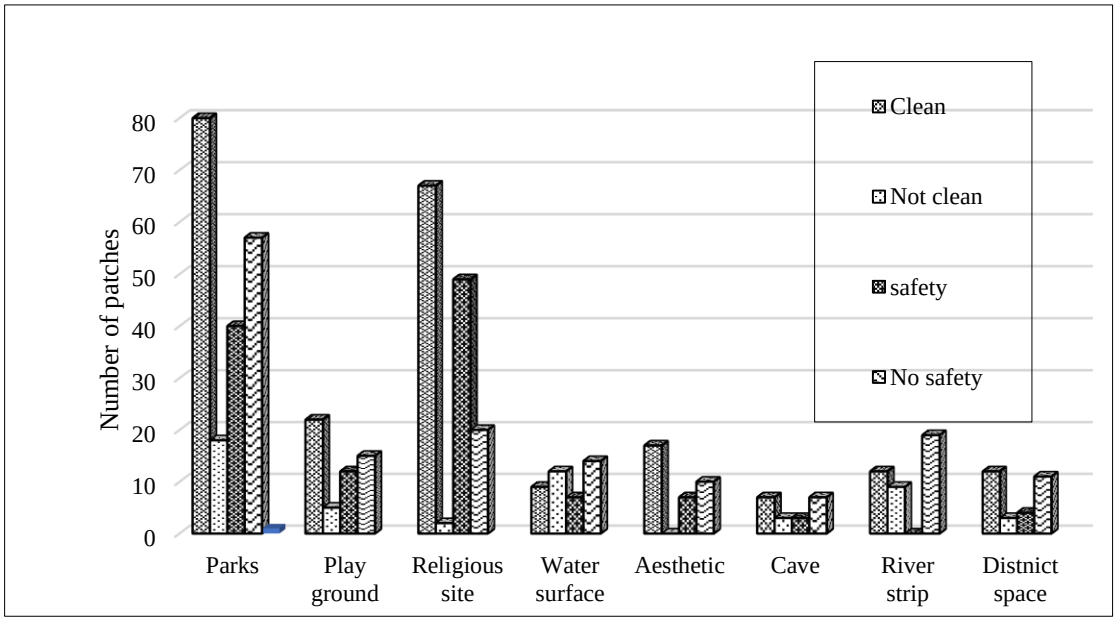


Figure 5.20b: *Vegetation coverage in PO*

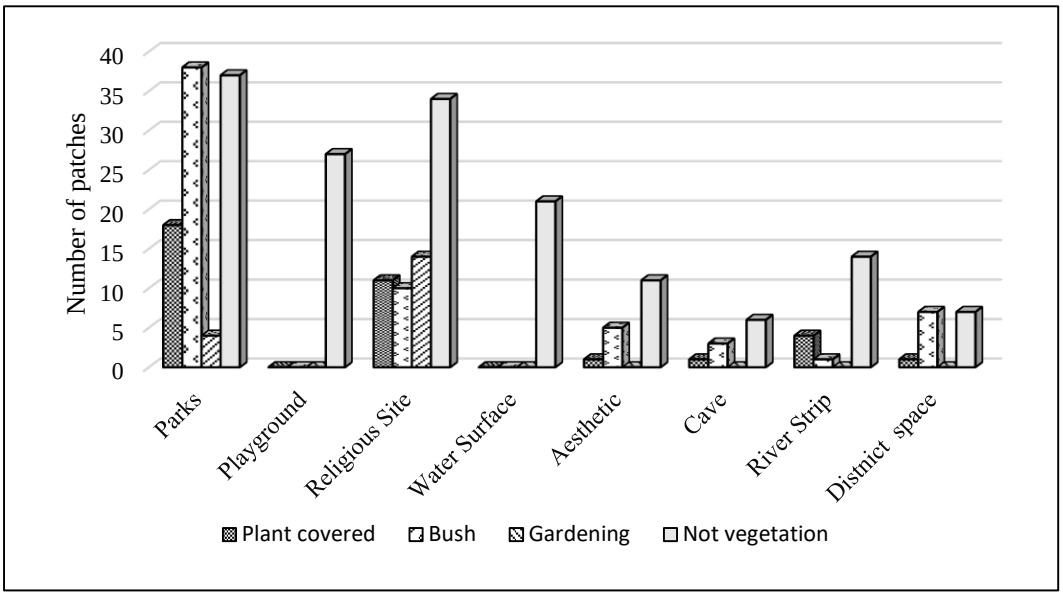


Table 5.14 and Figure 5.20a reveals that 223 patches (81.09 percent) are clean in terms of sanitation. But 44.36 percent patches have compounds and are safe for use. Similarly, only 13 percent POS are covered by forest while 57 percent has no vegetation.

5.4 Per Capita POS in PMC

The ratio of total areas of POS to total population in an area provides per capita of POS. PMC has 2574.2 hectares' area in total as a POS and its population was 4,13,934 (CBS of 2011). It shows that PMC has 62.2 m² per capita POS. However, the figure is different at the ward level. Among 33 wards in PMC, ward no. 1, 2, 3, 4, 5, 6, 7, 8 and 12 have less than 9 m² POS ratio which is less than the standard set by the WHO. Ward-wise analysis of the data shows that PMC has 0.44-757 m² range per capita POS. The data shows that wards with high population density have low per capita POS while some wards with low population density have a high per capita of POS. However, the per capita occupancy of public open space in Pokhara metropolitan city ranges from 0.44 m^2 in ward number four to a maximum of 757.27 m^2 in ward number 31. The ward wise per capita POS is shown in Table 5.15.

POS is an essential area that provides safe place during the event of disaster and post-disaster. It offers opportunities for mitigation of losses during the fearful environment (Saxena, 2017). Therefore, the role of POS is increasing day by day in urban areas

particularly for the disasters like earthquake, flood, landslide, fire, cyclone, cloud burst, and drought. It is reported that the time at which earthquake happens and after tremor people stay outdoor side from home in an open area. Thus, WHO suggested that per person urbanities should manage 9 m^2 of public open space. However, all categories of POS are not appropriate for resilience for example water surface, cave, viewpoint, dense forest, sloping area, river strip, dumping site, wetland etc. In PMC, most of the parks, playgrounds, religious sites, and distinct space (Pardarsani Kendra, some picnic spots) can be considered safe places during the time of disaster which occupies only 6.63 percent (170.711 Hectares) area out of total POS.

Table 5.15: *Ward-wise per-capita POS in PMC*

Wards	**POS (Hectares)**	**Population**	**Per capita POS (m.²)**
1	14.187	16065	8.83
2	1.476	8837	1.67
3	6.879	9462	7.27
4	0.406	9275	0.44
5	2.369	15412	1.54
6	438.906	15253	287.75
7	0.483	13649	0.35
8	0.416	26717	0.16
9	18.711	16892	11.08
10	41.934	18924	22.16
11	36.941	16432	22.48
12	7.433	11870	6.26
13	60.122	17132	35.09
14	43.283	13562	31.91
15	80.482	17773	45.28
16	35.928	21751	16.52
17	88.762	27614	32.14
18	63.744	8781	72.59
19	48.736	10721	45.46
20	19.7	4022	48.98
21	59	9090	64.91
22	197.918	7391	267.78
23	176.63	4932	358.13
24	85.802	5892	145.62
25	42.102	12454	33.81
26	39.783	11607	34.28
27	31.147	9736	31.99
28	6.601	4727	13.96
29	19.116	9120	20.96
30	27.314	10930	24.99
31	558.712	7378	757.27
32	187.67	10727	174.95
33	131.507	9806	134.11
Total	2574.2	413934	62.19

Source: Field Survey, 2017-2018

5.5 Chapter Summary

POS is the inevitable part of the city as well as quality of life but it is covered by only five percent area of Pokhara Metropolitan City. The present chapter has discussed the existing condition of POS and its typology, its dimensional situation as well as spatial distribution pattern in Pokhara city, and per capita share of POS to urban population.

There are 275 patches of POS which covers only 5.53 percent (25.74 km²) area of PMC. The POS are characterized by various qualities of spatial, socioeconomic, religious and environmental dimensions which typify the existing conditions to use. The existing POS in the PMC are classified into eight-major types and 32 subtypes in terms of their characteristics. Those typologies of POS are Park, Playground, Religious Sites, Water Surface, View Points, Caves, River Strips, and Distinct Spaces. Among them, water surface(s) and river strip(s) cover two third areas of the total POS.

The Ward wise distribution of POS ranges from one to twenty-five patches characterized by the area of patches from 0.02 Ha to 558 Ha. Nearest Neighbor Index and quadrant analysis shows that the distribution pattern of POS is in a cluster pattern. It means all the people in the city do not get equal opportunities to use. The average per capita POS in PMC is 62.2 m². There are 25 wards, having more than 9 m^2 per capita (WHO standard) while the remaining 8 wards in PMC have less than the standards. POS could be used as the shelter and safe areas for disaster risk management hence a higher per capita of POS in urban areas is useful. In PMC, 162 patches covering 171 hectares comprising public parks, playgrounds, religious sites could be considered for safe zones during the disasters.

CHAPTER - VI

MAGNITUDE, PATHWAYS AND DRIVERS OF THE PUBLIC OPEN SPACE

This chapter discusses the history of public open space, the magnitude and pathway of change and its driving factors. In the first part, historical prospective of POS is introduced. The magnitude of change is highlighted in second section. The pathways of change are mentioned in the third section. Similarly, the driving forces of change of POS are illustrated in fourth section. The chapter summery is presented in last section.

6.1 Historical Perspectives of the POS in Pokhara Metropolitan City

The history of urbanization of Pokhara is short in comparison to Kathmandu the capital city of Nepal. It is believed that Pokhara started to form human settlements from the time of the Shah dynasty of Kaskikot. Pokhara was an important place in ancient times, as it was an important transit of the China-India trade route. Around 300 years ago 26 Newar families were shifted to Pokhara from Kathmandu valley and they helped to expand the culture of the Malla dynasty, art, business, and a small factory in Pokhara (Shrestha and Kshetry, 2008). Current places such as Bindabasini, Nalakomukh, Bhairavtole, Mohoriyatole, Saghumukh, Tersapatti, Ranipauwa, Gaudakomukh, were the major business center at that time. Later, expanded gradually in and around but Mahendrapul, Lakeside and Pardi also developed as a business hub of the city.

The start of Kathmandu-Pokhara and Pokhara-Bharatpur air service in 1950 played a crucial role in the development of Pokhara. Before that, Pokhara was connected to Kathmandu and Butwal by main trail. This city was connected with Kathmandu and Butwal by road almost 2 decades later. Pokhara was declared as a municipality in 1960 and became headquarter of the Western Development Region in 1973. These two developments helped to grow urbanization in Pokhara. In 2018, Pokhara was declared as the capital of Gandaki Province which also led further development of Pokhara.

In past, Pokhara had small alleys (local termed as *Dahar*) and streets together with *Chautari* (a traditional rest point for visitors and locals) as well as many small ponds to serve water for people and animals. According to Adhikari (2004), there were around 632 *Chautari* at Pokhara earlier, but the expansion of road and other physical infrastructures encroached these to make it only 278 now. Similarly, Pokhara had 26 large grasslands (Patan) but now these all most all places have been converted into

human settlements. Urbanization process with lack of proper planning has converted most of the government lands and/or open space into schools, Hospitals, Government offices etc. Some of these lands have been encroached and being used by the individuals as well. In the last four decades, Pokhara has experienced major urbanization as people are migrating to the main town massively; around 25 thousand Tibetian refugees settled down here and many retired army people selected this place for their future life. The available physical infrastructures, opportunities for employment, education and health facility have played a major role in attracting people to Pokhara.

Some of the open spaces are allocated to cater to the need of the growing population and have been developed as a playground while some of the places remained open spaces. Especially, religious places have been maintained for their open spaces property. In 1974, the Pokhara Municipality first prepared a sketch map on the available POS in Pokhara area (Pokhara Town Planning, 1974). Raniban was declared as a conservation area and the management of Basundhara Park was started in 1975 through the process of land pooling in Pokhara. But religious sites were established and managed along with increasing human settlements. There were some public sites like Chautara, pond and Pati Pauwa (Night rest house for traveller) in the past. A key informant narrates the spatio-temporal development of the public open spaces in Pokhara area as in Box 1.

Box 1: Key informant's view on development of POS in Pokhara

Some area of Pokhara stadium was already public space. The Basundhara Park was established by the Fistail lodge administration initially but later Basundhara park management committee started to manage it with the rules and regulation of Pokhara Metropolitan City. Similarly, Komagane area was used for growing crops like corn, peanut, etc. and Pokhara stadium area was used for agriculture and grass (Kharbari). The World Botanical Garden was protected as a conservation area on the King's decision. It is situated just in front of Ratna Mandir palace where most patches were barren due to sandy soil.
(See Appendix VIII for Key informants)

According to KII, most of the previously established public sites like Chautara and pond were destroyed due to the expansion of roads, establishments of government offices and schools. Similarly, the shape and size of several POS has been changed in the process of urban growth. Key informant is proud that Basundhara Park, Komagane

Park, some portion of Pokhara stadium was expanded by land pooling in their initiations together with surrounding community's decision process to make the POS.

6.2 Magnitude of Change of the POS

This section attempts to analyse the change of area or shape of the public open spaces located within Pokhara metropolitan city. The area of POS available in cadastral survey map of 1974 was taken as the base year for authenticity of POS. Similarly, the topographical map of 1998 published by Survey Department of Nepal and Google image 1998 were used as the base year for the POS historical situation in PMC.

In the same way, cadastral map of 2018, Google image 2018 and GPS survey carried out in 2018 were the basis of analysis for the recent status of POS within Pokhara Metropolitan City. The magnitude of change of patches has various causes. Some patches are changed by natural causes where as some are due to human activities. The magnitudes of change of POS in PMC are shown in Table 6.1a and Figure 6.1a and Figure 6.2a -2c.

Table 6.1a: *Magnitude of change of the public open spaces*

Typology	POS name	Base year (Area Ha.)	Present year 2018 (Area Ha.)	Change in area (Hectares)	Change in percent
Parks	Basundhara park	5.958*	5.958 @@@	0	0
	Lovely hill	8.0906***	7.3746 @@@	-0.716	-8.75
	Phewa dam park	0.1845***	0.1591@@	-0.0254	-13.77
	Martyrs park	0.8197***	0.7943@@@	-0.0254	-3.1
	Mountain museum park	3.3442***	3.3442 @@@	0	0
	World Botanical Garden	165.528***	165.528@@@	0	0
Playground	Amarsingh ground	1.787*	1.684 @@	-0.103	-5.76
	Bhandardhik	2.812***	2.657@@	-0.155	-5.51
	Pokhara stadium	12.923*	21.008 @@@	+8.05	+62.57
	Sarangkot recreation	0.5551***	0.5551@@	0	0
	Simpani ground	0.864***	0.864@@	0	0
Religious site	Bhadrakali religious sit	7.112*	6.773@@@	-0.339	-4.77
	Kedareshwor religious	0.644*	0.644@	0	0
	World Peace Pagoda	1.978***	1.903@@@	-0.075	-3.8
Water surface	Jaubari reservoir	1.937***	1.937@@	0	0
	Kamal pokhari	0.242**	0.216 @@@	-0.026	-10.74
	Khaste lake	13.597**	11.821@@@	-1.776	-13.06
	Phewa lake	447.551**	434.089@@@	-13.462	-3.01
	Davi's fall	0.538*	0.538 @	0	0
Viewpoint	Kuile viewpoint	2.278***	2.278@@@	0	0
	Sarangkot viewpoint	0.641***	0.641@@	0	0
	Thulakot viewpoint	1.052***	1.052@@@	0	0
Cave	Mahendra cave	1.211*	1.211@	0	0
	Sita cave	0.021 ***	0.021@@@	0	0
River strip	Chirgadi Ghat	0.935***	0.935@@@	0	0
	Tulasitra Ghat	0.424***	0.424@@@	0	0
	Ramghat	21.473**	19.556@@@	-1.917	-8.93
	Seti Gorge	0.203 ***	0.203@@@	0	0
Distinct spaces	Dumping site	4.473***	4.473@@@	0	0
	Jayakot	38.116**	36.335@@@	-1.781	-4.67
	Phewa wetland	173.996**	161.109@@@	-12.887	-7.41
	Pradarsani kendra	2.674	2.674	0	0
	Total change	**923.962**	**898.7593**		

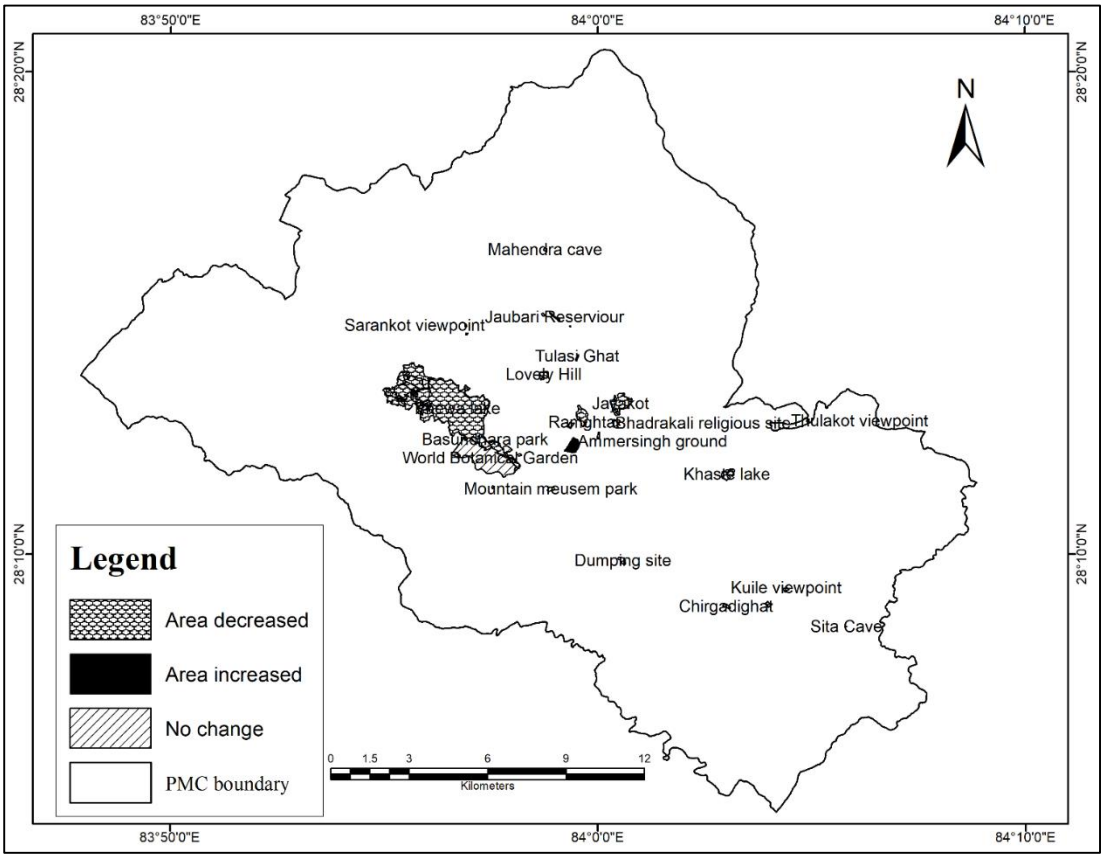
Sources: *Cadastral map, 1974 Survey Office, Kaski @Cadastral map, 2018 Survey Office, Kaski.

**Topographical map, 1998. @@GPS survey, 2018.

**Google image, 1998. @@@Google image, 2018.

Magnitude of change with increasing area for POS is the case for only Pokhara stadium within Pokhara Metropolitan City.

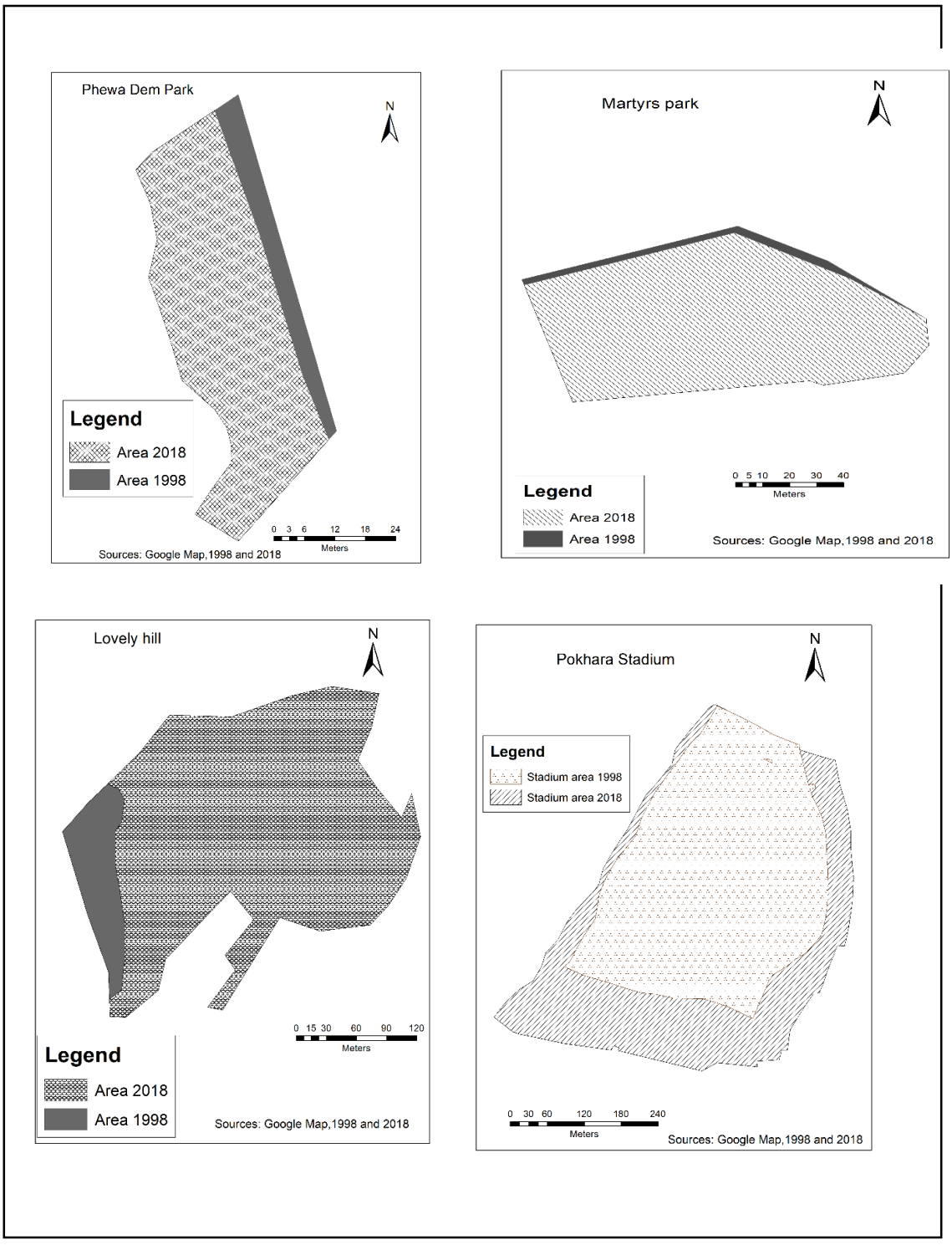
Figure 6.1: *Magnitude of change of POS*



Source: Field Survey 2018.

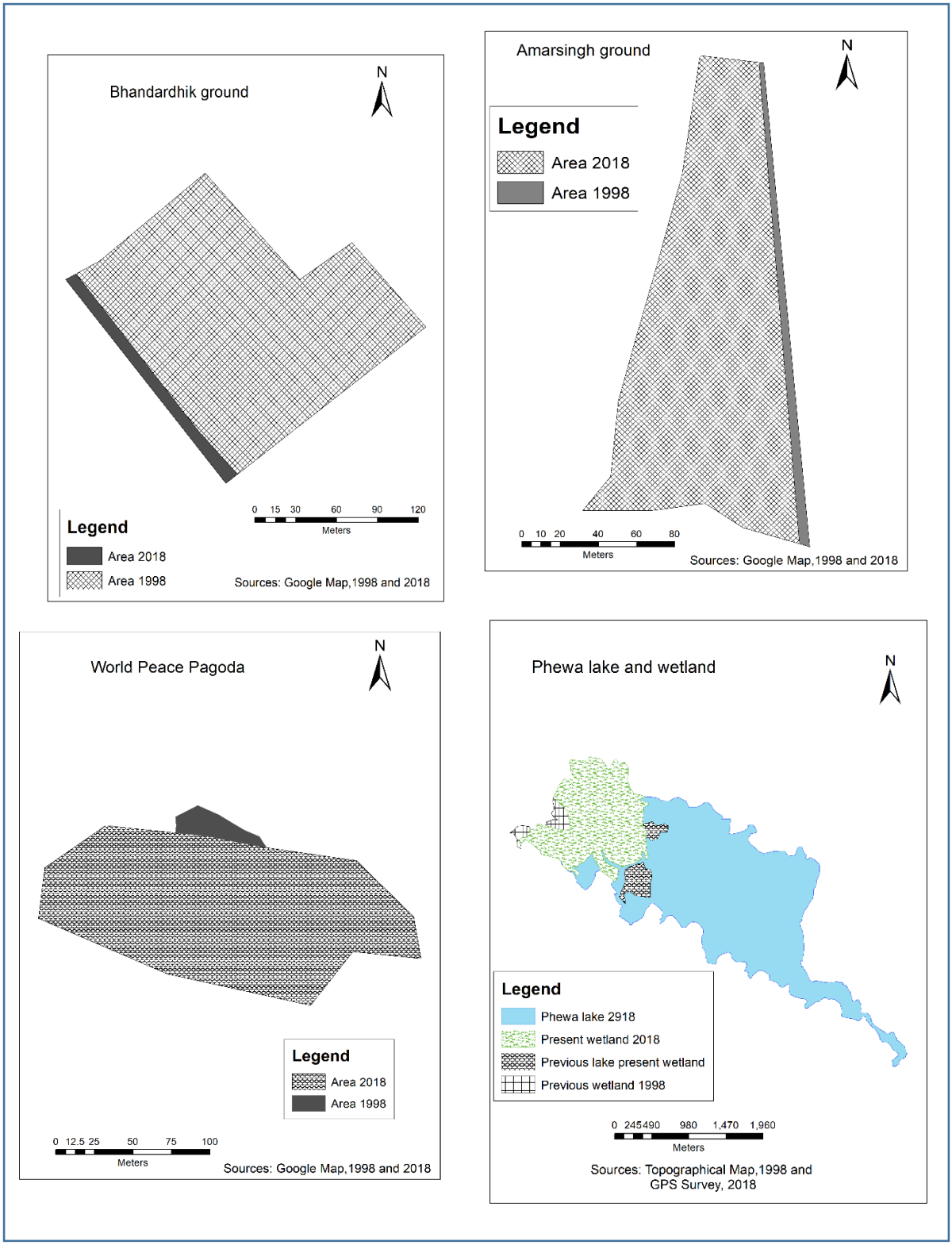
It was observed that area is decreasing due to various causes in 40 percent of POS but while 56 percent patches are remaining constant. Site specific magnitude of change is shown in Figures 6.1 and Figure 6.2a -6.2c. It reveals that a magnitude of change in past two decades as the decrease of area in 1.23 ha with decreasing rate of 0.13 percent per year (map of individual patches are shown in figure 6.2a-6.2c).

Figure 6.2a: *Magnitude of change of POS*



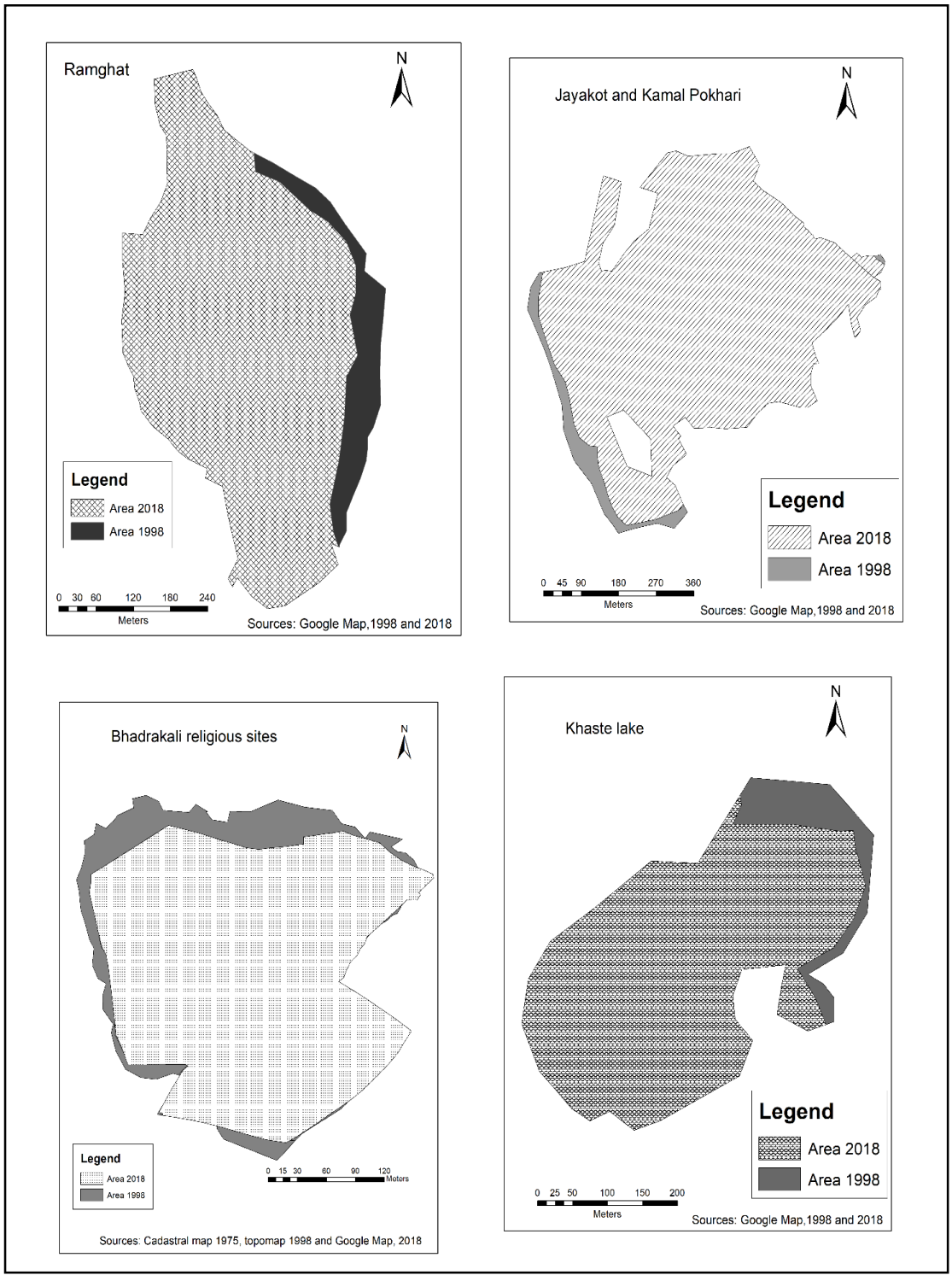
Source: Field Survey, 2018

Figure 6.2b: *Magnitude of change of POS*



Source: Field Survey, 2018

Figure 6.2c: *Magnitude of change of POS*



Source: Field Survey, 2018

Except Pokhara stadium, the areas of all POS have been shrinked. The area of Pokhara stadium was remarkably extended through the land pooling process from individual landowners by the government. Out of total 32 patches, 56 percent of POS in PMC has

remained constant in terms of area, while 4 percent has increased and the remaining 40 percent has been decreased in the area (Figure 6.1 and 6. 2a - 6. 2c).

The interview with KI reveals that no fencing around the POS and even confusion on the cadastral map regarding the boundary of some of the patches facilitated for the encroachment by the adjoining elite landowners as for example Shoryani the case. However, almost 22 percent of the patches are shrinking due to natural degradation. According to the KI almost 40 percent POS patches are affected by encroachment with the area of 24.6 hectares during the last 20 years.

6.2.1 Magnitude of Change of the Public Open Space by Typology

The magnitude of change as per eight types of POS available in PMC are described in the forthcoming section and shown in Table 6.1b.

Table 6.1b: *Magnitude of change of POS by typology*

Typology	**Base Year 1998 (h)**	**Present year 2018 (h)**	**Change**	**Change Percent**
Park	183.925	183.158	-0.767	-0.42
Playground	18.941	27.284	8.343	44.05
Religious	9.734	9.32	-0.414	-4.25
Water Surface	463.865	448.601	-15.264	-3.29
Viewpoint	0	0	0	0.00
Cave	0	0	0	0.00
River strip	23.025	21.119	-1.906	-8.28
Distinct space	219.253	204.591	-14.662	-6.69
Total	**918.743**	**894.073**	**24.67**	

The Table 6.1b shows that the areas of the POS have been reduced 918.74 ha. From 1998 to 894.07 ha. 2018 within 20 years. Only playground has been increased in area while parks, religious sites, water surfaces, river strips and distinct space have been reduced in their area in PMC. The change rate is 1.23 hectares per year it is a serious issue because on one side population is increasing while on the other side, POS size is shrinking each year. If this trend continues POS may not exist in near future PMC.

6.3 Pathways of Change of the POS

Pathways of change denote the change from one use to another use of land in course of time. The necessity and trend of utilization of POS are changing in PMC with the increase in urbanization and human settlements. Some of the marginal lands are now converted into playgrounds, parks, and religious places. Some of the agricultural lands,

bush areas, grasslands, riverside, top of hill and surroundings of caves are being used as a POS while some of the water shore land and internal parts of some patches are being used for the development of basic required infrastructures like footpath shades, toilets, parking, and gardens. Table 6.2a shows the previous and present situation of the POS areas in PMC.

Table 6.2a: *Pathways of change of POS*

Typology	POS name	Previous use	Changed to POS
Park	Basundhara park	Agriculture	Basic infrastructure managed for park
	Lovely hill	Grazing land	Natural state but use as a park
	Phewa dam park	Barren	Basic infrastructure
	Martyrs park	Grazing	Basic infrastructure
	Mountain	Agriculture	Basic infrastructure
	World Botanical	Forest	Basic infrastructure
Playground	Amarsingh	Barren land	Inadequate infrastructure
	Bhandardhik	Barren land	Basic infrastructure
	Pokhara	Grass weeds	Well managed
	Sarangkot	Grass weeds	Basic infrastructure
	Simpani ground	Grazing land	Inadequate infrastructure
Religious site	Bhadrakali	Religious	Well managed
	Kedareshwor	Agriculture	Well managed
	World Peace	Agriculture	Well managed
Water surface	Jaubari reservoir	Barren land	Well managed
	Kamal pokhari	Water	Inadequate infrastructure
	Khaste lake	Water	Inadequate infrastructure
	Phewa lake	Water	Basic infrastructure
	Davi's fall	Water fall	Well managed
Viewpoint	Kuile viewpoint	Barren land	Inadequate infrastructure
	Sarangkot	Agriculture	Well managed
	Thulakot	Barren land	Inadequate infrastructure
Cave	Mahendra cave	Cave	Well managed
	Sita cave	Cave	Inadequate infrastructure
River strip	Chirgadi Ghat	River strip	Inadequate infrastructure
	Tulasitra Ghat	River strip	Inadequate infrastructure
	Ramghat	River strip	Inadequate infrastructure
	Seti Gorge	River strip	Basic infrastructure
Distnict space	Dumping site	Barren land	Basic infrastructure
	Jayakot	Forest area	Basic infrastructure
	Phewa wetland	Wet land	Not managed
	Pradarsani	Barren	Basic infrastructure

Source: KII and field survey, 2018.

***Note**: Well managed POS refers to compound, footpath, bench, toilet, plantation, shade; Basic infrastructure refers to footpath, bench etc. and Inadequate infrastructure refers there is no basic infrastructure but is used as POS.*

The Table 6.2a shows that one fourth of the patches are characterized as well managed while 37 percent have improved their basic infrastructure inside the POS. However, almost 32 percent patches have inadequate provision and 6 percent patches have used for different purposes. Such as playground, water surface, viewpoints, Cave river side Ghat.

6.3.1 Pathways of Change of the POS by Typology

The pathways of change as per the eight typologies of POS in PMC are discussed.

i. Parks

Many parks now being used were converted from paddy field, barren land, grassland, and bush area. Among them, Basundhara Park was developed as a public place purchasing land from individuals. Similarly, Lovely hill, Fewa dam park, Memorial parks were developed in barren land. Likewise, as per the national policy the Mountain Museum Park was built in grassland. Similarly, the Botanical Garden was constructed within Raniban conservation area.

ii. Playground

The playgrounds of Pokhara are characterised by different levels. Some have good infrastructures while some of the playgrounds lack even basic infrastructures. Most of the playgrounds have been built in the areas covered by pastures, grasslands, or bush areas previously. The most organized playground is Pokhara Stadium.

iii. Religious Site

Most of the religious sites in Pokhara have been built 20 years ago. Some of the sites constructed lately have been constructed from the land donation. Bhadrakali hilltop area is taken as a model for religious site which was previously a bush area and was known as *Mudulothumko*. Now with a master plan, it is covered by greenery, water fun, playground, and other purposes. Similarly, the World Peace Pagoda is constructed in the grassland area. In the same way, Kedareshwor area was previously barren land.

iv. Water Surface

PMC is known as the city of lakes, waterfalls, and reservoirs. Pedestrians walking and sitting area keeping the benches along with the bank of the lake have further enhanced the beautification and importance of the lake. The bank of the Khaste lake is also added with these facilities for the visitors.

v. View Point

Pokhara is surrounded by many hills; the hilltops have been developed as the viewpoints to observe the surrounding areas. Popularly known viewpoint the Sarangkot was previously a barren land and Kuile Danda bush area.

vi. Cave

Natural caves entry points and the area above the cave have been developed as beautiful parks. This has helped in the beauty enhancement of the surrounding area as well. The surrounding area around Mahendra Cave is developed as a garden but the area around Sita Cave is still unutilized.

vii. River Strip

Seti river flows almost from the middle of the Pokhara city with many tributaries such as Herpan, Phusre, Bijayapur, Kali, Khudi khola join in different location creatingbeautiful confluence. Some of these confluence have been used as a picnic spot, playground, and some as funeral sites.

viii. Distinct space

The public open space area around Pokhara is used for multiple purposes. Dumping site is developed in previously barren land and wetland area open space near lake is used for biological conservations. Likewise, government-owned land under the city development committee are developed as a display center and various political, religious, educational, and economic activities. Jayakot community forest area is used as a picnic spot, viewpoint, bird-watching center, and walk ways area. This way government-owned unutilized land previously have been developed as POS and infrastructures like foot path, water supply, compound have been developed. The pathways of the change of POS in PMC are shown in Table 6.2b.

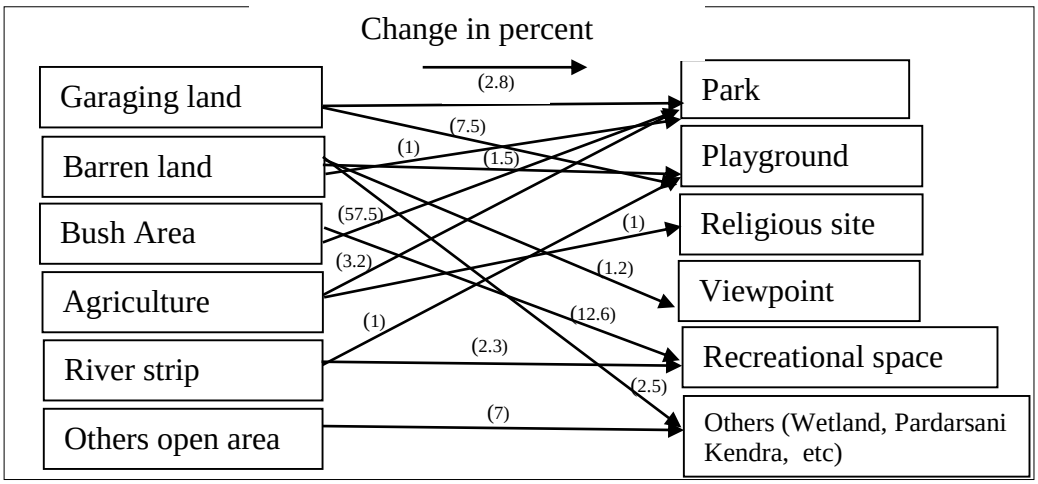
Table 6.2b: *Pathways of Change to public open space*

S.N.	POS name	Previous use	Present use & Typology
1	Basundhara park	Paddy field	Park
2	Lovely hill	Grazing land	
3	Phewa dam park	Barren	
4	Martyrs park	Grazing	
5	Mountain museum park	Agriculture	
6	World Botanical Garden	Forest	
7	Amarsingh ground	Barren land	Playground
8	Bhandardhik playground	Barren land	
9	Pokhara stadium	Grass weeds	
10	Sarangkot recreation area	Grass weeds	
11	Simpani ground	Grazing land	
12	Bhadrakali religious site	Religious site	Religious site
13	Kedareshwor religious site	Agriculture	
14	World Peace Pagoda	Agriculture	
15	Jaubari reservoir	Barren land	Water surface
16	Kamal Pokhari	Water surface	
17	Khaste lake		
18	Phewa lake		
19	Davi's fall	Water fall	
20	Kuile viewpoint	Barren land	Viewpoint
21	Sarangkot viewpoint area	Agriculture	
22	Thulakot viewpoint	Barren land	
23	Mahendra cave	Cave	Cave
24	Sita cave		
25	Chirgadi Ghat	River strip	River strip use in differently
26	Tulasitra Ghat		
27	Ramghat		
28	Seti Gorge		
29	Dumping site	Barren land	Distinct space
30	Jayakot	Forest area	
31	Phewa wetland	Wet land	
32	Pradarsani Kendra	Barren	

Sources: KII and Field Survey, 2018.

Change process from one type of use to another type land is called pathways. The major pathway changing factors of POS are land value, social awareness, people, community decision, urbanization, population and mobility, religion, design guideline government policy, and proper function, using pattern and infrastructure development etc. The pathway to change in POS is also shown by the Figure 6.3. As a matter of fact, the provision of service infrastructure plays a vital role in increasing popularity by attracting many visitors. POS are managed and used for religious activities, tourism activities, parks, playgrounds, and dumping of wastes.

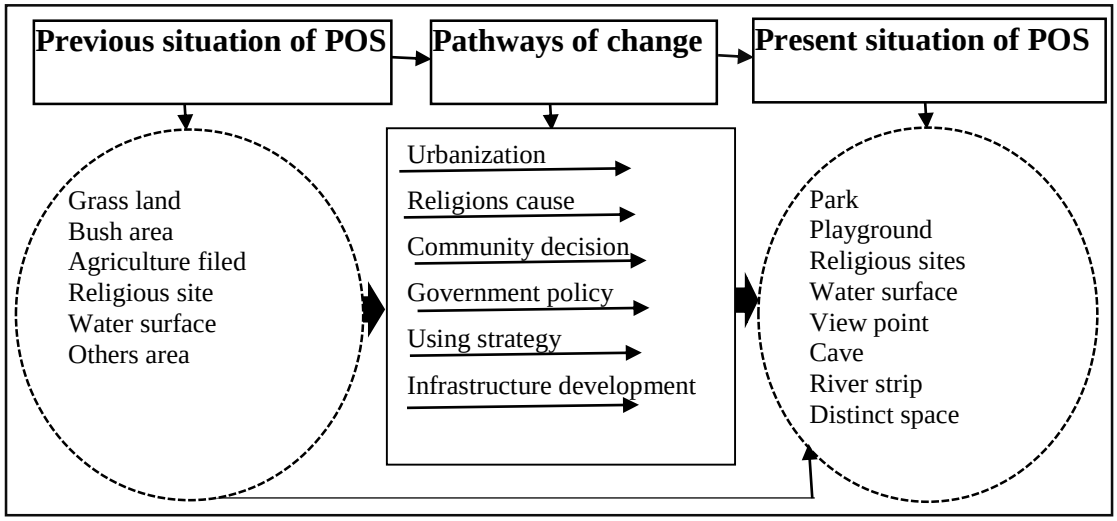
Figure 6.3: *Landscape change into POS*



Changing pattern of pathways from previous state of land into POS has been changed in various ways. Excluding water surface and river strip (except some sites) and religious sites (Bhadrakali) only 288 hectares' area has been changed. The Figure 6.3 shows that more than half of bushy area has been changed into Botanical garden and Jayakot green area while 10.3 percent of grass land has been changed into park and playground, 5.2 percent barren land has been changed into park, playground, viewpoint, and other recreational sites. Similarly, only 4.3 percent agriculture area is changed into park and religious sites. Therefore, previous agricultural land, barren, and bush areas etc. have been transformed into POS like park, playground, religious sites etc. The magnitude of change has undergone both increase and decrease in terms of size. Before urbanization in PMC there were no managed as POS but after acceleration of urbanization different land cover area are being used as POS (Figure 6.4).

However, the pathways of change are also influenced by user's need as well as implementation of urban development plan as shown in Figure 6.4.

Figure 6.4: *Pathways of change of the POS*



6.3.2 Changes in the POS by the Development of Service Infrastructure

The POS has also been changed due to the development of infrastructure and facilities such as fencing, drinking water provisions, rest rooms within the premises. However, required infrastructure development has resulted in decreasing areas of previous POS. The Table 6.3 shows the detail situation of selected 32 sample sites due to the development of infrastructure insides the premises of POS.

Table 6.3: *Service infrastructure developed in pulic open spaces*

Typology of POS	Name of open space	@Change by infrastructure development										
		*Land use	Compound	Sheds	footpath	Benches	Toilet	Parking	Children area	light	Drinking water	Land use plan
Park	Basundhara park	@	✺	◊	✺	✺	✺	◊	◊	✺	◊	✺
	Lovely Hill	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Dam side park	@	✺	◊	✺	✺	◊	◊	◊	◊	◊	◊
	Martyrs park	@	✺	✺	✺	✺	◊	◊	◊	✺	◊	✺
	Mountain museum park	@	✺	◊	✺	✺	✺	✺	◊	✺	✺	✺
	World Botanical Garden	θ	◊	◊	✺	✺	◊	◊	◊	◊	◊	◊
Playground	Amarsingh	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Bhandardhik	@	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Pokhara stadium	@	✺	✺	✺	✺	✺	✺	◊	✺	✺	◊
	Sarangkot paragliding site	@	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Simpani Paly ground	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
Religious	Bhadrakali religious site	@	✺	✺	✺	✺	✺	◊	✺	✺	✺	✺
	Kedareshwor religious site	Δ	✺	✺	✺	✺	✺	◊	◊	✺	✺	✺
	World Peace Pagoda	@	✺	✺	✺	✺	✺	✺	✺	✺	✺	✺
Water surface	Jaubari Reservoir	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Kamal Pokhari	θ	✺	✺	✺	✺	◊	◊	◊	◊	◊	◊
	Khaste lake	θ	◊	✺	✺	✺	◊	◊	◊	◊	◊	◊
	Davi's falls	@	✺	✺	✺	✺	✺	◊	◊	✺	✺	✺
	Phewa lake	θ	◊	✺	✺	✺	✺	✺	◊	✺	✺	✺
Viewpoints	Kuile viewpoint	θ	◊	◊	✺	◊	◊	◊	◊	◊	◊	◊
	Sarangkot viewpoint	@	◊	✺	✺	✺	✺	✺	◊	✺	✺	◊
	Thulakot viewpoint	θ	◊	✺	◊	✺	✺	◊	◊	◊	✺	◊
Cave	Mahendra cave	@	✺	✺	✺	✺	✺	✺	◊	✺	✺	✺
	Sita Cave	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
River strip site	Chirgadi Ghat	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Tulasitra Gghat	θ	◊	✺	◊	◊	◊	◊	◊	◊	◊	◊
	Ramghat	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Seti Gorge	@	✺	◊	✺	✺	✺	◊	◊	◊	◊	✺
Massy space	Dumping site	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Jayakot, Karki Danda	@	◊	✺	◊	✺	✺	✺	✺	◊	✺	◊
	Phewa wetland	θ	◊	◊	◊	◊	◊	◊	◊	◊	◊	◊
	Pradarsani Kendra	@	✺	✺	✺	◊	◊	◊	◊	◊	◊	◊

Source: KII and field observation, 2018

* @= Open space with more building occupancy; Δ=Open space being utilized for different purposes; θ=Open space left idle; #Infrastructure development situation: yes =✺, No= ◊

Infrastructure development in the patches brought the change in internal layout of the POS in PMC. Almost 13 patches have been compounded, while 15 patches have shed, and only 3 patches have been managed as children playing sites, while remaining 44 percent patches are left idle (see Appendix XVII).

6.4 Drivers of Change of POS

An important part of urban POS is the change by different driving factors. According to KI information, POS has been changed in its outlook of its previous status is due to the natural and anthropogenic factors. At PMC, 17 POS are changed due to natural factors. However, only one patch is enlarged in size and most of the patches are reduced in area by natural process and human encroachment. The driving factors of POS are briefly described below:

6.4.1 Natural Factors

The natural landscape of POS patches has several forms: vegetation, bare land, and sandy or rocky surface. But due to different biophysical processes such as erosion, flood, river bank cutting, sedimentation, landslide, vegetation growth the public open spaces area might be changed. In case of Pokhara, POS near riverbanks are being used as funeral areas (Ghat) and site seeing areas. Ramghat, Tulasitra Ghat, Simplani playground are located along the river channel and they are affected by the flood, river bank cutting and siltation. Some of the POS located in the hilly area are affected by landslides and erosion. Similarly, as a result of plantation and conservation activities, barren areas such as Jayakot and Bhadrakali have been changed into greenery. Likewise, due to rapid siltation, Phewa and Khaste lake area has been changed. World peace pagoda area is affected by the landslide. The views of the KII on the natural factors as the drivers of changes are presented in Box 2.

Box 2: Response of key informant

The POS in PMC has been changed by natural causes. For example, Simpani and Ramghat areas are affected by Seti river flood. Phewa lake and Khaste lake are shrinked by sedimentation. World Peace Pagoda and Sarangkot view point area are decreasing by landslides. Similarly, areas of Tulasitra Ghat is shrinking due to the river bank cutting. The botanical garden and Jayakot area is currently covered by dense forest. Therefore, natural factors play vital role to change POS in PMC. Phewa lake now is facing gradual deposition of sedimentation by Harpan stream so lake area is in the state of shrinking (Appendix VIII).

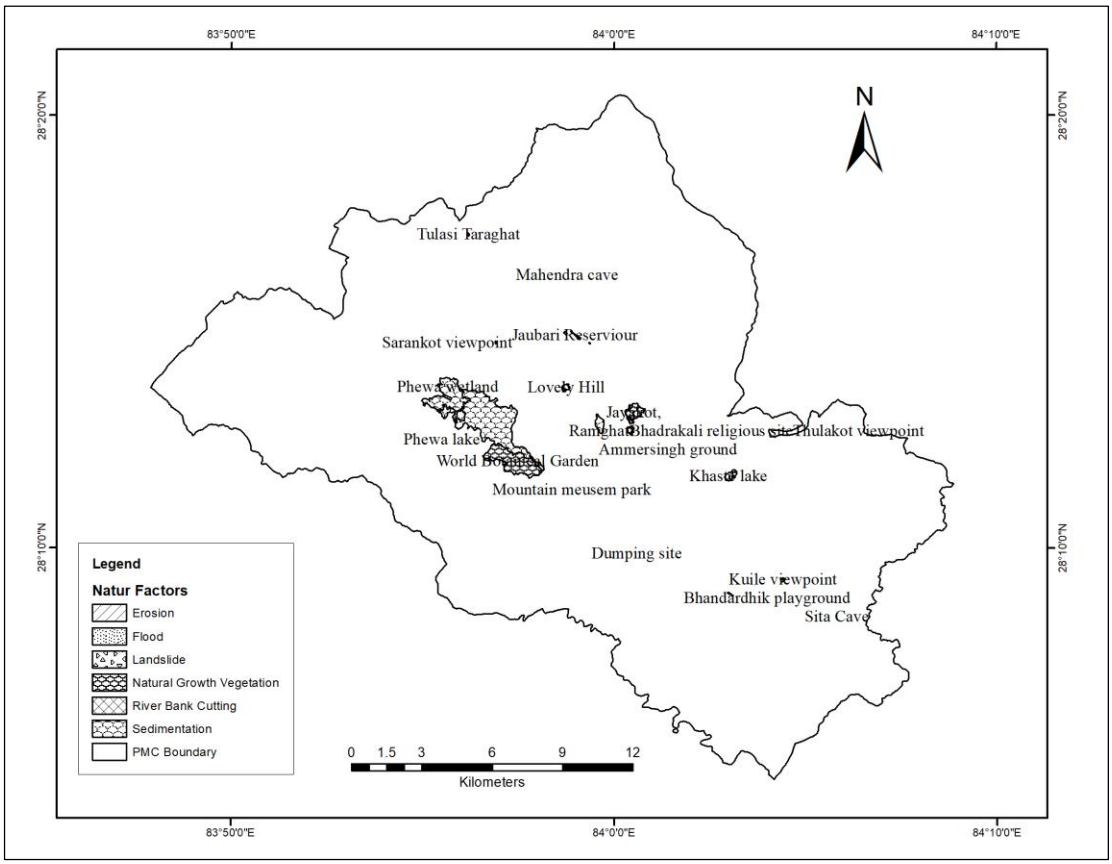
The number of sites affected due to natural factors and their consequences are shown in Table 6.4 and Figure 6.5.

Table 6.4: *Public open spaces and its area affected by natural factors*

Natural factors	**Number of sites**	**Affected patches area (Ha)**	**Consequences**	**Examples**
Sedimentation	6	628.72	Siltation from flood and debris deposits resulted in the decrease in area and depth	Jaubari, Kamal Pokhari, Khaste lake, Phewa lake, Phewa wetland, Ramghat
Landslide	2	2.54	Landslides damaged the land scape and infrastructure and increased hazard and disaster risk	World Peace Pagoda- 20 meters long and 10 meters wide landslide occurred in the north side near world peace pagoda area, Sarangkot viewpoint
Flood	1	0.86	The flood destroyed the land reducing the area	Simpani playground. The flood occurred in Seti river 2012 destroyed some parts
River bank cutting	3	1.56	Reduction in the area to be utilized	Chirgadi Ghat, Tulasitra Ghat and Seti gorge
Erosion	1	7.37	The scenic beauty of landscape is shrinking due to erosion	Lovely hill
Natural growth of vegetation	4	210.91	The scenic beauties of open space increased	World botanical garden, Bhadrakali, Kuile, Jayakot
Total	**17**	**851.96**		

Note: Remaining 15 sites are not affected by natural factors.

Figure 6.5: *Natural factors affecting the POS*



Source: Field Survey 2018

It was found that the headward side of Phewa lake was altered by siltation from Harpan watercourse which resulted in reduced water surface area and increased wet land. Similarly, Khaste lake area has been shrinking due to the landslide that occurred 20 years before. Famous World Peace Pagoda is also in high risk due to huge landslide that occurred at northern side of this premise in 2016. Similarly, landslides along its course have formed certain portions of edge like Ramghat, Chirgadi Ghat, Tullasitra Ghat left as an uninhabited open space. Similarly, 0.17 percent area occupied by caves is gradually being changed by rainwater, landslide, flood, edge cutting as a natural process.

6.4.2 Social Factors

The social driving factors responsible for the change of POS are urbanization, increase in population density, public awareness, religious as well as socioeconomic activities. Information by the KII also proved that the socio-economic factors are more responsible for the changes of POS (Box 3).

Box 3: Response of key informant

In the past, most of the settlements were adjacent to large vacant lands which were known as Patan and those lands were used in grazing, playing, and public gathering. Now its small portion which is used as a POS has been managed by community. According to KII, "public land has been converted to private because the government made a policy to collect more land revenue form the land taxation and the government also encouraged individuals to register land during the survey time because there were small number of population and more vacant land". Due to gradual increase in population the encroachment of POS also started. Adjacent landowner started to extend the boarder of their private land by adding the adjoining public land which is known as Soryani. Similarly, land encroachment has also initiated in ward number 10 to 15 along Phirke Khola and the stream corridor was narrowed down by continuous encroachment by owner of adjoined land.

*Similarly, the land use categories were not specified before 1974 (2031 B.S.). On the sketch of town plan at 2031 B.S. of existing Pokhara Nagar Panchyat, some road, airport, financial institutions, industrial area, park (Shanti Ban), Komagane park, Basundhara park area, tourist site, administrative site etc. were possible to be tentatively located. The plan which was prepared before the cadastral survey had given importance of POS but stakeholders did not emphasize to protect previous public area. The land of the present POS like Basundhara Park, Mountain museum, and Pokhara stadium which were acquired from the individuals can be justified from cadastral map also. These sites have been changed due to urbanization. Even in these POS certain portion of land was public while some portion were privately owned land. Such land were acquired from the owner by providing certain volume in cash. (*See Appendix VIII).

Based on empirical expression of the KII and present field observation, the fact is that the river strip, surrounding area of lakes and wetland areas were changed by natural process and human activities too.

Box 4: Response of key informant

"The forest area in front of the Ratna Mandir palace was used for slash and burn farming (Khoriya) which did not seem environmental friendly to the King" and

according to the order given by the King, later this area was managed and protected in the name of queen Ratna. Now it has been converted as World Botanical Garden.

Again, according to him, other sites of public space were registered after the cadastral survey was completed. Some part of terrace on both the sides of Seti river especially Bagmara side and Bhandardhik to Dhungepatan passing through Lameaahal, as well as, Phewa lake area, Harpan stream land were encroached.

Finally, about the changing trend of POS area he suggested that, mapping the present POS and comparing with its previous demarcation should be followed.

Another 58 years KI who live in Kharanepath near the Khaste Lake says, the area of Khaste Lake was reduced by land slide before 35 years. So, it was changed by natural process as its edge was used for plantation.

A 40 years old KI put his views regarding the Mahendra cave, it was used as open space from 2028 B.S. but currently its premise has been decorated by local community with a master plan therefore, whoever visits the cave they express their positive response about the internal layout of land around the cave. The cave management committee generated income by charging entry fee which is invested for its betterment (See Appendix VIII).

The social driving factors of the modification of POS are shown in Table 6.5.

Table 6.5: *Social driving factors to change POS*

Social driven factors		Number of patches & percent	Consequences	Patches name
Urbanization effect	1. Accelerated Urbanization	7 (21.88 %)	Decrease in area and quality of open space due to construction road, encroachment for temporary business, dumping urban waste.	Basundhara park, Dam side park, Bhandardhik playground, Pokhara stadium, Phewa lake, Dumping site, Pradarsni Kendra
	2. Increase Population	5 (15.63 %)	Encroached public land and construct individual house, use vulnerable area (river strip)	Lovely hill, Amarsingh, Kuile viewpoint, Chirgadi Ghat, Tulasitra Ghat
	3. Increase in land value as a result of rapid increase in population	2 (6.25 %)	Due to high land value people have brought the land which was previously left idle resulting decrease in the area as well as the use pattern of land (from idle to agriculture).	Ramghat, Phewa wetland
Public awareness	4. Well managed by community and government	5 (15.63 %)	Build infrastructures which eventually help to increase value of attractiveness.	Mountain museum park, Sarangkot recreation area, Davi's fall, Sarangkot viewpoint, Mahendra cave
	5. Improvement in awareness among local people and communities	4 (12.50 %)	As the people realized the importance of POS, the carried out activities such as fencing, gardening, sheds, foot trek development. As a result, the area remains constant and the quality is improved.	Jayakot, Martyrs park, Thulakot viewpoint, Bijaypur-Phurse khola sites.
Population movement	6. Immigration	1 (3.13 %)	They try to manage playground for their children	Simpani Paly ground
	7. Increased religious activities	2 (6.25 %)	Increased in attractiveness.	Bhadrakali religious site, Kedareshwor religious site
	8. Increase in the flow of both the international and domestic tourists	6 (18.75 %)	Protection and improvement in the quality of open space through development of service infrastructure and improving the greenery,.	World Botanical Garden, Shanti Stupa, Khaste lake, Sita Cave, Seti gorge park, Jayakot

Source: Field Survey, 2018.

Note: The patches are modified by human activities.

Table 6.5 shows that 21.88 percent patches are changed by acceleration of urbanization such as road expansion, temporary business, dumping site etc. while 18.75 percent patches are made useable for touristic destination because among the visitors 7.1 percent are foreigners.

6.4.3 Economic Factors

Economic factors are also important drivers of POS because revenue generated from visitors could also be used for the management of POS. Following such income source, with the revenue generated from POS like Davis' fall, Sarangkot viewpoint, Mahendra cave and Seti gorge park areas have been well managed. The details of the daily visitors and the income from the POS are shown in Table 6.6.

Table 6.6: *Economic driven factors*

Sites of economic importance	Visitors /day	Drivers of Change	Source of income	Responsible institutions for management
Mountain museum park	200	National policy, (Gardening and greenery)	Charge to visitors for use.	Manage by tourism board of Nepal
Sarangkot recreation area	89	Business Community (Land use change i. e construction of paragliding flight ground)	Charge for paragliding expedition.	Individual business promoter
Davis' falls	450	Local Community (Fencing, gardening, footpath development, lighting etc.)	Charge entry fee to visitors.	Management of site and some portion provide to the Chhorepatan high school
Phewa lake	800	National Policy and Local Community (Development of service infrastructure and other tourism related activities such as boating)	Boating fee, fishing etc.	Government, Local community, Boating association.
Sarangkot viewpoint	372	Local Community (Fencing of compound, construction of view tower)	Charge entry fee to visitors.	Local community
Mahendra cave	590	Local Community (Lighting, gardening, construction of footpath, picnic spot, shade etc.)	Charge entry fee to visitors.	Bindabasini secondary school management committee
Seti gorge park	132	Local Government (Fencing, gardening and construction of , foot path)	Charge entry fee to visitors.	Pokhara metropolitan city
Pradarsni Kendra	500 (but not regular)	Local government (Construction of exhibition hall, parking area)	Charge entry fee to visitors.	Pradarsani Kendra Management committee

Source: Field Survey, 2018.

This Table 6.6 shows that there are number of visitors visiting these sites. The site management committee and government authority charge the fee to enter these sites to raise money. However, among the total sites of POS these sites are quite attractive as well as well managed. It is found that, due to their regular income generation the management body is also motivated to develop required infrastructure development. Therefore, economically prospective sites are significantly changed and are making these places more attractive.

6.4.4 Religious Factors

In Pokhara, people with different religious beliefs reside. However, the population of Hindu dominates others. For the conservation of the POS near the religious sites, people provide donations. Most of the religious sites have well-maintained infrastructure. In most religious sites, there is a formation of a development committee, which constantly works to conserve the area and develop infrastructure as well as beautification of the area. For example, Bhadrakali temple development committee has built many infrastructures in its premises. Likewise, Kedareshwor temple and the World Peace Pagoda site also have been conserved well. The conditions of such places have changed from the previous state with the purpose to provide basic facilities to the pilgrims.

6.4.5 Policy of the Government or Government Interventions

Public Open Space is essential for the mental and physical well-being of humans. It is an imperative element for a clean and healthy environment as well. The central and local governments have formed and implemented various policy for managing Public Open Space. The governments have taken different policies for different POS. For example, POS like Pokhara Stadium, World Peace Pagoda, Basundhara Park and Mountain Museum Park are being developed under the policy of the Central Government while Malepatan Sports Ground, Tundikhel, Seti George Park and Dumping Site area are being managed under the local government. The local government has prioritized the management and development of the POS. Out of the sampled 32 POS, Basundhara Park, Amarsingh Play Ground, Kamal Pokhari, Khaste Lake, River strip, and dumping sites are being conserved and developed under the initiation of the local government.

6.5 Chapter Summary

The present chapter attempted to discuss the magnitude, pathways of change and driving factors of POS at Pokhara for last two decades.

The POS areas in Pokhara have been decreasing in the past two decades. Out of the 32 sample patches except Pokhara Stadium all have loose certain portion of their area. The area of POS has decreased by 1.234 hectares or by 0.13 percent per year. The expansion of road projects is a major factor in the decrease of road side located public open space areas.

Urbanization, construction of religious sites, community buildings, government policies, and construction of physical infrastructures are the factors for conversion of bush areas, grazing lands, water surfaces, agricultural lands into POS. Similarly, open areas and strips along the rivers have also been transformed into POS. It is also found that the construction of parks, playgrounds, religious sites, and other patches are also factors for change in internal layout. The construction of parks, playgrounds, religious sites, viewpoints, caves, river strips, and distinct spaces can be managed properly based on need of the people and it should be as per the rules and regulations of Pokhara Metropolitan City.

Natural, socio-economic, religious, government policy are the major factors for the transformation of public places. Natural factors like landslides, sedimentation, floods, soil erosion, and increased vegetation cover are the cause of change in half of the POS patches in the past. On the other hand, accelerated urbanization, increase in population, awareness activities and religious activities are the major factors of transforming other POS. Similarly, the government policy is also an important factor in the development and management of POS.

CHAPTER - VII

USE, USERS' PERCEPTIONS AND MANAGEMENT OF PUBLIC OPEN SPACE

The chapter discusses use, users' perception and the management practices of the POS in PMC. This chapter comprises of five main subunits. The first subunit covers visitors' profile, their place of origin**,** mode of transportation, and purpose of visiting POS. The management practice of POS is highlighted in the second subunit while visitor's perception regarding the existing situations of the POS is dealt in the third one. The fourth subunit discusses level of satisfaction on the POS by the Visitors and attempt has also been made to develop a model on the visitor's perceptions on the POS. The last subunit presents the summary of this chapter.

7.1 Visitors and their Characteristics

Visitors and their characteristics have been analyzed based on daily flow, socio-economic characteristics of the visitors, mode of transportation, , purpose of visits, duration of stay etc. in POS of PMC.

7.1.1 Daily Flow

People use POS for various purposes. They come from different corners of the country as a domestic tourist, International tourists come from different countries to visit public open spaces with different objectives. There are approximately 24,455 visitors per day in 275 POS sites (Appendix XIII) whereas 32 sample POS had approximately 7,124 visitors per day (Appendix II). Some of the famous open spaces such as, Basundhara park, Pokhara stadium, World Peace Pagoda, Phewa lake, Mahendra cave, Sarangkot viewpoint, Ramghat receive approximately 396, 750, 680, 800, 590, 372, and 450 tourists per day respectively. Therefore, the daily flow of the visitors varies from one public open space to another.

7.1.2 Socio-economic Characteristics of Visitors

The socio-economic characteristics of the visitors are analyzed through the parameters such as age, gander, caste, marital status, education, and occupation.

7.1.2.1 Age and Sex Characteristics of the Visitors

Age and sex are an important demographic characteristic and these influence the attitude or psychological perception of the visitors. Hence, age and sex of the visitors can create different experience of the visit and observation of the object in a POS. The Table 7.1 shows the age and sex characteristics of visitors who visit public open space of PMC.

Table 7.1: *Characteristics of visitors by age and gender*

Sex of the Visitors	**Age group (years)**				
	Below 19	**20-39**	**40-59**	**Above 60**	**Total**
Female	40 (13.6)	172 (58.3)	73 (24.7)	10 (3.4)	295 (38.3)
Male	74 (15.6)	230 (48.4)	141 (29.7)	30 (6.3)	475 (61.7)
Total	**114 (14.8)**	**402 (52.2)**	**214 (27.8)**	**40 (5.2)**	**770 (100)**

Source: Field survey, 2018.

Note: The figures in parentheses are the percentage

Out of the total visitors in POS of Pokhara Metropolitan City, two thirds are male which indicates that it is a male dominated situation of the visitors. So far as the age group is concerned, almost half of the visitors falls in 20-39 years' age group, whereas one fourth falls under 40-59 years' age group. The aged and younger groups are comparatively lower in number. The trend could be generalized as, the larger number of productive age group of male visitors travels to PMC POS areas than the depended age group visitors and female visitors.

7.1.2.2 Marital Status

As far as the marital status of the visitors is concerned, the majority (60 percent) of visitors are married whereas, 36 percent are unmarried and a small percent are either single or divorced. Thus, it can be understood that variation in marital status of visitors exists in PMC.

7.1.2.3 Caste/Ethnicity of Visitors

Caste/ ethnicity is an important characteristic which could also influences the visit to the POS. Out of the total sample visitors more than fifty percent are Brahmin-Chhetri

and few are foreigners. The characteristics of visitors as per the caste and ethnicity are shown in Table 7.2.

Table 7.2: *Caste/ ethnicity of visitors*

Socio-economic characteristics	Variables	Number	Percent
Caste/ ethnicity	Brahmin-Chhetri	411	53.4
	Janajati	235	30.5
	Dalit	75	9.7
	Foreigner	49	6.4
Total		**770**	**100**

Source: Field Survey, 2018.

Table 7.2 reveals that out of total, 53.4 percent visitors belong to the Brahmin and Chhetri families whereas, 30.5 percent represent ethnic groups, 9.7 percent are Dalit or untouchable caste, and 6.4 percent are foreigners (Different part of the world). The ethnic diversity of international visitors is not divided like people from Nepali society, so only foreigners are mentioned in this study**.**

7.1.2.4 Education of Visitors

The education qualification could also influence visits to POS. The field survey data revels that students are major visitors of the POS in PMC. The education level of sample visitors is shown in Table 7.3.

Table 7.3: *The education level of visitors*

People characteristics	Variables	Number	Percent
Education	Literate	141	18.3
	High school	384	49.9
	Higher education	245	31.8
Total		**770**	**100**

Source: Field Survey, 2018.

Table 7.4 shows that, half of visitors visiting the POSs are high school passed. Almost 32 percent of the visitors have a higher degree; bachelor's and Master's degree, 50 percent are high school graduates and 18 percent of visitors are only literate. It suggests that the educational background of the visitors also matters in visiting POS of PMC.

7.1.2.5 Occupation Structure of Visitors

The occupation of the visitors of POS is found to be diverse. The percentage of economically active visitors recorded as 94.8 (Table 7.1). The structure of occupation, their leisure time, entertainment activities and their perception are quite different. Employed POS visitors use the POS in holidays and weekends at certain time while unemployed visitors spend more time inside POS (Table 7.4).

Table 7.4: *Occupation of visitors*

People characteristics	**Variables**	**Number**	**Percent**
Occupation	Job holders	222	28.8
	Business	117	15.2
	Agriculture	38	4.9
	Student	230	29.9
	Unemployed	97	12.6
	Others (Foreign labour, Households, etc.)	66	8.75
Total		**770**	**100**

Source: Field Survey, 2018.

Table 7.4 shows that out of total visitors of POS in PMC, more than half have either job, business, agriculture or foreign employment and more than 40 percent visitors are unemployed.

7.1.3 Place of Origin of the Visitors

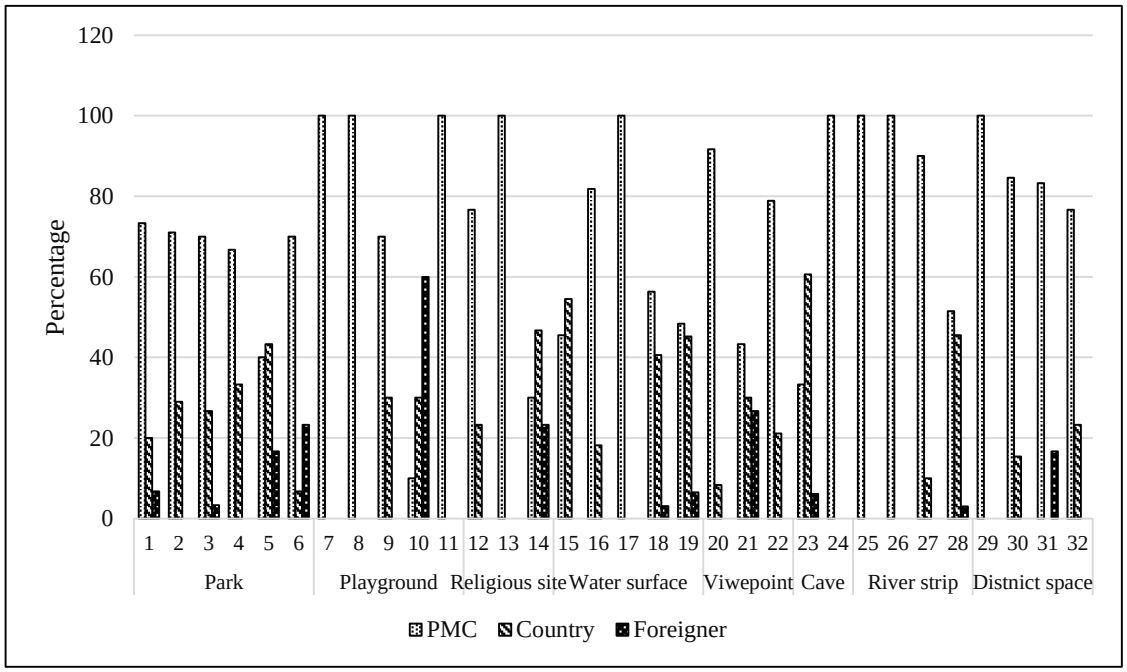
The majority of the POS users are city dwellers whereas people from different parts of the country were also visiting POS. Large number of the public open space visitors are PMC citizens. PMC is a tourist destination attracting domestic tourists and international tourists (Table 7.5 and Figure 7.1).

Table 7.5: *Place of origin of visitors*

Address	Variables	Number	Percent
Place of origin	PMC	532	69.1
	Outside PMC but from Nepal	183	23.8
	Outside Nepal	55	7.1

Source: Field Survey, 2018.

Figure 7.1: Data and interpretation for types of POS

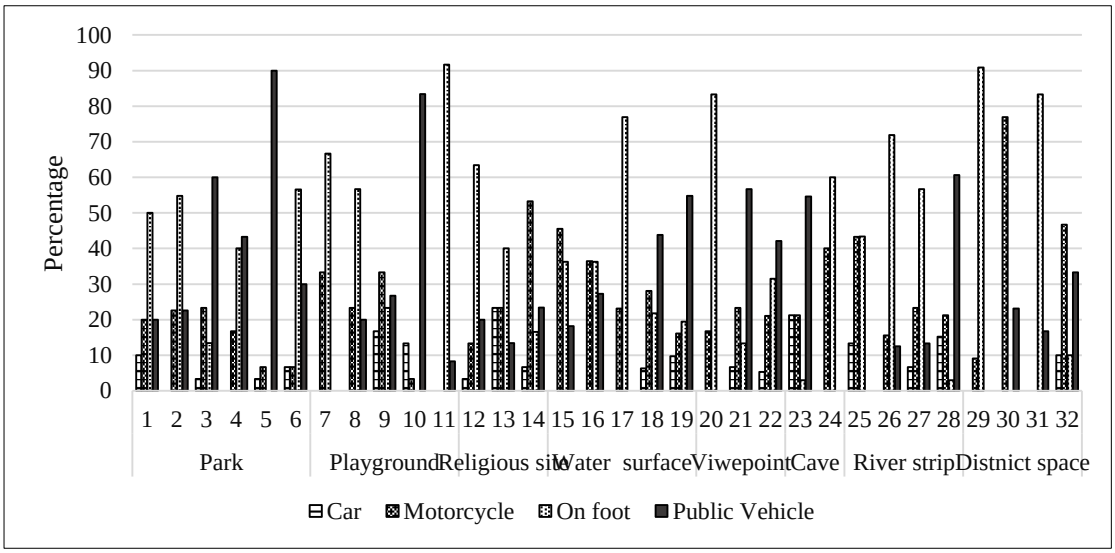


69.1 percent of visitors have reported that they are from within the PMC while 23.8 percent are from other parts of country and around 7 percent of the visitors are from different corners of the world (Appendix IV_ A1).

7.1.4 Mode of Transportation of the Visitors

Visitors who visit open sites are seen to be using different means of transportation like public vehicles, private car, motorbike etc. to reach these places (Figure 7.2).

Figure 7.2: *The percentage of visitors using mode of vehicle*



Source: Field survey, 2018

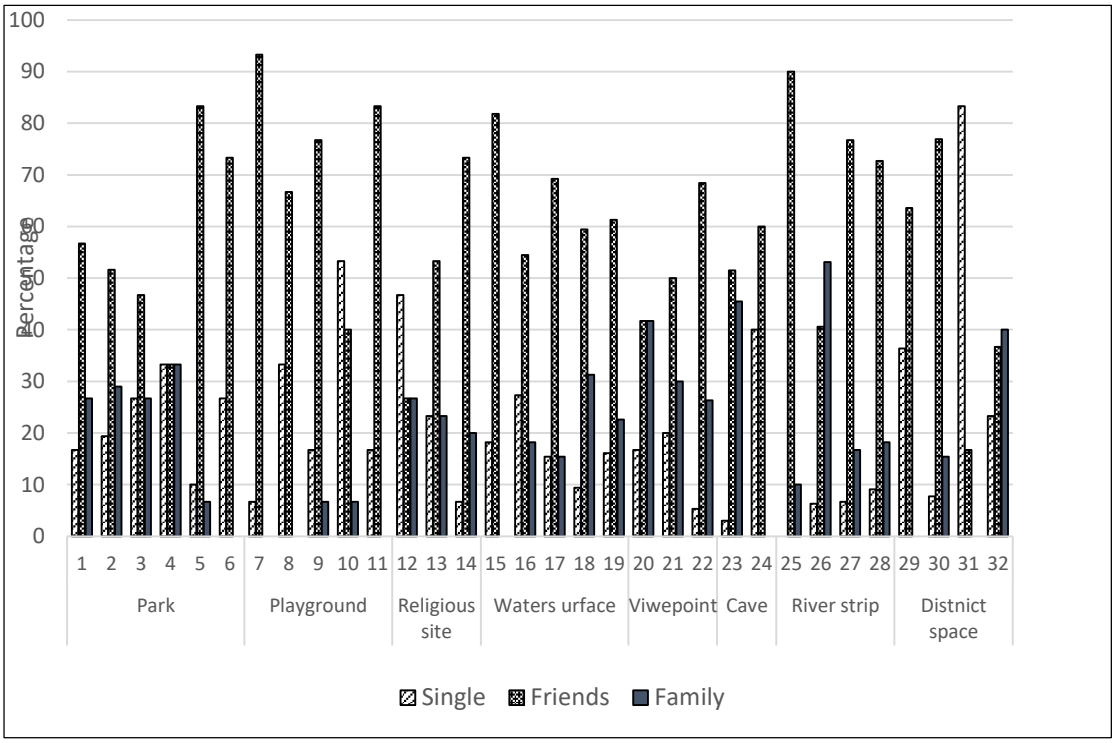
Figure 7.2 shows that almost 35 percent of the visitors reported that they came to POS in PMC on foot whereas 32 percent used public vehicles. Similarly, almost 24 percent used motorcycles and 7 percent visited by their own cars (Appendix IV_A2). The visitors came on foot were from the peripheries of POS such as Dameside park, Basundhara park, Bhadrakali and Kedareswhor temple. However, Sarangkot, Davis fall, Mahendra cave and Pradarsani center are destinations for outsiders as well.

7.1.5 Accompany of the Visitors as Per the POS

Open spaces are also known as social spaces. Visitors come to open spaces either alone or with friends and family. People of different age, sex, castes want to enjoy and spend their time especially with friends and families. It was found that visitors visit alone in Memorial park, Pradarsani center, Sarangkot paragliding ground, Green park and institutional park whereas they prefer to have a company of family member(s) in religious site, Phewa lake, and Mahendra cave (Figure 7.3).

The visitor's survey shows that the majority (60 percent) of the visitors came to POS with friends whereas 21 percent of visitors came with family and friends whereas only 19 percent visited alone. (Appendix IV_A3). Small percent of visitors visit viewpoints, river strips whereas, large number of visitors visit parks, playgrounds, religious sites with friends (Figure 7.3).

Figure 7.3: *Visitors accompany as per the POS*



7.1.6 Purposes of Visit

Visitors come to the public open spaces with different purposes. The survey found that visitor's purposes vary with the visitor's characteristics such as sex, age, caste, educational and employment status. The purpose to visit to the park was for enjoying the natural environment, walking on park, practicing yoga, spending leisure time and interacting with friends whereas people visited playgrounds to play, exercise and many more. Similarly, people visit the religious sites for a spiritual purpose, water surface to enjoy the natural beauty and for swimming, aesthetic sites for panoramic view, caves to observe limestone feature, riversides for recreation, religious and cemetery purpose (Table 7.6 and Figure 7.4).

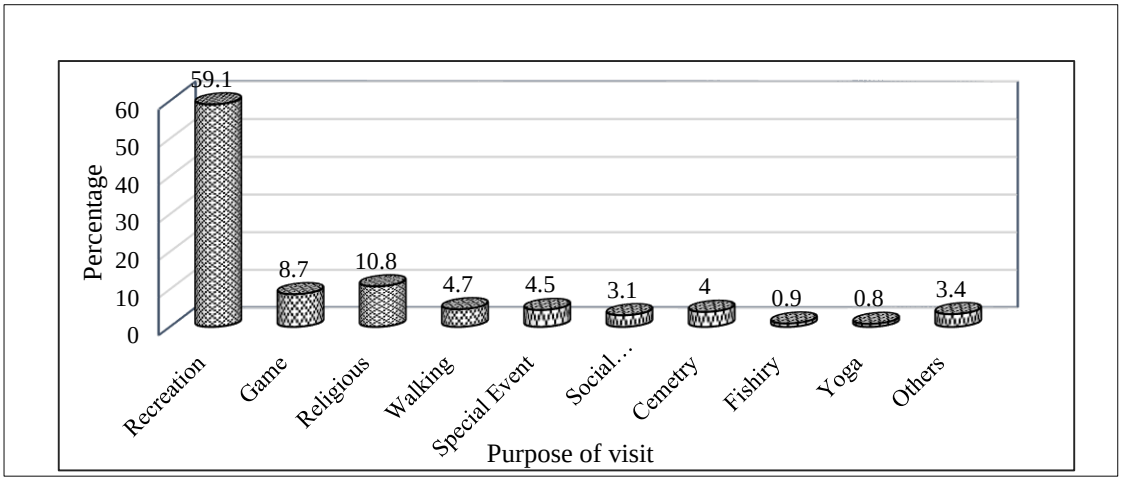
Table 7.6: *Purposes of the visitors*

S. N*.	Major purpose of visit in POS										Total
	Recreation	Game	Religious	Walking	Special Event	Social activities	Cemetery	Fishery	Yoga	Others	
1	86.7	10	0	0	0	0	0	0	3.3	0	100
2	64.5	0	0	32.3	0	0	0	0	0	3.2	100
3	73.3	0	0	0	0	26.7	0	0	0	0	100
4	46.7	0	0	30	0	13.3	0	0	10	0	100
5	96.7	0	0	0	0	0	0	0	0	3.3	100
6	73.3	0	0	13.3	0	0	0	0	0	13.3	100
7	0	80	0	20	0	0	0	0	0	0	100
8	26.7	40	0	3.3	30	0	0	0	0	0	100
9	0	83.3	0	16.7	0	0	0	0	0	0	100
10	80	20	0	0	0	0	0	0	0	0	100
11	16.7	75	0	8.3	0	0	0	0	0	0	100
12	26.7	0	73.3	0	0	0	0	0	0	0	100
13	6.7	0	93.3	0	0	0	0	0	0	0	100
14	80	0	13.3	0	0	3.3	0	0	3.3	0	100
15	90.9	0	0	0	0	0	0	0	0	9.1	100
16	90.9	0	0	0	0	0	0	0	0	9.1	100
17	84.6	0	0	0	0	0	0	0	0	15.4	100
18	78.1	0	0	0	0	21.9	0	0	0	0	100
19	96.8	0	0	0	0	0	0	0	0	3.2	100
20	75	0	0	25	0	0	0	0	0	0	100
21	100	0	0	0	0	0	0	0	0	0	100
22	100	0	0	0	0	0	0	0	0	0	100
23	84.8	0	0	0	0	12.1	0	0	0	3	100
24	60	0	0	0	0	0	0	0	0	40	100
25	0	0	6.7	0	0	0	93.3	0	0	0	100
26	18.8	0	78.1	0	0	0	0	3.1	0	0	100
27	76.7	0	6.7	0	0	0	10	3.3	3.3	0	100
28	100	0	0	0	0	0	0	0	0	0	100
29	0	0	0	0	0	0	0	0	0	100	100
30	100	0	0	0	0	0	0	0	0	0	100
31	0	0	0	0	0	0	0	83.3	0	16.7	100
32	13.3	0	0	0	86.7	0	0	0	0	0	100
Total Percent	59.1	8.7	10.8	4.7	4.5	3.1	4	0.9	0.8	3.4	100

Source: Field survey, 2018

*Note: POS name shown in Appendix II.

Figure 7.4: *Main purposes to visit the POS*

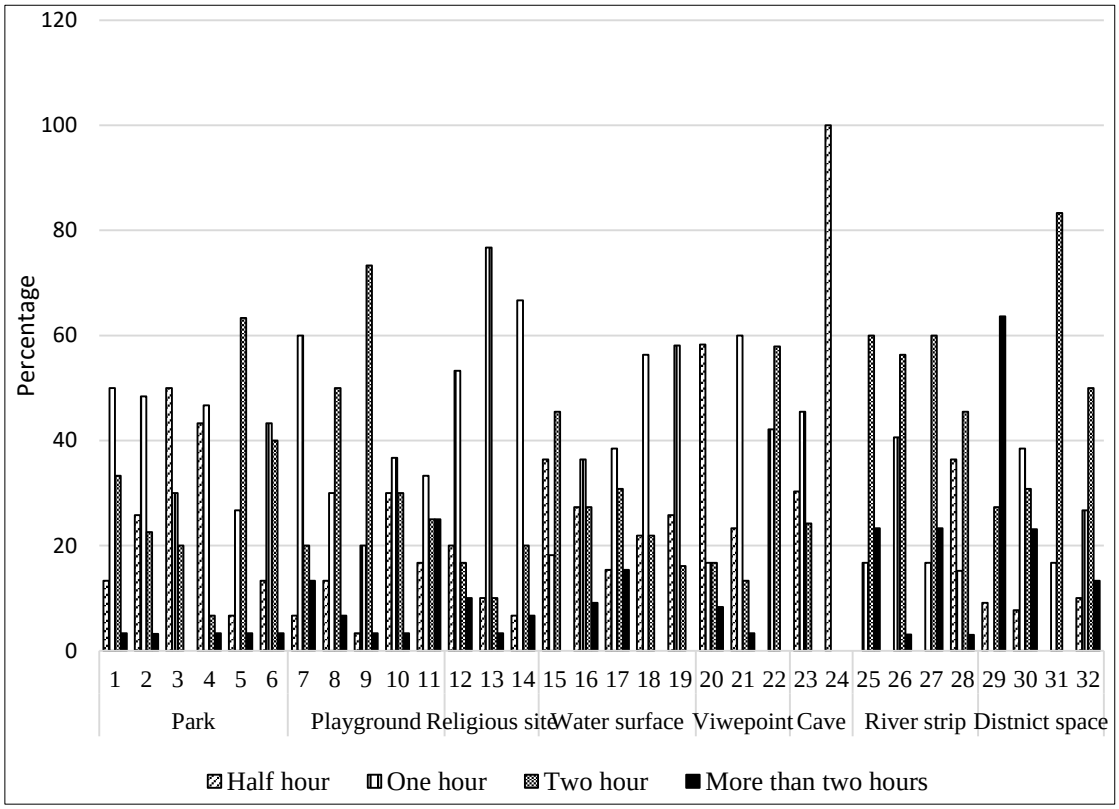


The Table 7.6 and Figure 7.4 show that 59 percent visitors reported that they visited to enjoy the nature and culture, almost nine percent visitors are reported for playing different games while less than one percent came for yoga or meditation. Few POS such as Botanical garden, Basundhara park, Phewa lake, Pradrasani center and Bhadrakali are characterized with multi-purposes of visits. in POS. On the other hand, some POS like Kedareswhor religious site, World Peace Pagoda and dumping site were used for single purposes. However, the nature of POS and management situations also play a vital role to fulfill the visitor's motives and desires.

7.1.7 Repetition and Duration of Stay of the Visitors

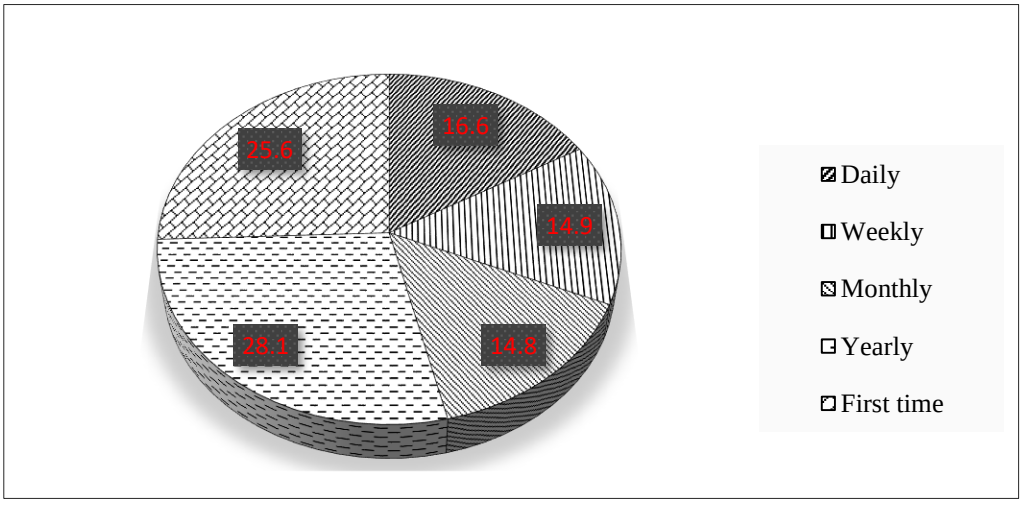
Visitors can spend their short or long hours in POS. However, the attraction and amenities of POS plays vital role to determine repetition and duration of stay of visitors. Visitors spent more time in religious site, water surface, viewpoints and cave than in others typology. The repetition and duration of stay of visitors is shown in Figure 7.5. Almost 11 percent of visitors reported that they are spending more than two hours in the POS while almost 29 percent visitors spent around two hours and 41 percent spent only an hour in open spaces (Appendix IV_A4).

Figure 7.5: *Duration of stay of visitors in POS*



The repetition characteristic of the visitors in the POS are different. People visit the POS as daily, weekly, monthly and annually.

Figure 7.6: Repetition pattern of visitors



Note: Figure are in percentage

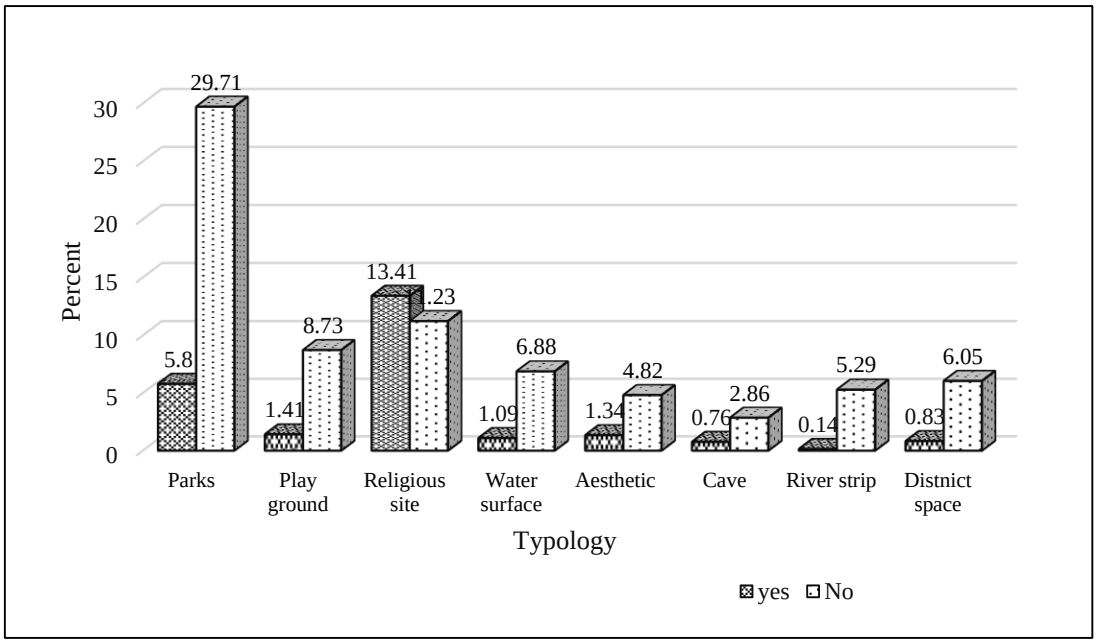
The Figure 7.6 reveals that the repetitive behaviors of visitors to the POS. Almost 17 percent of visitors reported a daily visit, 15 percent as weekly whereas 28 percent

reported monthly visits to the POS. But almost 17 percent visitors came just once in the particular POS (Appendix IV_A5).

7.2 Management Practices and Improvements needed in the POS of PMC

The infrastructure development of a POS determines the number of visitors or users. The POS of developed country focuses on required physical facilities, landscaping and infrastructure developments.

Figure 7.7: *Infrastructure develoment and management in POS*



In case of POS in PMC, there were variations in the facilities among the patches, However, a basic infrastructure such as compound, shed, road access, parking, toilet, resting place, drinking water, light, security etc. are essential to all. In reality it was found that in most of the open spaces of PMC management of basic infrastructure development is required to improve substantially (Figure 7.7).

It was found that only 5.8 percent parks, 1.41 percent playgrounds, 13.41 percent religious sites, 6.88 percent water surface, 2.86 percent caves, 5.29 percent river strip and 6.05 percent distinct spaces sites have been developed properly. Out of the total 275 patches almost 58 percent POS have no proper management (Appendix XIII).

Table 7.7: *Management situations of POS*

S. No.	Management organizations					Management activities		
	User community	Community	Government	institutional	Ideal	Institutional effort	Community	Individual activity
1	xx	✓	✓	xx	xx	Compound	Internal layout	xx
2	xx	xx	xx	xx	✓	xx	xx	xx
3	xx	✓	xx	xx	xx	xx	Internal layout	xx
4	xx	xx	✓	xx	xx	internal layout	xx	xx
5	xx	xx	xx	✓	xx	internal layout	xx	xx
6	xx	xx	✓	xx	xx	Compound	xx	xx
7	xx	✓	xx	xx	xx	Compound	Basketball court	xx
8	✓	xx	xx	xx	xx	Compound	Trek	xx
9	xx	xx	✓	xx	xx	Compound	Trek, parafeet, internal sport facilities	xx
10	xx	xx	✓	xx	xx	xx	xx	Manage filed
11	✓	xx	xx	xx	xx	xx	xx	Poor manage
12	xx	✓	xx	xx	xx	Compound, layout, others	xx	xx
13	xx	✓	xx	xx	xx	Compound, layout, others	xx	xx
14	xx	xx	xx	xx	xx	Compound, layout, others	Management	xx
15	xx	xx	xx	✓	xx	remove sediments		xx
16	✓	xx	xx	xx	xx	xx	Compound	xx
17	✓	xx	xx	xx	xx	xx	Fancy bar	xx
18	xx	✓	xx	✓	✓	Try to manage but no effective	xx	xx
19	xx	✓	xx	xx	xx	xx	Well manage	xx
20	xx	✓	xx	xx	xx	xx	Foot trek	xx
21	xx	✓	xx	xx	xx	xx	Tour, foot trek, compound	xx
22	xx	✓	xx	xx	xx	xx	xx	Poor manage
23	xx	✓	xx	xx	xx	Compound, layout, others	xx	xx
24	xx	xx	xx	xx	✓	xx	xx	No manage
25	xx	xx	✓	xx	xx	Compound. Internal layout	xx	xx
26	xx	xx	xx	xx	✓	xx	xx	No manage
27	xx	xx	xx	xx	✓	xx	xx	No manage
28	xx	xx	xx	xx	✓	xx	xx	No manage
29	xx	xx	✓	xx	xx	Recycling waste	xx	xx
30	xx	✓	xx	xx	xx	xx	Fancy bar	xx
31	xx	xx	xx	xx	✓	xx	xx	No manage
32	xx	xx	xx	✓	xx	xx	Compound, exhibition dome	xx

Note: ✓: - Involvement organizations; xx: - Not involvement
Sources: Field Survey and KI interviews, 2018.

Management status of the sample POS located in PMC is shown in Table 7.7 which suggest for improvements in present conditions.

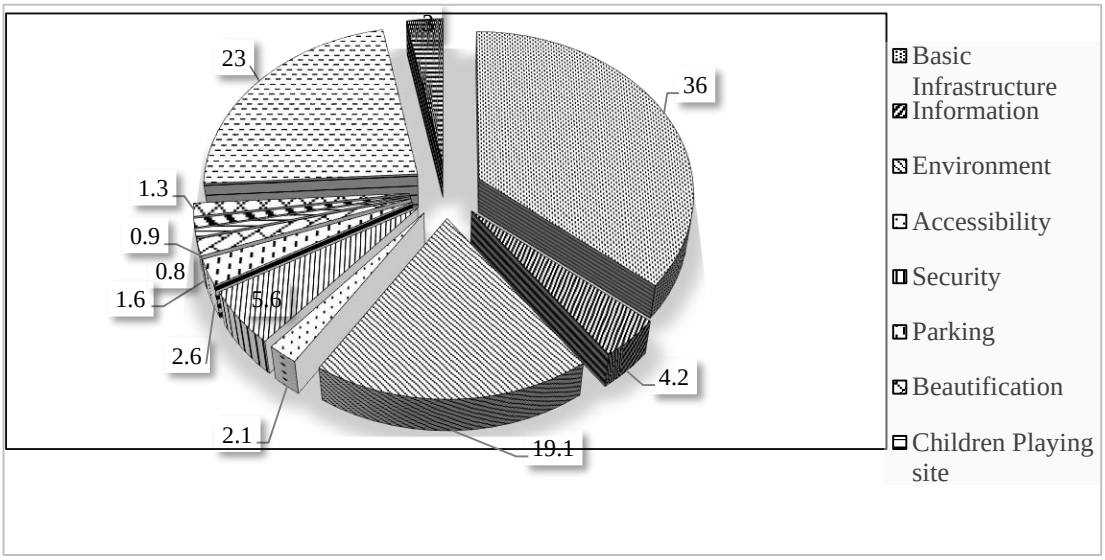
Table 7.8: *Visitor's perception on the problems of POS*

Typology	S. No	Problems faced by Visitors												Total
		Basic Infrastructure	Information	Environment	Accessibility	Security	Parking	Beautification	Children Playing site	Site Planning	No Enough space	No Comment	Good Management	
Park	1	14 (46.7)	1 3.3)	9 (30)	0	0	0	1(3.3)	1(3.3)	0	0	4 (13.3)	0	30 (100)
	2	17 (54.8)	1 (3.2)	7 (26.6)	0	0	2 (6.5)	0	0	1 (3.2)	0	3 (9.7)	0	31 (100)
	3	6 (20)	0	15 (50)	0	2 (6.7)	3 (10)	2 (6.7)	0	0	0	2 (6.7)	0	30 (100)
	4	14 (46.7)	0	2 (6.7)	0	2 (6.7)	0	2 (6.7)	1 (3.3)	0	1 (3.3)	8 (26.7)	0	30 (100)
	5	3 (10)	3 (10)	5 (16.7)	0	0	0	0	2 (6.7)	0	0	9 (30)	8	30 (100)
	6	18 (60)	0	0	0	7 (23.3)	0	0	0	0	0	3 (10)	2	30 (100)
	7	11 (73.3)	0	2 (13.3)	0	1 (6.7)	0	0	0	0	0	0	1(6.7)	15 (100)
Playground	8	9 (30)	1 (3.3)	3 (10)	1 (3.3)	0	2 (6.7)	0	0	0	3 (10)	9 (30)	2 (6.7)	30 (100)
	9	21(70)	0	0	0	0	1 (3.3)	0	0	0	0	7 (23.4)	1 (3.3)	30 (100)
	10	5 (16.7)	7 (23.3)	1 (3.3)	1 (3.3)	4 (13.3)	0	0	0	1 (3.3)	0	11 (36.7)	0	30 (100)
	11	10 (83.3)	0	0	0	0	0	0	0	0	0	2 (16.7)	0	12 (100)
Religious site	12	1 (3.3)	0	7 (23.3)	5 (16.7)	2 (6.7)	0	0	1 (3.3)	2 (6.7)	0	12 (40)	0	30 (100)
	13	9 (30)	1 (3.3)	7 (23.4)	0	0	0	1 (3.3)	0	0	2 (6.7)	6 (20)	4 (13.3)	30 (100)
	14	4 (13.4)	1 (3.3)	0	5 (16.7)	1 (3.3)	0	0	0	0	1 (3.3)	18 (60)	0	30 (100)
	15	6 (54.5)	0	2 (18.2)	0	0	1 (9.1)	0	0	0	0	2 (18.2)	0	11 (100)
Water surface	16	2 (18.2)	0	4 (36.4)	0	0	0	0	0	0	0	4 (36.4)	1 (9.1)	11 (100)
	17	3 (23.1)	0	1 (7.7)	0	1 (7.7)	2 (15.4)	2 (15.4)	0	0	0	3 (23.0)	1 (7.7)	13 (100)
	18	2 (6.3)	2 (6.3)	23 (71.9)	0	1 (3.1)	0	0	0	0	0	4 (12.5)	0	32 (100)
	19	4 (12.9)	1 (3.2)	5 (16/1)	0	3 (9.7)	1 (3.2)	0	1 (3.2)	0	0	16 (51.6)	0	31 (100)
Viewpoint	20	5 (41.7)	0	4 (33.3)	0	0	0	0	0	0	0	3 (25)	0	12 (100)
	21	13 (43.3)	3 (10)	5 (16.7)	0	0	0	0	0	0	0	9 (30)	0	30 (100)
	22	18 (94.7)	0	1 (5.3)	0	0	0	0	0	0	0	0	0	19 (100)
Cave	23	8 (24.2)	1 (3)	7 (21.2)	3 (9.1)	0	1 (3)	0	0	0	2 (6.1)	11 (33.3)	0	33 (100)
	24	5 (100)	0	0	0	0	0	0	0	0	0	0	0	5 (100)
	25	26 (86.7)	0	0	0	0	0	0	0	0	0	4 (13.3)	0	30 (100)
River strip	26	10 (31.3)	0	9 (28.2)	0	5 (15.6)	0	1 (3.1)	0	0	0	6 (18.7)	1 (3.1)	32 (100)
	27	13 (43.3)	4 (13.3)	4 (13.3)	0	7 (23.3)	0	2 (6.7)	0	0	0	0	0	30 (100)
	28	9 (27.3)	2 (6.1)	9 (27.)	0	3 (9.1)	3 (9.1)	0	0	2 (6.1)	1 (3)	4 (12)	0	33 (100)
Distinct space	29	1 (9.1)	0	5 (45.5)	0	0	1 (9.1)	0	0	0	0	4 (36.4)	0	11 (100)
	30	1 (7.7)	0	2 (15.3)	0	1 (7.7)	3 (23.1)	0	0	0	0	6 (42.2)	0	13 (100)
	31	0	0	3 (50)	0	3 (50)	0	0	0	0	0	0	0	6 (100)
	32	9 (30)	4 (13.3)	5 (16.7)	1 (3.3)	0	0	1 (3.3)	0	1 (3.3)	0	7 (23.3)	2 (6.7)	30 (100)
Total		**277 (36)**	**32 (4.2)**	**147 (19.1)**	**16 (2.1)**	**43 (5.6)**	**20 (2.6)**	**12 (1.6)**	**6 (8)**	**7 (9)**	**10 (1.3)**	**177 (23)**	**23 (3)**	**770 (100)**

Source: Field Survey, 2018

During the field survey, attempt was made to identify visitor's perception on the major problems inside the POS and is shown in Table 7.8.

Figure 7.8: *Existing problems in POS faced by visitors*

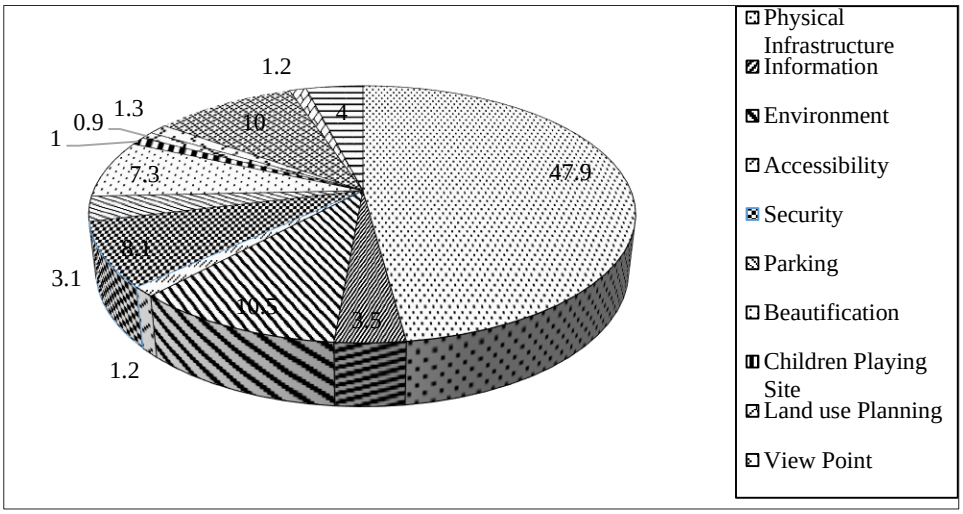


Note: Figure are in percentage

Figure 7.8 show that more than one-thirds of the visitors reported that they faced numerous problems in POS. Similarly, 19 percent visitors reported environmental problems like pollution and noise etc., while almost 6 percent reported safety issues.

The present research attempts to trace suggestions from visitors on the further improvements needed on those problem found in POS. It is expected that these suggestions provided by visitors will help to the improvement of the POS (Appendix VI).

Figure 7.9: *Visitor's suggestions for POS management*



Note: Figure are in percentage

Almost fifty percentage of visitors suggested for the improvements of the physical infrastructures such as foot path, drinking water and parking etc., 10 percent suggested maintaining a peaceful environment and 10 percent emphasized on better management of the patches.

7.3 Perception of the Visitors on the POS in PMC

The perceptions of the visitor have also been analyzed based on the accessibility, natural attraction, cultural attraction, sanitation, layout, security, parking, and surrounding environment of the POS and is discussed below:

7.3.1 Perception of the Visitors Based on the Accessibility of the POS

There was no access to most of the POS during the night time. People can have the access to almost 94 percent of the 275 available sites in the city during the daytime. Interestingly proper basic infrastructures have been developed through proper management in the privately owned spaces like Golf Course but these are not open for public use.

Figure 7.10: *Visitors' perception on the accessibility to POS*

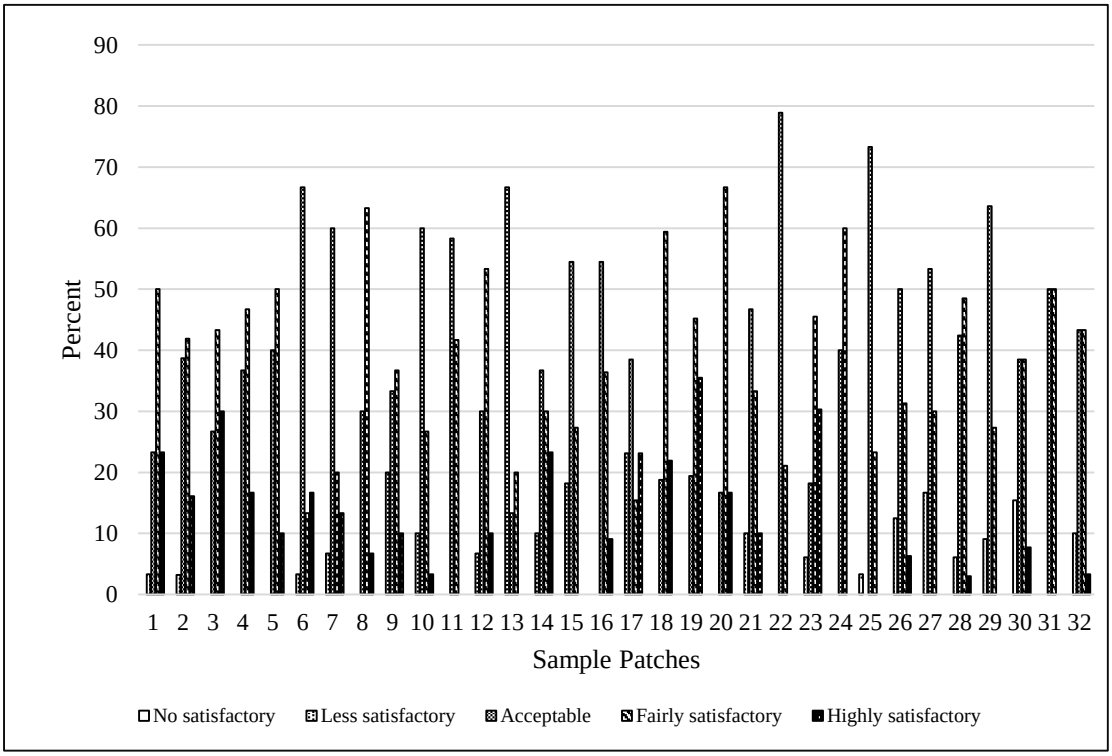


Figure 7.10 shows the accessibility on the sample patches. in terms of accessibility, 12 percent visitors were highly satisfied, 39 percent fairly satisfied, 40 percent satisfied, and 8 percent not satisfied (Appendix V_B1).

7.3.2 Perception of the Visitors Based on the Natural Attraction of the POS

Humans have a tendency to feel ownself as the most wonderful gift of nature. people want to be refreshed enjoying the time at open spaces located in urban areas. Visitors' attraction towards the POS of PMC is based on the natural beauty of public places. Natural beauty is the valuable asset of the city which helps promote the tourism industry by its attractions. Thus, people are enthused to spend their spare time with beautiful nature which they manage from their busy urban lifestyle.

Figure 7.11 shows that almost 38 percent of the visitors are highly satisfied with the natural attractions of POS in PMC. Similarly, another 38 percent have satisfied with their expectations from the POS (Appendix V_B2).

Figure 7.11: *Perception of the visitors based on the natural attraction of the POS*

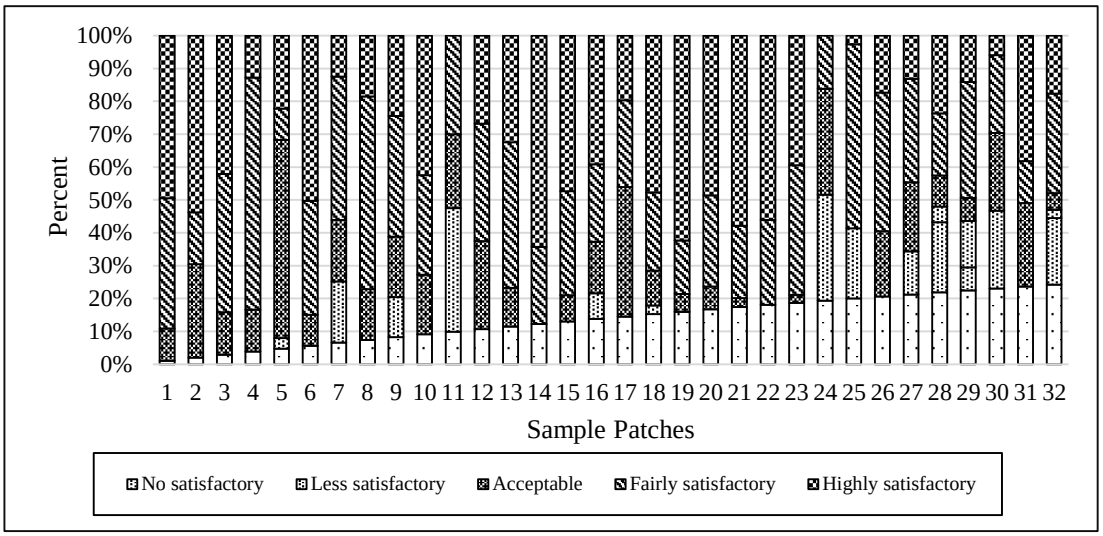


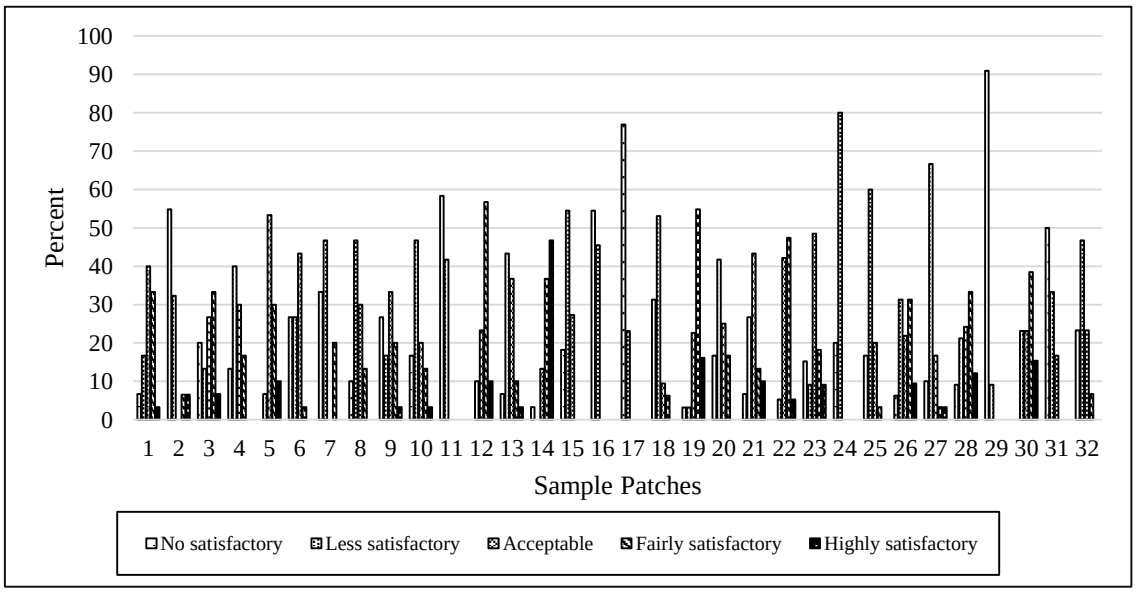
Figure 7.11 show that open spaces of Pokhara are capable of giving complete mental satisfaction to visitors because people have a higher level of satisfaction from the pleasure offered from the amenities of any landscape which helps to refresh person reducing their worries and motivate the person to be a healthy and mentally strong person

Perception of the visitors based on natural attraction

7.3.3 Perception of the Visitors Based on the Cultural Attraction of the POS

POS of Pokhara is managed and established for the health, entertainment, and social activities and are also known for cultural heritages.

Figure 7.12 : *Perception of visitors based on cultural attraction of the POS*



activities are carried mainly on existing public open spaces. In the context of Pokhara, religious sites and museums are specially taken as cultural heritage sites (Figure 7.12).

Almost seven percent visitors are highly satisfied with the cultural heritage at POS, 20 percent are satisfied, while 18 percent are unsatisfied with the cultural attractions of Pokhara (Appendix V_B3).

7.3.4 Perception of Visitors Based on Internal Layout of the POS

The state of the architectural design and internal decorations are also the major factors in changing a visitor's perceptions of the place. Most of the visitors liked Peace Pagoda, Mahaendra cave premise, Davi's fall area and Bhadrakali religious sites due to their unique layouts. Visitors' perceptions on internal lay ut of the POS are shown in Figure 7.13a and 7.13b.

Figure 7.13a: *Perception of the visitors based on internal layout*

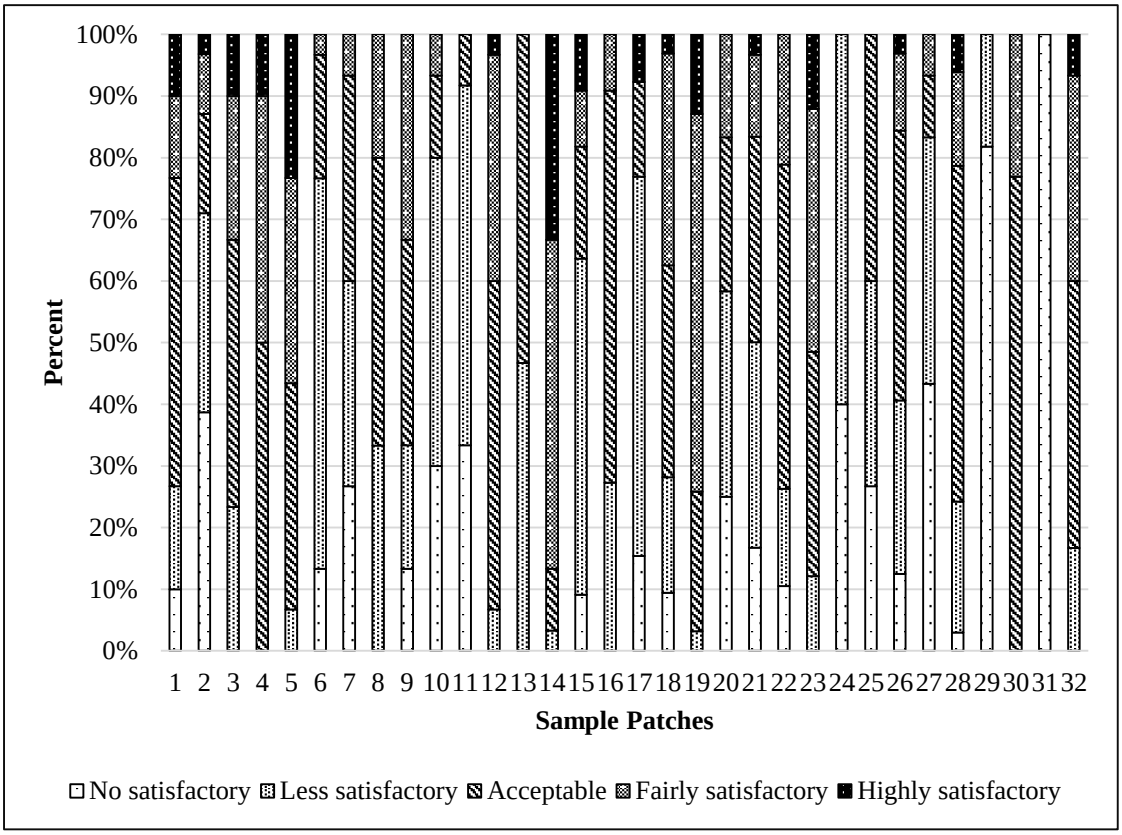


Figure 7.13b: *Perception of the visitors based on internal layout*

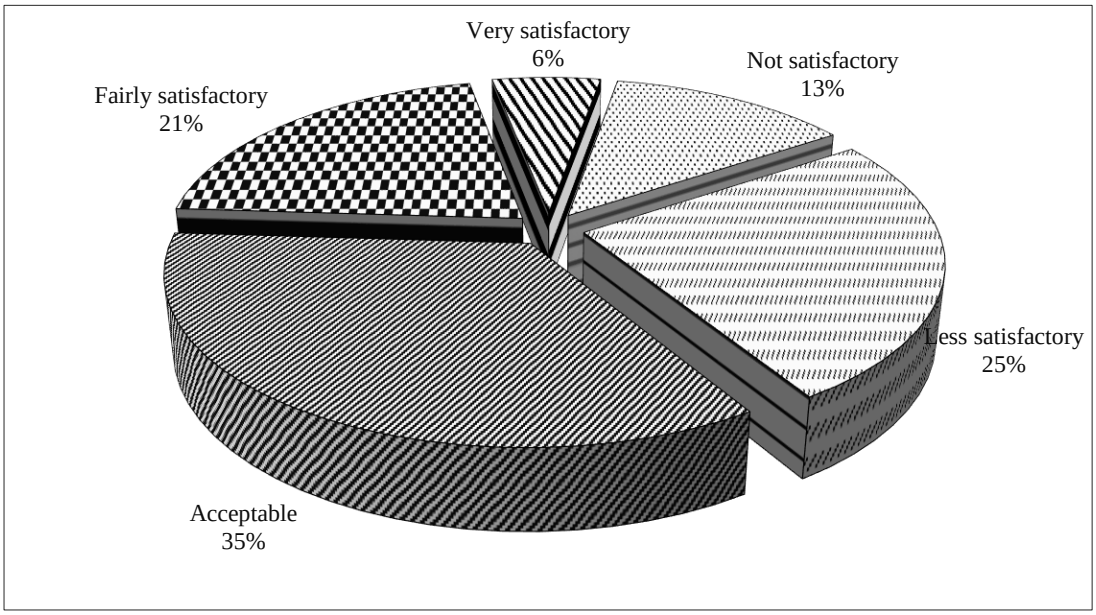


Figure 7.13b shows that just six percent of the visitors are highly satisfied with the internal layout of the POS in Pokhara, while 21 percent are fairly satisfied and 35 percent have accepted to some extent on the existing architectural designs and decoration of POS in Pokhara. The study found that there is a need to improve in the internal layout of POS to make it more attractive, organized, and visitor-friendly.

7.3.5 Perception of Visitors Based on the Sanitation of the POS

Sanitation of the urban public open spaces is the perfect epitome of the sanitation and hygienic situation of the city. The urban areas and public open spaces of the city should also be completely clean and hygienic in terms of the health conditions. Public open spaces mandatorily should have the minimum facilities of safe and clean drinking water, toilets, dustbins, and rainwater drainage system. Likewise, the periphery of the public open space should be made clean and attractive managing the garbage and decayed plants properly. Visitor's perception about the sanitation of the POS is shown in Figure 7.14.

Figure 7.14: *Perception of the visitors based on the sanitation of the POS*

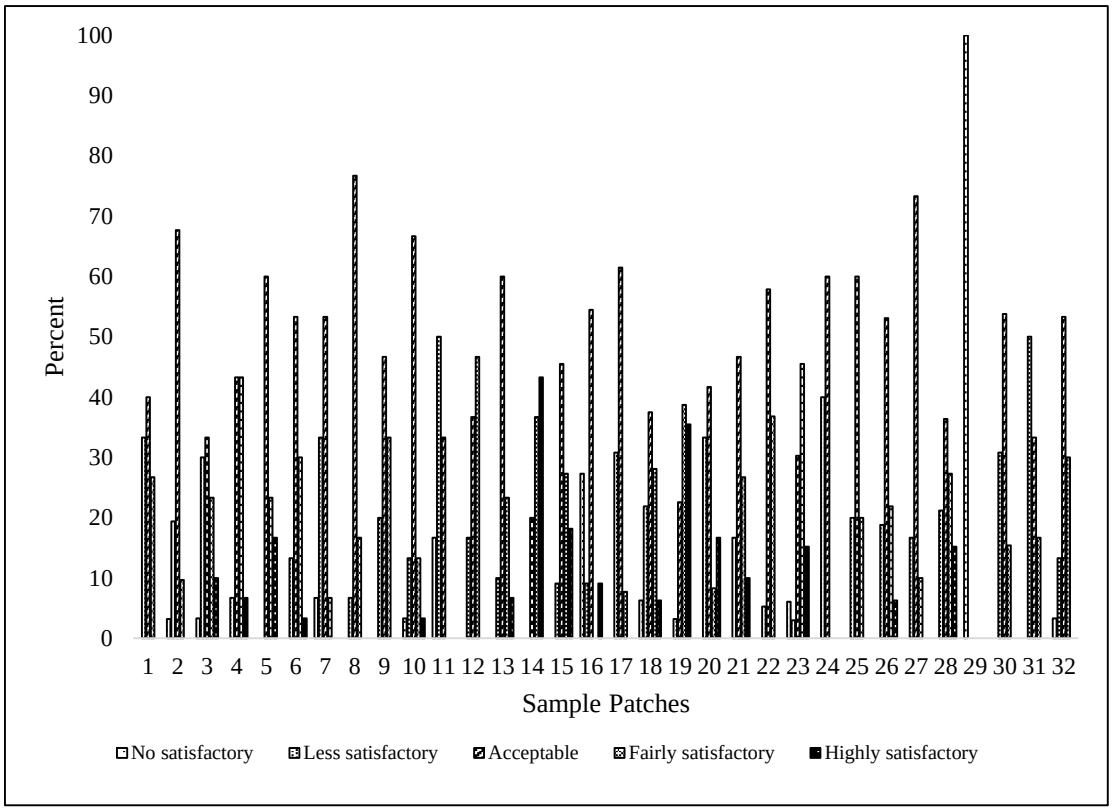
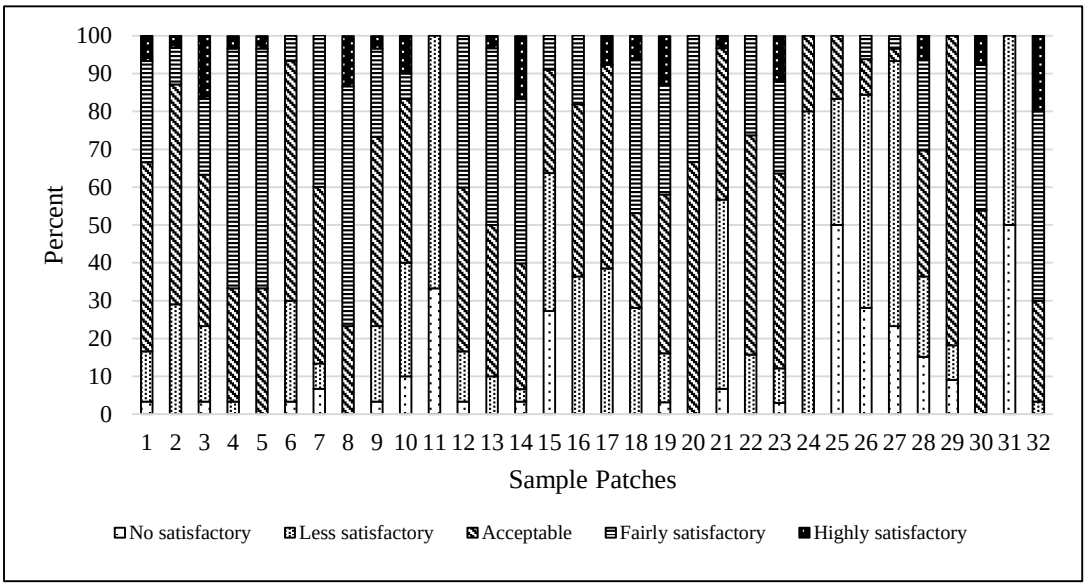


Figure 7.14 shows that out of total POS visitors, almost eight percent were highly satisfied, 25 percent fairly satisfied, 48 percent are less satisfied and 19 percent visitors were not satisfied from the management of sanitation in the public spaces (Appendix V_B5).

7.3.6 Perception of Visitors Based on Safety and Security of the POS

Visitors come to POS for refreshment. They prefer to visit POS that has sound security system. Therefore, they select the POS site prioritizing safety and security situation. the research measures and identifies the visitors' attitudes toward the POS in terms of satisfaction or perception on the basis of natural and social safety. Social problems create social risks whereas riversides, lakeshores, and cave areas are naturally riskier sites. The visitor's perception on POS about safety and security is shown Figure 7.15.

Figure 7.15: *Perception of visitors based on safety and security of the POS*



The result shows that (Figure7.15), in the combined base of safety situation on sub typology 30.5 percent of visitors reported that they have highly and fairly satisfactory experience, 47.4 percent feel acceptable safety situation however 22.1 percent visitors reported that they felt risk or no safety. Similarly, 37.5 percent of visitors experienced natural risk and 30.2 percent felt even high risk after their visits (Appendix V_B6).

7.3.7 Perception of Visitors Based on Parking Facilities of the POS

The majority of the POS in Pokhara have access to road networks. As many visitors arrive at POS in private cars, motorbikes, reserved vehicles, POS are required to have parking facilities. Figure 7.16 reflects the satisfaction level of visitors about parking facilities around the patches of POS. Only four percent of the POS visitors are highly satisfied, almost 15 percent are fairly satisfied, while half of the visitors are not happy with the parking condition and stated the need to improve on parking services and facilities (Appendix V_B7).

Figure 7.16: *Perception of visitors based on parking facilities of the POS*

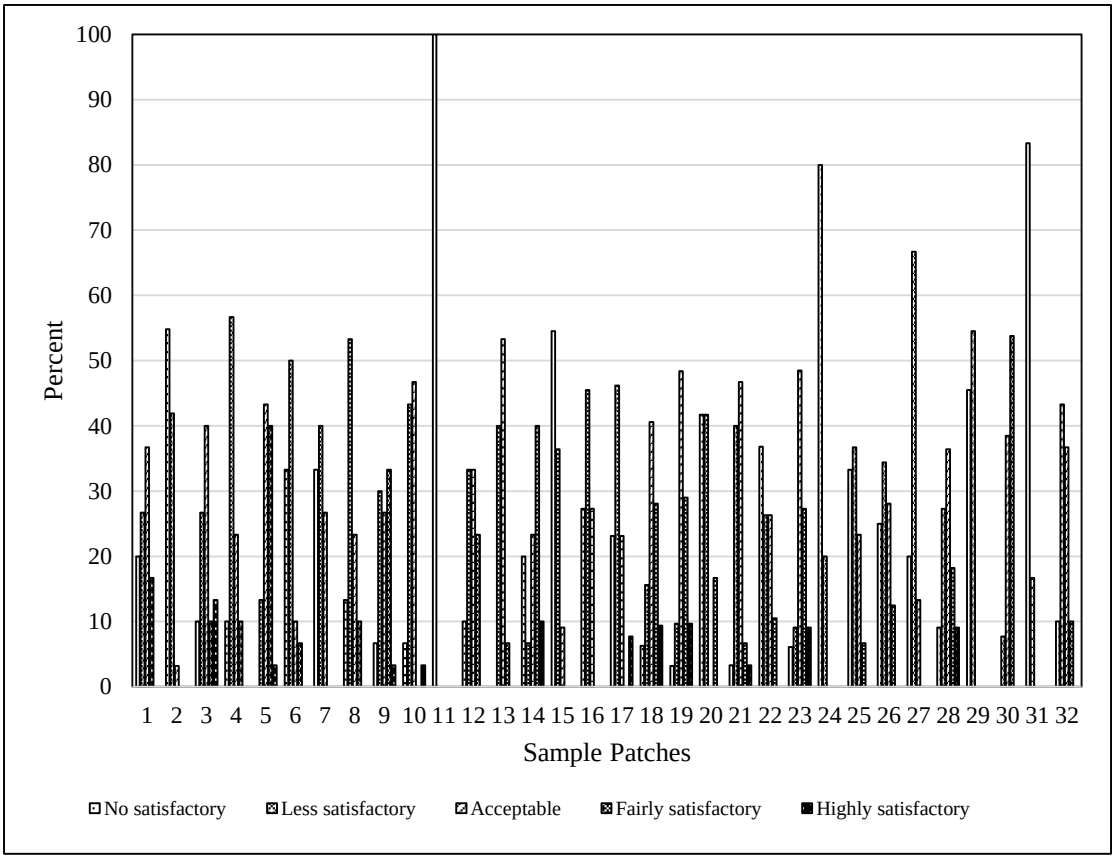


Figure 7.16 reflects the satisfaction grade of visitors about parking facilities around the patches of POS. Out of the total 17.9 percent of park visitors reported that they are preferred parking facilities as strongly satisfactory. Those belonging vehicles having an acceptable level of satisfaction are 30.0 percent whereas the parking facility in 52.1 percent visitors feel poor situation reported by the visitors for parking in and outside of patches (Appendix V_B7).

7.3.8 Perception of Visitors Based on Surrounding Environment of the POS

Eye catching beauty encircling Pokhara city is in the form of rapturous snowy peaks. The natural and cultural sites nestled in the city has functioned as a catalyst to increase the popularity of Pokhara significantly. Public open spaces huddled on the top of the hill like Sarangkot, Kaskikot, Pumdikot, Mattikhan, Phonsingkot, Hundikot, Thulakot, Panchase, and Kanhudanda have attracted more visitors because of the aesthetic viewpoint from where the breathtaking vision of the complete landscapes of Pokhara city as well as panoramic view of the Himalayan range. The experience of visitors on the surrounding situation has been shown in the Figure 7.17.

Figure 7.17: *Perception of visitors based on surrounding environment of the POS*

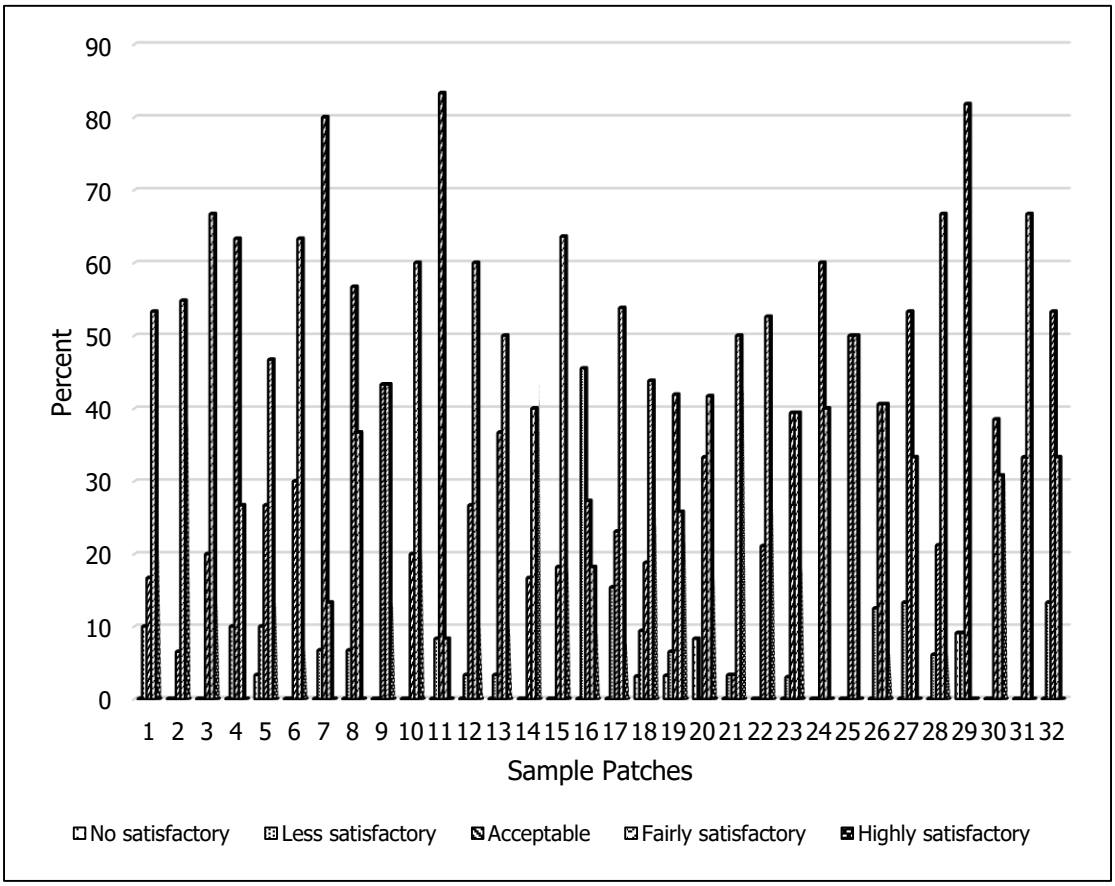


Figure 7.17 shows as many as 14 percent of the visitors are highly satisfied with the surrounding of POS while 45 percent of the visitors are fairly satisfied. Similarly, 35 percent of visitors are satisfied to an acceptable level with the POS surroundings, while six percent of the visitors have expressed dissatisfaction over the surrounding environment of POS (Appendix V_B8).

7.4 Overall Level of Satisfaction on the POS by the Visitors

The overall analysis based on the perception of visitors towards POS bears different results. Present research tries to analyze the satisfaction level based on population characteristics and origin of the visitors. The analysis of perception measurement of eight parameters is shown in Table 7.9.

Table 7.9: *Overall level of satifaction of the visitors*

Category	sub category	No Satisfactory	Less Satisfactory	Acceptable	Fairly Satisfactory	Highly Satisfactory	Total
Gender	Female	6.1	18	35.6	28.1	12.2	100
	Male	14.1	18.3	34.5	21.1	12	100
Caste	Brahmin Chhetri	11.7	18.2	34.8	23.4	11.9	100
	Janajati	9.8	20	32.3	26	11.9	100
	Dalit	16	18.7	44	13.3	8	100
	Foreigner	4.1	8.2	34.7	32.7	20.4	100
Age	Below 19	3.5	28.9	36.8	24.6	6.1	100
	20-39	8.7	13.9	35.1	26.6	15.7	100
	40-59	16.4	18.2	35	19.6	10.7	100
	Above 60	27.5	30	27.5	15	0	100
Origin	Local	14.7	21.1	34.8	21.3	8.1	100
	Country	2.7	13.1	36.1	27.3	20.8	100
	Foreign	3.6	7.3	32.7	34.5	21.8	100
Occupation	Employed	14.4	13.1	32.9	24.3	15.3	100
	Business	15.4	16.2	28.2	24.8	15.4	100
	Agriculture	18.4	15.8	28.9	21.1	15.8	100
	Student	4.8	23	39.1	24.3	8.7	100
	Unemployed	11.3	22.7	40.2	18.6	7.2	100
	Others	9.1	16.7	34.8	27.3	12.1	100
Education level	Literate	21.3	17	36.2	18.4	7.1	100
	High School	7.8	20.6	38.3	21.6	11.7	100
	Higher education	10.2	15.1	29	30.2	15.5	100
Total percent		**11**	**18.2**	**34.9**	**23.8**	**12.1**	**100**

Sources: Field Survey 2018.

Table 7.9 shows overall satisfaction level of visitors based on selected characteristics. More than one third of the visitors reported that their satisfaction level was acceptable, while 23.8 percent were fairly satisfied and 12.1 percent were highly satisfied. The satisfaction level between male and female was found to be similar. Less number visitors of age below 19 were highly satisfied as compared to other higher age groups. The satisfaction level among castes does not differ significantly. Similarly, there is no notable variation in satisfaction level among the visitors by education, occupation and place of origin.

The present research has also attempted to analyze the satisfaction level of the POS based on sex, age, caste/ethnicity, occupation and education level of visitors and

satisfaction level on the POS.

7.4.1 Satisfaction Level to POS Based on the Sex of the Visitors

The level of satisfaction on the POS by male and female visitors is almost the same. The satisfaction level based on the sex of the visitors is shown in Table 7.10.

Table 7.10: *Satisfaction level based on the sex of the visitors*

Level of Perception	**Visitors/ User Groups by Sex**		**Total**
	Female N=295	**Male N= 475**	
No Satisfactory	6.1	14.1	11
Less Satisfactory	18	18.3	18.2
Acceptable	35.6	34.5	34.9
Fairly Satisfactory	28.1	21.1	23.8
Highly Satisfactory	12.2	12	12.1
Total Percent	**100**	**100**	**100**

Table 7.10 shows satisfaction level by sex of the visitors in POS. There was no distinct variation among male and female visitors on the satisfaction level on the POS.

A Chi-Square test has been performed to assess the association between gender and level of satisfaction. The test showed that there is a strong statistical association between gender and level of satisfaction (Chi-Square =14.48, df =1 and $p<0.01$). Cramer's V value indicates that there is about 13 percent influence on satisfaction of visitors.

7.4.2 Satisfaction Level to POS Based on the Age Groups of the Visitors

The level of satisfactions of different age groups of visitors on the POS is different (Table 7.11).

Table 7.11: *Satisfaction level based on the age groupes of the visitors*

Level of Perception	**Visitors/ User Groups by Age**				**Total**
	Below 19 N=114	**20-39 N=402**	**40-59 N=214**	**Above 60 N=40**	**770**
No Satisfactory	3.5	8.7	16.4	27.5	11
Less Satisfactory	28.9	13.9	18.2	30	18.2
Acceptable	36.8	35.1	35	27.5	34.9
Fairly Satisfactory	24.6	26.6	19.6	15	23.8
Highly Satisfactory	6.1	15.7	10.7	0	12.1
Total Percent	**100**	**100**	**100**	**100**	**100**

Source: Field Survey, 2018.

Table 7.11 shows satisfaction level of visitor by age groups. In terms of satisfaction, 19.6 percent of the 20 – 39 age groups visitors are highly satisfied while 26.6 percent are satisfied and 35 percent each for both 20-39 and 40 -59 age groups expressed an acceptable level are satisfaction. But 27.5 percent visitors of above 60 years are unsatisfied from the POS.

A Chi-Square test was conducted to examine the association between age and level of satisfaction. The analysis revealed that there is a strong association between age and satisfaction level. (Chi-Square = 55.44 df= 12 and þ<0.001). Cramer's V test also showed that it has 15 percent influences on statistical (Appendix VII-C1).

7.4.3 Satisfaction Level to POS Based on the Caste/Ethnicity of the Visitors

Attempt has also been made to analyze based on Cast/Ethnicity groups of visitors and their level of satisfaction from visit on POS (Table 7.12).

Table 7.12: *Satisfaction level based on the caste/ ethnicity of the visitors*

Level of Perception	**Visitors/ Users Groups by Caste /Ethnicity**				**Total 770**
	Brahmin/ Chhetri N= 411	**Janajati N=235**	**Dalit N=75**	**Foreigner N=49**	
No Satisfactory	11.7	9.8	16	4.1	11
Less Satisfactory	18.2	20	18.7	8.2	18.2
Acceptable	34.8	32.3	44	34.7	34.9
Fairly Satisfactory	23.4	26	13.3	32.7	23.8
Highly Satisfactory	11.9	11.9	8	20.4	12.1
Total percent	**100**	**100**	**100**	**100**	**100**

Table 7.12 shows that the satisfaction level of visitors based on caste/ethnicity groups. Almost 12 percent of the Brahmin/Chhetri and Janajati visitors were highly satisfied along with 20.4 percent foreign visitors and eight percent Dalit visitors. Similarly, 12 percent Brahmin/Chhetri, 10 percent ethnic groups, 16 percent Dalit and 4 percent foreign visitors were unsatisfied from the existing condition of POS of PMC.

Chi square test was applied to observe any association between ethnicity and visitor's perception. The test reveals that there is association between ethnicity and perception of visitors (Chi- Square= 19.09 with 12 df at þ<.10). Therefore, various caste groups of visitors expressed their perception differently (Appendix VII- C3).

7.4.4 Satisfaction Level to POS Based on the Occupation of the Visitors

Occupation influences the income level directly. The feeling obtained from the site visit can also differ due to their level of income. Table 7.13 shows that out of total respondents, more than 28.8 percent are employed and among them, 37.6 percent are unsatisfied while 36.6 percent are highly satisfied after visiting POS. Similarly, out of the total respondents, 230 are students; among them, 33.5 percent of student visitors regarded POS as an acceptable situation. Also 34.94 percent of the total visitors perceived situation of POS in PMC as in acceptable level.

An association was conducted using Chi-Square test. The result reveals that there is also a statistically significant association between occupation and level of satisfaction

(Chi-Square = 35.55, df = 20 and χ^2<0.05 with Cramer's V .107 with þ<0.05). This is indicative that occupation also matters with the satisfaction of visitors and it has about 13.0 percent influences on satisfaction towards the public open space (Appendix VII-C4).

Table 7.13: *Satisfaction level based on the occupation of the visitors*

Level of Perception	**Visitors/ User Groups by Occupation Status**						**Total 770**
	Employed N=222	**Business N=117**	**Agriculture N=38**	**Student N=230**	**Unemployed N=97**	**Others N=66**	
No Satisfactory	14.4	15.4	18.4	4.8	11.3	9.1	11
Less Satisfactory	13.1	16.2	15.8	23	22.7	16.7	18.2
Acceptable	32.9	28.2	28.9	39.1	40.2	34.8	34.9
Fairly Satisfactory	24.3	24.8	21.1	24.3	18.6	27.3	23.8
Highly Satisfactory	15.3	15.4	15.8	8.7	7.2	12.1	12.1
Total Percent	**100**	**100**	**100**	**100**	**100**	**100**	**100**

7.4.5 Satisfaction Level to POS Based on the Education of the Visitors

Education helps broaden the range of knowledge and human realization. Therefore, visitors with different levels of education express different perception. The levels of satisfaction on the POS by education level of of the visitors are presented in Table 7.14.

Table 7.14: *Satisfaction level based on the education of the visitors*

Level of Perception	**Visitors/ User Groups by Level of Education**			**Total 770**
	Literate N=141	**High School N=384**	**Higher Education N=245**	
Not Satisfactory	21.3	7.8	10.2	11
Less Satisfactory	17	20.6	15.1	18.2
Acceptable	36.2	38.3	29	34.9
Fairly Satisfactory	18.4	21.6	30.2	23.8
Highly Satisfactory	7.1	11.7	15.5	12.1
Total Percent	**100**	**100**	**100**	**100**

Table 7.14 shows the satisfaction level of the respondents for the POS in PMC as per their education level. It was found that visitors with higher educational level were relatively more satisfied as compared to the visitors with lower level of education.

The Chi-Square test was also executed to examine the association between level of education and perception of the satisfaction of visitors. The test revealed that there is a strong statistically significant association between the level of perception and education level (Chi-Square = 35.75, df =8 and þ<0.01). Again, Cramer's V shows about 15 percent variation on the level of satisfaction ($þ^2$ <0.01). It is evident that education level is associated with the satisfaction level of the visitors (Appendix VII-C5).

7.4.6 Satisfaction Level Based on the Available Facilities within POS

Satisfaction level on the available facilities within POS of Pokhara have been analysed with the help of Cafuta (2015) approach as well. Cafuta developed an open space evaluation methodology commonly known as dimensional evaluation model. As shown in Figure 3.5, visitor's satisfaction level on the 32 sample patches in PMC are calculated based on the influencing stimuli parameters that were measured through the direct interview with visitors.

Eight parameters of POS like accessibility, safety, natural comfort, cultural attraction, sanitation, internal management, surrounding environment, and parking have been used to measure the visitor's perception towards the public open space as shown in Table 7.15.

Table 7.15: *Satisfaction level based on the available facilities within POS*

S. N.	Perception providing Indicators	Highly satisfied =5	Fairy satisfied =4	Acceptable =3	Less satisfied=2	Not satisfied=1
1	Accessibility	12.2	38.8	40.4	8.4	0.1
2	Natural attraction	32.5	50.0	15.6	1.0	0.9
3	Cultural attraction	6.5	20.1	25.3	29.9	18.2
4	Internal layout	5.8	21.0	34.8	25.5	12.9
5	Sanitation	7.8	24.9	47.9	16.1	3.2
6	Parking	3.1	14.8	30.0	33.0	19.1
7	Safety/security	6.2	24.3	47.4	20.0	2.1
8	Surrounding environment	14.3	44.8	34.5	5.7	6.0

The Table 7.15 shows that almost 32 percent of the visitors were highly satisfied by the natural attraction, 14 percent were by surrounding environment and 12 percent of the visitors were satisfied by the accessibility of POS in PMC. Visitors were disappointed

by the cultural attractions, internal layout, and parking, safety/security situation in the POS. The natural attraction of the POS was ranked as satisfying parameters by most of the visitors in PMC.

The less satisfaction reflects the negative perception of the visitors on the POS that must be improved in order to increase the attraction toward the patches. Thus, proper attention should be given by the managements to make the sites more attractive. Furthermore, there is urgent need of the concerned authority to preserve the positive aspects and pay immediate attention to negative ranking to make the POS acceptable or popular and user friendly.

7.5 Chapter Summary

The present chapter attempts to analyze visitor's characteristics, perceptions on the basis of attractions of POS, management of the POS in PMC, and satisfaction level of the visitors. The findings on the visitors' characteristics show that almost 61.7 percent are male and 38.3 percent are female visitors. While 60 percent of POS visitors are married, 36 percent are unmarried together with 4 percent comprising of widows, divorced and single. In terms of caste-ethnicity of the visitors, almost 53.4 percent are from Brahmin-Chhetris, 30.5 percent are from Janajati and nine percent are from Dalit community as well as 6.4 percent foreigners. In terms of occupation, almost 29 percent of the POS visitors are jobholders, 15 percent are involved in business, 30 percent are students, 13 percent are unemployed, and almost 9 percent are migrant workers. As far as the education level of the visitors are concerned, almost 32 percent have pursued higher education, 50 percent have completed their high school and 18 percent are literate. Likewise, 35 percent of the people visiting POS arrived on foot, 32 percent in public vehicles, and 37 percent in private vehicles. Besides, 60 percent of people visit POS with their friends, 21 percent with their family members, and 19 percent visit alone. It indicates that the socio-economic characteristics of the visitors such as age, sex, level of education, employment and mode of transportation influence visitors differently to visit to the POS of PMC.

The management of the POS could be evaluated based on available minimum facilities needed in POS such as drinking water, foot paths, benches, shades, compounds, gardening etc. Different POSs of PMC stood differently in regard to the management

situation of POS. As far as the basic infrastructure development was concerned, only 6 percent parks, 2 percent playground, 13 percent religious sites have been found well-managed whereas the quality of viewpoints, cave, river strip and distinct space management situation was not satisfying.

Similarly, the perceptions of the visitors are analyzed based on the available attractions of POS that includes accessibility, natural attraction, cultural attraction, sanitation, layout, security, parking, and surrounding environment. The analysis shows almost 32 percent of the visitor's preferred natural attraction of the POS followed by surrounding environment and accessibility in the priority of decreasing order. The Likert scale have been used as five level of satisfaction based on sex, age, caste/ethnicity, occupation and education level of the visitors with highly satisfied, fairly satisfied, acceptable level of satisfaction, less satisfied and unsatisfied. The result shows a variation on the basis of such differences of the visitor. The well-managed patches provided a high level of positive perceptions while patches with poor management or no management faced negative perception of the visitors. Visitor's perception could be the strong feedbacks for the managements in order to improve the conditions and make the public open spaces of Pokhara more user's friendly in future.

CHAPTER - VIII
SUMMARY AND CONCLUSION

8.1 Summary

Public open space in the term "Open Space" had been used at first in Britain in 1833. Here, the term urban landscape has been used to describe open space with different perspective. Open space is described as any patches of land that is open and has no building structure on it. Public open space (POS) in an urban place is generally open and easily accessible to people. POS is an essential part of urban land use which is indispensable for the beautification of the city as it provides different wellbeing like recreations, sports, peaceful environment, political, religious and commercial activities important for socialization to the urbanites as well as other visitors. It is also used for shelter during various calamities. There are different types of POS in cities which are categorized based on urban development situation, availability of public land, existing landscape, economic assessment, use strategy etc.

The different types of POS such as parks playgrounds, religious sites, water surfaces, viewpoints, caves, river strips and distinct spaces are used for different purposes. The importance of POS increased its aesthetic views and social activities. Socio-economic change can be understood through changes in urban space organization. POS are changing rapidly. Several factors such as urbanization, infrastructure development and other socio-economic and policy provisions are responsible for such change. An understanding of the existing condition of the POS, utilization and management, visitor's perceptions as well as its changes to formulate and develop policies, strategies, program and activities for sustainable development of urban areas.

It is in this context; the present study was proposed with the following objectives:

i. To discuss the typology, spatial pattern and per capita of public open space;
ii. To analyze the magnitude and pathways of change and its drivers; and
iii. To examine the management of POS and the user's perception on the existing situation of public open space in Pokhara Metropolitan City.

Pokhara Metropolitan City, a rapidly growing urban area in Nepal with an area of 464.24 km^2 and a population of 413924 was selected for this study.

Both qualitative and quantitative data have been used which were collected from primary as well as secondary sources. The primary information's were collected through field verification of maps, KII and user survey. At first, open spaces were mapped with the help of different maps and images such as cadastral sheets, topo sheet, and satellite image including Google Earth. After preparing maps reconnaissance survey for verification of map information was carried out and polygon or points were added if they were missed in the map through information obtained from Ward Office. GPS device was used for field survey that generates the required individual spatial data of every object or patch. After mapping of all 275 open spaces, information was collected from ward office for the development of its typology. Further, 32 sample sites (public open spaces) were purposively selected aiming at to represent at least one patches from each sub typology. Information was derived from Key Informant Interviews (KII) using unstructured questionnaire. Finally, convenience sampling method was applied to collect the visitor's perception towards the POS through the structured questionnaires. All total 770 visitors were selected through the convincing sampling within 32 days. Data so far collected were processed and analyzed with the help of GIS, SPSS and other statistical tools. The statistical tests used are NNI, Quadrat analysis, and Chi square ($X^{2)}$ test.

The followings are the major findings of the present study:

8.1.1 Typology Spatial Pattern and Per Capita of Public Open Space

a) Typology

A total of 275 patches of open space were identified, mapped and characterized in the study area. This covers total of 2574.2 ha. (25.74 km²) area (5.53 percent of the total area of PMC) which is used by 24,455 visitors per day. Most of the patches are being utilized to cater the demand needed for an urban lifestyle. These open spaces are classified into eight typologies and 32-sub typologies. The eight typologies are Park, Playground, Religious Site, Water Surface, View Point, Cave, River Strip, and Distinct Space.

b) Spatial Distribution and Pattern of POS

The spatial distribution of POS in PMC is not equal. All 33 wards don't have the same number and types of POS. Some wards have as high as 25 patches whereas some wards have only one patch. Both Nearest Neighbor Index and quadrat analysis showed that

the spatial distribution pattern of POS is in a clustered pattern. It means all the people in the city do not have equal access to the POS.

c) Dimension of POS

The study has examined the situations of shape and size of POS with the consideration of dynamics of its utilization in social activities, the situation of public accessibility, internal management, daily users, the situation of basic infrastructures, depth of utilization, individual characteristics, etc. Regarding the size of POS it ranges from 0.02 hectare to 434 hectares. Among the POS only four percent are more than 50 hectares whereas most are tiny in size less than one hectare. Almost 95 percent have public access, 92 percent government ownerships and only 40 percent patches are properly managed.

d) Per Capita POS in PMC

The average per capita POS in PMC is 62.2 m^2 but this figure varies by wards. According to the World Health Organization 9 m^2 per capita POS is needed. Twenty-five wards in PMC out of 33 wards meet that WHO standard. The remaining 8 wards in PMC have less than 9 m^2 per capita POS. POS is necessary not only for recreation but also for disaster risk management. The result shows that the POS in PMC is not enough in many of the wards.

8.1.2 Magnitude and Pathways of Change and its Drivers

a) The Magnitude of the Change of POS

During the two decades 22 percent of patches of sampled POS in PMC have been affected because of factors like landslides, flood, erosion, etc. While other 28 percent of patches of sampled POS have been shrinking (33.24 hectares) because of human encroachment. Combining both, 50 percent patches are decreasing by 0.13 percent (1.23 hectares) per year. Only 3 percent of total patches have been increased (8.1 hectares) than their actual size. Thus, remaining 47 percent of patches have remained unchanged in terms of shape and size for 20 years. Therefore, identifying borders and making protectionary compounds is necessary to preserve patches that are affected by human encroachment.

b) Pathways of the Change

The necessity and trend of utilization of POS are changing in PMC as the urbanization and human settlements have been growing. The low population density in some places has helped to convert grassland, barren land, agriculture land into POS. Out of total area of POS (excluding river strip and water surface), only 32 percent (288 hectares) area has changed in different pathways. Out of 288 hectares, 10.3 percent grassland and 5.8 percent barren land has changed into playground, park and others recreational sites. Similarly, 4.4 percent agricultural land has been changed into parks and religious sites. Likewise, 20 percent barren land has purposed for POS. Previously thin forest or bush covering 57.5 percent area has been renovated into Botanical Garden or Green Park in PMC. Almost 31 percent patches as barren land or bush area as a marginal land are now converted into playgrounds, parks, and religious places and viewpoints. Similarly, 56 percent patches are being used for the development of basic required infrastructures like footpath shades, toilets, parking, and gardens.

c) Drivers of the Change

Natural and social-driven factors play a crucial role in the change of POS. Natural driven factors such as landslide, flood, river bank cutting etc. have impacted 53 percent of patches of POS in PMC. Around 22 percent of patches are being used to generate income through the implementation of entrance fees and certain percentages of generated revenue are being used for the management of the area. About 16 percent patches out of 32 of POS are now converted into a conservation area as they are being used as a playground and parks as a part of city planning. All religious sites have undergone changes through infrastructure development. Almost all the sampled patches of POS have seen at least some changes because of socio-economic factors; concerns and the necessity of the community. The natural viewpoints, cave, water surfaces, and some other distinct places have been converted into POS with human efforts.

8.1.3 Use, Users' Perception and Management of POS

a) Visitors Characteristic in the Public Open Space

In 32 sample sites a total of 770 visitors were interviewed. Among them 38 percent were female and 62 percent were male. Among the visitors' 59.7 percent are married, 36.2 percent are unmarried and 4.1 percent are single, divorced and widow. POS in Pokhara is also visited by the nearby public and also by tourists. 61 percent of the visitors were public from PMC, 24 percent were domestic tourists and 7 percent were international tourists. In terms of caste, 53 percent of visitors were Brahmin/Chhetri, 30 percent were ethnic groups, 10 percent were Dalits, and 7 percent were others. According to age group 20-49 years, visitors constitute of 70 percent and below 19 years constitute 15 percent visitors and above 50 years are only 15 percent. Regarding the occupation status of the visitors, 29 percent were job holders, 15 percent involved in business, 30 percent were students and 13 percent were unemployed. There are 18 percent visitors who are literate while 50 percent have passed the high school (Intermediate level) and 32 percent have higher degrees.

On the basis of origin of the visitors, 73 percent are PMC residents while, 20 percent are from other parts of Nepal and 7 percent are foreigners. POS is a social as well as recreation place for leisure time so 60 percent visitors come with friends, 21 percent come with family and 19 percent visit to these patches alone. Due to the patch's attraction and interest of visitors, their frequency of visiting the patches is different, 17 percent visit the patches daily, 14 percent has weekly visit, 15 percent has monthly visit, 28 percent has yearly visit and 26 percent are the first-time visitors of the patches. POS is known as a leisure space so visitors spend time inside the patches according to their available time. However, 41 percent visitors spend one hour, 29 percent spend around two hours, 19 percent spend half an hour and rest 11 percent stay inside the patches in one visit time for more than two hours.

People visit the POS patches with various purposes. However, 14 percent come for physical activities while 35 percent visit the site to enjoy the natural environment, 15 percent visit for religious and ritual purposes, 8 percent for meeting and social events and 28 percent visitors come to POS to spend their leisure time. Out of the respondents who visited the POS patches, 24 percent visitor's used motorcycle and 7 percent private cars, 35 percent came on foot and 34 percent used public vehicle to visit the patches.

b) Management Practices of POS

Infrastructure development and effort for conversation of the current 275 patches in PMC are not enough, these sites even don't have strong basic infrastructure. They lack even crucial facilities. Only 28 percent of sites have the facility of drinking water and toilet. Though the compound is important to conserve the POS area, only 40-percentage of POS have the compound. Similarly, only 10 percentages of POS have managed parking facilities. Religious sites have more physical facilities in comparison to other sites. Most of the public parks don't have children playing sites. Similarly, most of the POS doesn't have light, which is essential for visitors in the evening and night. In total, 34 percent of POS have shed and 26 percentages of POS have footpaths. However, 67 percent of playgrounds don't have a compound yet. Thus, statistics shows that most of the POS in PMC don't have basic facilities. So, it is necessary to upgrade and manage the present public open spaces focusing on infrastructure development to make them popular, user friendly, and center of attraction. Similarly, most of the visitors show up at such kind of places with friends and family which would create a social environment for interaction and friendship that would be helpful to maintain harmony.

c) Perception of the Visitors on the POS

Visitors perception have been analyzed on the basis of facilities of POS including accessibility, natural attraction, cultural attraction, sanitation, layout, security, parking, and surrounding environment. Different visitors have different perceptions over a POS. Although 94 percent of the POS are accessible by visitors, just 12 percent of them are highly satisfied. In the context of natural attraction, 38 percent are highly satisfied. But in terms of cultural attraction, just six percent of the visitors were highly satisfied. The study shows that the satisfaction levels of visitors of POS in Pokhara are significantly lower. Likewise, only six percent of the visitors were satisfied with the internal layout of POS in Pokhara, while just eight percent are satisfied with the sanitation in POS, six percent are satisfied with the safety and security at POS. In the case of parking facilities at POS, just three percent of the visitors are highly satisfied. In addition, just 14 percent of visitors are highly satisfied with the surrounding environment at POS. As per the study, all parameters of POS apart from the natural attraction need to be transformed and well managed to increase the satisfactory level of POS visitors. Although, a positive perception of the visitors plays a vital role to make the site popular, the negative

perception also provides several feedbacks to improve the process of the site as a visitor's requirement for the future. The result shows that naturally distinct sites and socio-culturally popular sites have a positive influence and most visitors want to visit there.

d) Level of Satisfaction on the POS by the Visitors.

In the context of POS, the satisfaction level of the visitors was tested under the eight parameters including gender, age, caste, occupation, and education level and analyzed in five levels of satisfaction (Highly satisfactory, Fairly satisfactory, Acceptable, Less satisfactory, and Not satisfactory). The results show that the relationship between POS and visitors is strongly associated.

The emerging urban society of PMC has several traits. Visitors' perception is a strong feedback factor regarding the use and management of the existing urban open spaces in PMC. However, the result indicates that the demographic component and visitor's perception of POS significantly tie, and show that well-managed patches have a high level of positive perception while patches with poor management or no management radiates negative perception due to their facilities and lack of attractiveness.

8.2 Conclusion

Public open space is revered as an important factor for urban areas which helps to create a clean environment, recreational activities for urban residents, socialization, political, religious, economic activity, and helps in risk reduction. According to the reconnaissance survey received from the ward level of Pokhara, there are as many as 275 patches of POS. POS land in Pokhara spreads from 0,02 hectares to 831 hectares. A total of 32 subtypes of POS including parks, playgrounds, religious sites, water surfaces, viewpoints, caves, river strips, and distinct spaces were redeveloped and categorized into 8 types of POS. The conditions and state of spatial dimension, socio-economic dimension, environmental dimension vary from each other. POS from the clustered pattern covers 2574.2 hectares of land, totaling five percent of the total POS area of Pokhara. However, according to international laws, it is mandatory to cover at least 15 percent of vacant lands in urban areas into POS. It can be considered as an indispensable place for any kind of natural or man-made disaster situation. Many types of POS are found, but they are not enough so per capita is low. POS is the only shelter

in urban areas like Kathmandu and Pokhara in the case of any major disasters like earthquakes. Although there are some existing playgrounds, religious sites, and open spaces in the cities which covered only 6.6 percent out of total POS in PMC, not all vacant lands are suitable for use in times of disaster.

In the past two decades, a study of 32 sample sites in 1998 indicated that the area of POS which covered 923 hectares of land has decreased at a rate of 1.235 hectares per year, covering 898.5 hectares by 2018. This shows that the area of POS was minimized during road expansion and encroachment by certain individuals. Despite the decrease in POS areas, management bodies concerned have initiated plans to construct infrastructures to protect and clean public spaces as per the citizen's needs in urban cities. However, the pace of development work has not been able to take place due to natural causes like soil erosion, landslide, and colonization of native plants in bush areas. Similarly, socio-economic factors like urbanization, increase in land value, community involvement, immigration, and increase of religious activities, and the influx of tourists can also manipulate the development of POS. In some patches, lack of capital and difficulty in sustaining itself can also manipulate the development of POS.

The study on the current state of POS in PMC was carried out by taking the perception of visitors as feedback to find a way to construct visitor-friendly sites as well as increase the popularity of Pokhara Metropolitan City. By taking all the perceptions of various types of visitors and making a hypothesis as a result of the test shows there is association between user and POS is significantly tie. It shows that there is a positive relationship between visitors and public open spaces in Pokhara Metropolitan City.

Public open space sites and their users are closely associated to each other, therefore policy makers and designers should consider visitors' attitudes during the planning and development of the POS. During the development plan of POS, the participatory approach should be on consideration because stakeholders are also involved in development of the infrastructure of POS because the government has not supported on many patches of land yet. The top-down approach was used to design a model for different natures of POS, however, a bottom-up approach is necessary to the mobilize users as well as the local community. Therefore, both the top-down and bottom-up

approaches are applied as an integrated form to develop POS to make user-friendly sites and to meet the sustainable city development goal.

In terms of satisfaction toward the management of POS, only 12.1 percent were highly satisfied and 23.8 percent were fairly satisfied. The significance of this study is to enlighten theoretical understanding about existing POS, its magnitude and pathways of change and user experience. It also makes the stakeholders and individuals aware to protect POS from encroachment in the name of urban infrastructure development. Its magnitude and pathways of change and changing drivers examine the users' experiences about the provisions in POS.

8.3 Recommendations for Sustainable Development of POS

With bigger role to provide mental and physical wellbeing to the urbanities, the importance of public open space is increasing in emerging urban area of Nepal. This research understands the core concept of POS is as a place making. Therefore, it is contributing in the growing complexity of urban development role of university, knowledge for community and policy input to government. These institutions could increase their effort for the qualitative improvement of public open space by bringing innovative ideas. As per the Sustainable Development Goal 11: Sustainable Cities and Communities, Local, Provincial and Federal government authorities can make POS development plan for the sustainable cities**.**

For the purpose of further sustainable development through management of POS and protection from the encroachment and at the same time to make the city user friendly as well as popular some recommendations are as follows:

a) As the distribution of existing public open space is clustered in pattern, it should be expanded by land pooling in those wards where POS is nominal or non-existent. POS must be uniformly distributed so that people could have equal access and can increase from 5.5 percent area to 15 percent according to recommendation of WHO.
b) For management of POS, top-down approach can be adopted by federal and provincial governments for policy implementation and bottom-up approach should be applied for involvement of the local community.
c) Considering the user's perception towards the POS, emphasis should be given first on the proper development of those patches with less satisfaction and no

satisfaction of the visitors towards the available facilities like drinking water, sanitation, internal layout, and parking situation.

8.4 Further Research Directions

a) This study is based on detailed information obtained from 32 sites – similar information needs to be generated and analyzed for other sites also to verify the result of this study and conclusion.

b) There is no clear policy to manage POS so policy gaps need to identified through the detail study.

c) The detail study could be conducted focusing on the urban beautification as well as public life through the proper development of POS in the context of Pokhara Metropolitan City.

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Publication:

Books

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2. A Glimpse of the Development Status and Resource Mapping, Kaski (2011). Everest Map Publication 2070, Kathmandu, Nepal.
3. मानव भूगोल २०७५, प्रज्ञा पोखरेल, पोखरा ।
4. वस्तुगत विवरण निर्मलपोखरी गा.वि.स. कास्की, २०६७ (Village Profile of Nirmal Pokhari VDC, Kaski). निर्मल पोखरी गा.वि.स.को कार्यालय, कास्की ।
4. मुस्ताङ जिल्लाको पर्यटन गुरुयोजना (२०७०), जिल्ला विकास समितिको कार्यालय, मुस्ताङ ।
5. शालिग्राम गाविस, पर्वतको भौगोलिक, समाजिक र आर्थिक अवस्था, २०७०, गोर्खाली अपसेट प्रेस, पोखरा ।

Research Articles and paper

1. Visitors' Perception and their Experience of Public Open Space of Bhadrakali Premises in Pokhara, Kaski, Nepal . Janapriya Journal of Interdisciplinary Studies (Jjis) Volume IX | December 2020.
2. Visitors' Intentions of Visiting Public Open Spaces and Experiences in Pokhara Metropolis, Nepal, अनुशीलन, २०७७, वर्ष १८ अकं १, पूर्णाङ्क ६ । नेपाल प्रगतिशील प्राध्यापक संगठन क्षेत्रीय समिति पश्चिमाञ्चल 'क', पोखरा, ।
3. पोखरा महानगरपालिकामा विद्यमान सार्वजनिक खुला स्थान र यसको दिगो उपयोग, २०७७ सयपत्री समाज, कास्की
4. Pathways and magnitude of change of public open space in Pokhara metropolitan city. The Geographical Journal of Nepal, 2020, vol 13, Central Department of Geography, Kritipur, Kathmandu, Nepal.
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6. Possibility of Overall Utilization of Mysterious Gupteshwor Cave in Chhorepatan, Pokhara and its Management Strategies, Kalika Journal of Multidisciplinary Studies, 2017, vol. I Kalika Multiple Campus, Pokhara.
7. Sustainable Physical Development Plan of Rock Garden in Sukla Gandaki Municipality, Thanhun - 2072. The Himalayan Geographers, 2015, vol. 9 & 10, Department of Geography, Tribhuvan University, Prithvi Narayan Campus, Pokhara.
8. Vulnerable land in Pokhara city and its Use Potentiality, The Himalayan Geographers, 2013, vol. 8, Department of Geography, Tribhuvan University, Prithvi Narayan Campus, Pokhara.
9. पोखरा उपमहानगरपालिकामा विपद् उत्थानशील समुदायको अध्ययन (Study of Disaster Resilient Communities in Pokhara Sub-Metropolitan City-) अनुशीलन, २०७०, वर्ष ११ अकं १, पूर्णाङ्क ६ । नेपाल प्रगतिशील प्राध्यापक संगठन क्षेत्रीय समिति पश्चिमाञ्चल 'क', पोखरा, ।
10. विद्यालय विपद् सम्बन्धि ज्ञान, धारण र अभ्यासको स्थिति २०६८, प्रगतिशिल दर्पण, २०६९, वर्ष ३, अङ्क १ । नेपाल प्रगतिशील प्राध्यापक सङगठन, पृथ्वीनारायण क्याम्पस समिति, पोखरा ।
11. खेती नदीमा त्रासदीपूर्ण बाढी (बैशाख २०६९) र पोखराको भौगोलिक संरचना एक अध्ययन, स्वर्ण महोत्साव स्मारिका २०६९, पर्दी उच्च मा. वि. पोखरा ।
12. Land Use Plan of Prithvi Narayan Campus (2007) Department of Geography P.N. Campus, Pokhara.
13. Masters Level Dissertation on "Socio Cultural Land Use Pattern" in Phoksing Shivalaya, Kaski, Nepal (2052)
14. Village Profile on "Agricultural Land-use Pattern" in Nirmal Pokhari VDC, Kaski, Nepal (2051)

Research Reports:

1. आर्वाविजय गा.वि.स.को भौतिक विकास योजना तथा कार्यक्रम तर्जुमा, २०६८/०६९, (Physical Development Planning of Aarba Bijaya VDC, Kaski)
2. स्थानीय विपद् व्यवस्थापन योजना - २०७०, लेखनाथ नगरपालिका, कास्की
3. स्रोत नक्शाकंन - २०७०, वन्दीपुर आदर्श नगरोन्मुख गाविस, तनहुँ ।
4. देवदह नगरपालिकाको पर्यटन गुरुयोजना २०७२, देवदह नगरपालिका, रुपन्देही ।
5. पोखरा महानगरपालिकाको सार्वजनिक खुल्ला स्थान र यसको उपयोग, २०७६, सयपत्रि समाज पोखरा, कास्की
6. पुतलीवजार नगरपालिका, स्याङ्जा – आवधिक योजना, २०७८

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1. Urban Open Space and Using Potentiality in Pokhara Metropolitan City, Kalika Journal of Multidisciplinary Studies, 2018, vol. II. Kalika Multiple Campus, Pokhara.

2. नेपालमा घरवास तथा ग्रामिण पर्यटन- चुनौति र संभावनाहरु (Home stay or Village Tourism in Nepal – Prospects and Challenges), प्रगतिशील दर्पण, २०७०, वर्ष ४ अंक १ पूर्णाङ्क ३ । नेपाल प्रगतिशील प्राध्यापक संगठन पृथ्वीनारायण क्याम्पस समिति, पोखरा ।
3. हावापानी परिवर्तनको विश्वव्यापी प्रभाव र नेपालमा यसको प्रभाव न्यूनिकरणका उपायहरु (World Impact of Climate Change & it's Impact Mitigation ways in Nepal) अनुशीलन, २०६९, बर्ष १० अंक १ । नेपाल प्रगतिशील प्राध्यापक संगठन क्षेत्रीय समिति, पश्चिमाञ्चल 'क' पोखरा ।
4. नेपालको मध्य पहाडी क्षेत्र (वर-साम्मी- मट्टीखान क्षेत्रको एक अध्ययन) मा विकासका संभाव्यता, स्मारिका २०६८, निर्मल पोखरी भरतपोखरी कृस्ती सेवा समाज, काठमाण्डौ ।
5. "भिमदुङ्गा" पोखरा उपत्यकाकाको संरचनाको प्रतिविम्ब, प्रगतिशील दर्पण, २०६७, बर्ष १ अंक १ । नेपाल प्रगतिशील प्राध्यापक संगठन पृथ्वीनारायण क्याम्पस समिति, पोखरा ।
6. नेपालको ग्रामिण जीवनशैलीलाई आधुनिकतामा प्रतिविम्बित गर्न चुनौति र सम्भावना, स्वर्णमहोत्सव स्मारिका, २०६५, श्री जनचेतन माध्यमिक विद्यालय निर्मल पोखरी - ५, कास्की ।
7. नेपालमा ग्रामिण पर्यटन - चूनौति र संभावनाहरु (Village Tourism in Nepal- Prospects and Challenges), वार्षिक स्मरिका २०६३, निर्मल पोखरी सेवा समाज, काठमाण्डौ ।
8. पोखराको बजारीकरणमा बुद्ध विशाल बजारको भूमिका, रजत जयन्ती स्मारिका, २०६५, बुद्ध विशाल बजार ब्यापारिक यसोसियसन, पोखरा-४ विशालबजार ।
9. ह्रासोन्मुख वातावरणीय अवस्था र दिगो विकासको अपरिहार्यता, (२०६०) माछापुछे, पृथ्वीनाराण क्याम्पस पोखरा ।
10. पोखराको वातावरण र वातावरणीय करको औचित्य। वर्ष ६, अङ्क १२१, २०५८, आदर्श समाज राष्ट्रिय दैनिक, पोखरा ।
11. Holistic Approach in Environmental Geography, 2056 vol.1, Shikchhya Chautari. Shikchya Mahabidhyalaya, Pokhara.

Map work/Cartography

1. Prepared Dhorpatan to Hilsa Trek Map by Field Survey (2010), Women Empowerment of Nepal and Department of Geography, Prithvi Narayan Campus, Pokhara, Published by Everest Map Publication, Kathmandu.
2. Prepared Millennium Trek Map by Field Survey 2012, Millennium Trek Management Committee and Department of Geography, Prithvi Narayan Campus, Pokhara.
3. Prepared 20 VDC's, (Kaski District and Parbat District) Profiles with Mapping in using GIS and GPS Technology, (2009-2012). Organize by VDC Offices and Geo-Net Connection P. Ltd. Pokhara (Publish by VDCs Offices)
4. Prepared Land use map of Prithvi Narayan Campus, Pokhara, using GIS and GPS Technology (2012) organize by Department of Geography Prithvi Narayan Campus, Pokhara.

Training

1. Scientific methods and writing- EU 18S Exercise Course: University of Salzburg, Austria, Held on 21st march 2018 to 29th June 2018.
2. Selected Course in Geoinformatics- 18S VO lecture Course: University of Salzburg, Austria, Held on 21st march 2018 4th July 2018.
3. Training on Geographic Information Systems (Arc GIS 10) and GPS (From 10 t0 15 Mangsir, 2069 (25-30 November, 2012) Organized by Nepal GIS Society.
4. Application of Remote Sensing (RS), Organization by Department of Geography, Prithvi Narayan Campus, Pokhara held on 2nd January 2011 to 2nd February 2011.
5. Application of Geographic Information System (GIS) in Natural Resources Management (13 to 20, 2008) organized by Department of Geography, P.N. Campus, Pokhara.
6. Statistical Data Analysis using SPSS Program (21-27 Feb. 2007), Prithvi Narayan. Campus, Pokhara.
7. Computer Program: Refresher Workshop cum Training on 'Geographic Information System and Remote Sensing in the month of June 2003, Organized by Department of Geography Education Central Department University Campus, Kritipur.
8. PACKAGE FOR SOCIAL SCIENCE (SPSS), Organized by Central Computer Lab, P.N. Campus, Pokhara (Held on 15-01-2001 to 14-02-2001).
9. Basic Computer: – WP51, Lotus-123, MS-DOS, Windows-95, Microsoft-97, Excel (2053-08-02 to 2053-10-05 B.S.) BUSY COMPUTER INSTITUTE, Pokhara.

Conference / Seminar Paper/ Workshop

1. Hands-on Training on Land Use Land Cover Analysis using RADAR System, held on 22 June 2016, organized by Department of Geography Prithvi Narayan Campus, Pokhara and Geo-Net Connection Pvt. Ltd.
2. Workshop on GIS Application for Assessing and Managing Natural Hadards in the Himalayas from 22nd to 27th February 2015, Organized by AMaN – himal, Z_GIS, Austria and Central Department of Education, Tribhuvan University, Nepal.
3. Work shop seminar on Research Methodology, Academic Writing and Semester System, organized by Dean's Office, Faculty of Humanities and Social Sciences, Tribhuvan University, held in Pokhara, from 12 to July 16, 2015.
4. Workshop on online Course Design & Development organized by Open University Infrastructure Development Board, Kesharmahal Kathmandu, Nepal from 17 May to 19th may 2014.
5. International Geospatial Conference, IWAGTSEC-2013 organized by International Workshop on Advance geospatial technologies for Sustainable Environment and Culture held on 12-13 September 2013, Pokhara, Nepal.

6. Application of Remote Sensing (RS) on land Use Practice, as a Resources person organized by Department of Geography, Prithvi Narayan Campus, Pokhara held on 16-22 Paush, 2069.
7. National Seminar on Tourism Participant as a paper presenter "Probability Homestay Tourism in Millennium Trek Area" held on 3rd to 4th April 2012, organized by department of History, Culture, Geography, Population studies and sociology/ Anthropology & Rural Development, P.N. Campus, Pokhara, Nepal.
8. National Seminar on Tourism Participant as a Session Reporter held on 3rd to 4th April 2012, organized by department of History, Culture, Geography, Population studies and sociology/ Anthropology & Rural Development, P.N. Campus, Pokhara, Nepal.
9. Regional Level Seminar on "Research Methodology" Organized by Research Division Rector office, T.U., held on March 31st to April 1st 2010 (Mahendara Multiple Campus, Nepalgunj)
10. Proceeding of National Conference on Geography in Nepal Mountain environment and Human activities in Nepal, Participant as a paper presenter " on Geography Education: Issues and Challenges organized by Nepal Geographical Society held on January 4-5 2004, Pokhara, Nepal
11. Seminar on Environmental Protection held on November 25- 26, 1999, Jointly Organized by Japan Environmental Cooperation Japan & the Association for Overseas Technical Scholarship, Japan & Jointly implemented by NASS, Kathmandu & PCCI, Pokhara, Nepal.
12. Global Positioning System" (GPS) Jointly Organized by Geography Department, P. N. Campus, Pokhara and Keio University Japan, held on 19th July 1999.
13. Participant, International Geographical Union (IGU), International conference on Economy Environment and Quality of Life in Hill and Mountain, held at Pokhara, January 10-12, 1994, conducted by Geography Department of P. N. Campus, Pokhara with collaboration of IGU, India.

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APPENDICES

Appendix I

Typology of POS

Type/ Subtype of Open space	Characteristics
Public Parks	
Public/ Central Park	Publicly developed and managed open space as part of zoned open space system of city; open space of city wide importance; neighborhood park.
Downtown Parks	Green parks with grass and trees located in downtown areas; can be traditional, historic parks or newly developed open spaces.
Commons	A large green area developed in older New England cities and towns; once pasture area for common use; now used for leisure activities.
Neighborhood Park	Open space developed in residential environments; publicly developed and managed as a part of the zoned open space of cities, or as part of new private residential development; may include playgrounds, sport facilities, etc.
Mini/Vest-pocket Park	Small urban park bounded by buildings; may include fountain of water feature
Squares and Plazas	Central Square or plaza, often part of historic development of city center; may be formally planned or exist as a meeting places of streets, frequently publicly developed and managed.
Memorials	Public place that memorializes people or events of local and national importance.
Markets	Farmers' Markets Open space or streets used for Farmer's Markets or Flea Markets; often temporary or occur only during certain times in existing space (such as parks, downtown streets of parking lots).

Streets	Pedestrian Sidewalks Part of cities where people move on foot / most commonly along sidewalks and paths, planned or found, which connect one destination to another.
Pedestrian Mall	Street closed to auto traffic; pedestrian amenities provided such as benches, planting; often located along Main Street in downtown area.
Transit Mall	Development of improved transit access to downtown areas; replacement of traditional pedestrian malls with bus and "light rail" malls.
Traffic Restricted Streets	Street used as public open space; traffic and vehicle restriction can include pedestrian improvements and sidewalk widening, street tree planting.
Town Trails	Connect parts of cities through integrated urban trails; use of streets and open spaces planned and setting for environmental learning; some are designed and marked trails.
Playgrounds	Playground are located in neighborhood; frequently includes traditional play equipment such as slides and swings; sometimes include amenities for adults such as benches; can also include innovative designs such as Adventure Playgrounds
Schoolyard	School yard as play area; some developed as place for environmental learning or as community use spaces.
Community Open Spaces	
Community Garden/Park	Neighborhood spaces designed, developed or managed by local residents on vacant land; may include viewing gardens, play areas, and community gardens; often developed on private land; not officially viewed as part of open space system of cities; often vulnerable to displacement by other uses such as housing and commercial development.

Greenways and Linear Parkways	Interconnected recreational and natural areas connected by pedestrian and bicycle paths.
Urban Wilderness	Undeveloped or wild natural areas in or near cities. Often popular for hiking, dog walking and recreation. Frequently involves conflicts between users and ecological preservation/restoration.
Atrium/Indoor/Marketplaces	
Atrium	Interior private spaces developed as indoor atrium space; and indoor, lockable plaza or Pedestrian Street; counted by many cities as part of open space system; privately developed and managed as part of new office or commercial development.
Marketplace/ Downtown Shopping Center	Interior, Private shopping areas, usually freestanding or rehabilitation of older building(s); May include both interior and outdoor spaces; sometimes called "Festival marketplaces"; privately developed and managed ads part of new office or commercial development.
Found/Neighborhood Spaces	
Everyday Spaces	Publically accessible open places such as street corners, steps of building, etc., which people claim and use.
Neighborhood Spaces	Publically accessible open space such as street corners, lots, etc. near where people live; can also be vacant or undeveloped space located in neighborhood including vacant lots and future building sites; often used by children and teenagers, and local residents.
Waterfronts	Open space along water ways in cites; increased public access to waterfront areas; development of waterfront parks.
Waterfronts, Harbors, Beaches, Riverfronts Piers, Lakefronts	

Appendix II

Sample Site of POS Visitors

Typology	S.N.	Sample POS (Sub typology)	POS Users			Sample (Gender)		Site Use by Caste (Sample Size)				Time			Total Sample	Sampling Percent
			Female	Male	Total Users	Male	Female	Brahmin Chhetri	Ethnic Caste	Dalit	Foreigner	6-10 am	11-4 pm	4-6 pm		
	1	Basubdhara (Formal garden)	68	328	396	13	17	20	6	2	2	12	4	14	30	20.69
Park	2	Lovely hill (Purposed Park)	25	143	168	10	21	15	12	4	0	15	6	10	31	18.24
	3	Dameside (Mini Park)	52	175	227	13	17	11	13	5	1	8	9	13	30	15.38
	4	Shid Chock) Maryters Park	34	119	153	13	17	17	10	3	0	8	16	6	30	29.13
	5	Mountain Museum (Institutional Park)	78	200	278	10	20	16	8	1	5	0	25	5	30	15.38
	6	World B garden (Green Park)	22	83	105	6	24	17	4	2	7	18	12	0	30	78.95
Playground	7	Amarsingh playground (No manage)	0	88	88	0	15	2	10	3	0	7	0	8	15	100
	8	Bhandardhik (Manage P ground)	35	85	120	8	22	15	11	4	0	6	14	10	30	25
	9	Pokhara Stadium (Well Manage)	182	568	750	10	20	12	14	4	0	13	11	6	30	9.09
	10	Sarangkot (Adventure flight ground)	17	72	89	10	20	5	8	1	16	5	25	0	30	37.5
	11	Simpani (Poor manage ground)	3	9	12	1	11	0	10	2	0	0	4	8	12	100
Religious sites	12	Bhadrakali (Religious with Green Space)	167	98	265	14	16	21	7	2	0	16	5	9	30	31.58
	13	Kedareshwor (Religious with Open Space)	122	76	198	24	6	21	9	0	0	19	4	7	30	46.15
	14	World Peace Pagoda (Religious with Garden)	223	457	680	13	17	13	11	0	6	10	16	4	30	9.38
Water Surface	15	Jaubari (Reservoir)	6	5	11	6	5	10	1	0	0	1	8	2	11	100
	16	Kamal Pokhari (Pond)	6	5	11	6	5	5	5	1	0	2	8	1	11	100
	17	Khaste lake (Less Popular)	2	11	13	2	11	4	7	2	0	0	10	3	13	100

	18	Phewa lake Barahi Ghat (Popular)	242	558	800	11	21	22	10	0	0	10	12	10	32	9.7
	19	Davis' Fall (Water fall)	180	270	450	19	12	19	10	0	2	5	18	8	31	8.86
Viewpoint	20	Khuile Danda (Few Visitors)	6	6	12	6	6	4	6	2	0	2	4	6	12	100
	21	Sarangkot (Popular Viewpoint)	116	256	372	14	16	16	5	1	8	16	12	2	30	13.33
	22	Thulakot (Less Popular Viewpoint)	9	10	19	9	10	8	8	3	0	2	15	2	19	100
Cave	23	Mahendra cave (Popular Cave)	241	349	590	14	19	21	6	6	0	4	22	7	33	5.5
	24	Sita (Less Popular Cave	1	4	5	1	4	4	1	0	0	0	5	0	5	100
River strip	25	Chirgadi (Cemetery)	2	48	50	0	30	25	5	0	0	0	30	0	30	27.27
	26	Bijyapur & Phurse sites (Multi use)	30	120	150	17	15	18	8	6	0	4	22	6	32	21.33
	27	Ramghta (Holy Bathing)	233	217	450	15	15	23	5	2	0	20	10	0	30	5.17
	28	KI Sincg (Aesthetic)	15	117	132	4	29	15	8	6	4	7	23	3	33	18.86
Distnict space	29	Dumping Site	4	7	11	4	7	1	5	5	0	0	11	0	11	100
	30	Jaya Kot (Picnic, walking)	5	8	13	4	9	7	6	0	0	5	8	0	13	100
	31	Phewa Wet land	1	5	6	1	5	1	0	4	1	0	6	0	6	100
	32	Pradarsani Kendra (Socio-economic)	163	337	500	17	13	19	8	3	0	0	25	5	30	6.74
Total			**2290**	**4834**	**7124**	**295**	**475**	**407**	**237**	**74**	**52**	**215**	**400**	**155**	**770**	10.81

Appendix III

Ward wise Population Density

Ward No.	Number of households	Female	Male	Total Pop	Area ha.	Area km^2	Density per km^2
1	4541	8360	7705	16065	154.54	1.5454	10395.37
2	2464	4543	4294	8837	60.14	0.6014	14694.05
3	2750	4919	4543	9462	63.49	0.6349	14903.13
4	2491	4887	4388	9275	51.05	0.5105	18168.46
5	3943	7965	7447	15412	178.42	1.7842	8638.05
6	3869	8036	7217	15253	633.48	6.3348	2407.81
7	3451	6966	6683	13649	197.59	1.9759	6907.74
8	7138	13950	12767	26717	176.49	1.7649	15137.97
9	4295	8717	8175	16892	122.46	1.2246	13793.89
10	4912	9266	9658	18924	195.84	1.9584	9662.99
11	4023	8542	7890	16432	697.89	6.9789	2354.53
12	3014	5557	6313	11870	140.13	1.4013	8470.71
13	4149	7849	9283	17132	1540.12	15.4012	1112.38
14	3305	6453	7109	13562	1338.47	13.3847	1013.25
15	4328	8291	9482	17773	512.61	5.1261	3467.16
16	5462	10842	10909	21751	3473.7	34.737	626.16
17	6944	13452	14162	27614	790.11	7.9011	3494.96
18	2080	4198	4583	8781	1779.24	17.7924	493.53
19	4820	4877	5844	10721	2456.67	24.5667	436.40
20	1027	1814	2208	4022	2297.73	22.9773	175.04
21	2432	3886	5204	9090	3595.72	35.9572	252.80
22	1837	3358	4033	7391	3215.21	32.1521	229.88
23	1300	2211	2721	4932	4786.05	47.8605	103.05
24	1508	2591	3301	5892	1852.67	18.5267	318.03
25	3019	5783	6671	12454	2241.59	22.4159	555.59
26	2903	5420	6187	11607	1215.37	12.1537	955.02
27	2358	4602	5134	9736	1225.02	12.2502	794.76
28	1303	2047	2680	4727	1760.46	17.6046	268.51
29	2261	4083	5037	9120	422.42	4.2242	2158.99
30	2786	5161	5769	10930	941.74	9.4174	1160.62
31	1908	3334	4044	7378	2450.23	24.5023	301.11
32	2721	4794	5933	10727	1503.19	15.0319	713.62
33	2468	4353	5453	9806	4425.15	44.2515	221.60
Total	107810	201107	212827	413934	46424	464.24	891.63

Source: National population census, 2011 CBS and Kaski District Profile, 2018.

Appendix IV

Table A1: Visitors' Address

S.N.	Visitors' address			Total
	PMC	Country	Foreigner	
1	22 (73.3)	6 (20.0)	2 (6.7)	30 (100)
2	22 (71)	9 (29)	0	31(100)
3	21 (70)	8(26.7)	1(3.3)	30(100)
4	20(66.70)	10(33.30)	0(0.00)	30(100)
5	12(40.00)	13(43.30)	5(16.67)	30(100.00)
6	21(70.00)	2(6.70)	7(23.30)	30(100.00)
7	15(100.00)	0(0.00)	0(0.00)	15(100.00)
8	30(100.00)	0(0.00)	0(0.00)	30(100.00)
9	21(70.00)	9(30.00)	0(0.00)	30(100.00)
10	3(10.00)	9(30.00)	18(60.00)	30(100.00)
11	12(100.00)	0(0.00)	0(0.00)	12(100.00)
12	23(76.7)	7(23.30)	0(0.00)	30(100)
13	30(100)	0(0)	0(0)	30(100)
14	9(30)	14(46.70)	7(23.3)	30(100)
15	5(45.40)	6(54.5)	0(0)	11(100)
16	9(81.8)	2(18.2)	0(0)	11(100)
17	13(100)	0(0)	0(0)	13(100)
18	18(56.3)	13(40.6)	1(3.1)	32(100)
19	15(48.4)	14(45.2)	2(6.5)	31(100)
20	11(91.7)	1(8.3)	0(0)	12(100)
21	13(43.3)	9(30)	8(26.7)	30(100)
22	15(78.9)	4(21.1)	0(0)	19(100)
23	11(33.3)	20(60.6)	2(6.1)	33(100)
24	5(100)	0(0)	0(0)	5(100)
25	30(100)	0(0)	0(0)	30(100)
26	32(100)	0(0)	0(0)	32(100)
27	27(90)	3(10)	0(0)	30(100)
28	17(51.5)	15(45.5)	1(3)	33(100)
29	11(100)	0(0)	0(0)	11(100)
30	11(84.6)	2(15.4)	0(0)	13(100)
31	5(83.3)	0(0)	1(16.7)	6(100)
32	23(76.7)	7(23.3)	0(0)	30(100)
Total	532(69.1)	183(23.8)	55(7.1)	770(100)

Appendix IV

Table A2: Mode of Transport

S. No.	Mode of transport				Total
	Car	Motorcycle	On foot	Public Vehicle	
1	3(10)	6(20)	15(50)	6(20)	30(100)
2	0(0)	7(22.6)	17(54.8)	7(22.6)	31(100)
3	1(3.3)	7(23.3)	4(13.3)	18(60)	30(100)
4	0(0)	5(16.7)	12(40)	13(43.3)	30(100)
5	1(3.3)	2(6.7)	0(0)	27(90)	30(100)
6	2(6.7)	2(6.7)	17(56.7)	9(30)	30(100)
7	0(0)	5(33.3)	10(66.7)	0(0)	15(100)
8	0(0)	7(23.3)	17(56.7)	6(20)	30(100)
9	5(16.7)	10(33.3)	7(23.30)	8(26.7)	30(100)
10	4(13.3)	1(3.3)	0(0)	25(83.3)	30(100)
11	0(0)	0(0)	11(91.7)	1(8.3)	12(100)
12	1(3.3)	4(13.3)	19(63.3)	6(20)	30(100)
13	7(23.3)	7(23.3)	12(40)	4(13.3)	30(100)
14	2(6.7)	16(53.3)	5(16.7)	7(23.3)	30(100)
15	0(0)	5(45.5)	4(36.4)	2(18.2)	11(100)
16	0(0)	4(36.4)	4(36.4)	3(27.3)	11(100)
17	0(0)	3(23.1)	10(76.9)	0(0)	13(100)
18	2(6.3)	9(28.1)	7(21.9)	14(43.8)	32(100)
19	3(9.7)	5(16.1)	6(19.4)	17(54.8)	31(100)
20	0(0)	2(16.7)	10(83.3)	0(0)	12(100)
21	2(6.7)	7(23.3)	4(13.3)	17(56.7)	30(100)
22	1(5.3)	4(21.1)	6(31.6)	8(42.1)	19(100)
23	7(21.2)	7(21.2)	1(3)	18(54.4)	33(100)
24	0(0)	2(40)	3(60)	0(0)	5(100)
25	4(13.3)	13(43.3)	13(43.3(	0(0)	30(100)
26	0(0)	5(15.6)	23(71.9)	4(12.5)	32(100)
27	2(6.7)	7(23.3)	17(56.7)	4(13.3)	30(100)
28	5(15.2)	7(21.2)	1(3)	20(60.6)	33(100)
29	0(0)	1(9.1)	7(63.6)	3(27.3)	11(100)
30	0(0)	10(76.9)	0(0)	3(23.1)	13(100)
31	0(0)	0(0)	5(83.3)	1(16.7)	6(100)
32	3(10)	14(46.7)	3(10)	10(33.3)	30(100)
Total	55(7.1)	184(23.9)	270(35.1)	261(33.9)	770(100)

Appendix IV

Table A3: Visitors' Accompany

S. No.	Single	Friends	Family	Total
1	5(16.7)	17(56.7)	8(26.7)	30(100)
2	6(19.4)	16(51.6)	9(29)	31(100)
3	8(26.7)	14(46.8)	8(26.7)	30(100)
4	10(33.3)	10(33.3)	10(33.3)	30(100)
5	3(10)	25(83.3)	2(6.7)	30(100)
6	8(26.7)	22(73.3)	0(0)	30(100)
7	1(6.7)	14(93.3)	0(0)	15(100)
8	10(33.3)	20(66.7)	0(0)	30(100)
9	5(16.7)	23(76.7)	2(6.7)	30(100)
10	16(53.3)	12(40)	2(6.7)	30(100)
11	2(16.7)	10(83.3)	0(0)	12(100)
12	14(46.7)	8(26.7)	8(26.7)	30(100)
13	7(23.3)	16(53.3)	7(23.3)	30(100)
14	2(6.7)	22(73.3)	6(20)	30(100)
15	2(18.2)	9(81.8)	0(0)	11(100)
16	3(27.3)	6(54.5)	2(18.2)	11(100)
17	2(15.4)	9(69.2)	2(15.4)	13(100)
18	3(15.4)	19(59.4)	10(31.3)	32(100)
19	5(16.1)	19(61.3)	7(22.6)	31(100)
20	2(16.7)	5(41.7)	5(41.7)	12(100)
21	6(20)	15(50)	9(30)	30(100)
22	1(5.3)	13(68.4)	5(26.3)	19(100)
23	1(3)	17(51.5)	15(45.5)	33(100)
24	2(40)	3(60)	0(0)	5(100)
25	0(0)	27(90)	3(10)	30(100)
26	2(6.3)	13(40.6)	17(53.1)	32(100)
27	2(6.7)	23(76.7)	5(16.7)	30(100)
28	3(9.1)	24(72.7)	6(18.2)	33(100)
29	4(36.4)	7(63.6)	0(0)	11(100)
30	1(7.7)	10(76.9)	2(15.4)	13(100)
31	5(83.3)	1(16.7)	0(0)	6(100)
32	7(23.3)	11(36.7)	12(40)	30(100)
Total	148(19.2)	460(59.7)	162(21.0)	770(100)

Appendix IV

Table A4: Visitors' Duration of Stay

S. No.	Half Hour	One Hour	Two Hour	More than two Hours	Total
1	5(16.7)	7(23.3)	18(60)	0(0)	30(100)
2	7(22.6)	16(51.6)	6(19.4)	2(6.5)	31(100)
3	11(36.7)	15(50)	4(13.3)	0(0)	30(100)
4	9(30)	13(43.3)	6(20)	2(6.7)	30(100)
5	7(23.3)	12(40)	10(33.3)	1(3.3)	30(100)
6	10(33.3)	14(46.7)	5(16.7)	1(3.3)	30(100)
7	3(20)	6(40)	6(40)	0(0)	15(100)
8	4(13.3)	12(40)	13(43.3)	1(3.3)	30(100)
9	4(13.3)	13(43.3)	10(33.3)	3(10)	30(100)
10	4(13.3)	9(30)	9(30)	8(26.7)	30(100)
11	3(25)	3(25)	4(33.3)	2(16.7)	12(100)
12	3(10)	22(73.3)	5(16.7)	0(0)	30(100)
13	5(16.7)	20(66.7)	4(13.3)	1(3.3)	30(100)
14	3(10)	20(66.7)	5(16.7)	2(6.7)	30(100)
15	1(9.1)	7(66.7)	3(27.3)	0(0)	11(100)
16	2(18.2)	3(27.3)	4(36.4)	2(18.2)	11(100)
17	3(23.1)	7(53.8)	1(7.7)	2(15.4)	13(100)
18	10(31.3)	14(43.8)	7(21.9)	1(3.10)	32(100)
19	8(25.8)	16(51.6)	4(12.9)	3(9.7)	31(100)
20	2(16.7)	7(58.3)	2(16.7)	1(8.3)	12(100)
21	10(33.3)	13(43.3)	4(13.3)	3(10)	30(100)
22	4(21.1)	8(42.1)	5(26.3)	2(10.5)	19(100)
23	14(42.4)	11(33.3)	7(21.2)	1(3)	33(100)
24	1(20)	4(80)	0(0)	0(0)	5(100)
25	2(6.7)	12(40)	12(40)	4(13.3)	30(100)
26	8(25)	5(15.6)	14(43.8)	5(15.6)	32(100)
27	1(3.3)	10(33.3)	14(46.7)	5(16.7)	30(100)
28	4(12.1)	6(18.2)	16(48.5)	7(21.2)	33(100)
29	1(9.1)	2(18.2)	4(36.4)	4(36.4)	11(100)
30	0(0)	3(23.1)	6(46.2)	4(30.8)	13(100)
31	0(0)	0(0)	2(33.3)	4(66.7)	6(100)
32	1(3.3)	7(23.3)	10(33.3)	12(40)	30(100)
Total	150(19.5)	317(41.2)	220(28.6)	83(10.8)	770(100)

Appendix IV

Table A5: Visitors' Repetition in POS

S. No.	Daily	Weekly	Monthly	Yearly	First time	Total
1	14(46.7)	2(6.7)	5(16.7)	4(13.3)	5(16.7)	30
2	11(35.5)	7(22.6)	2(6.5)	4(12.9)	7(22.6)	31(100)
3	5(16.7)	12(40)	5(16.7)	3(10)	5(16.7)	30(100)
4	9(30)	3(10)	4(13.3)	7(23.3)	7(23.3)	30(100)
5	1(3.3)	2(6.7)	2(6.7)	11(36.7)	14(46.7)	30(100)
6	9(30)	4(13.3)	3(10)	4(13.3)	10(33.3)	30(100)
7	11(73.3)	3(200)	1(6.7)	0(0)	0(0)	15(100)
8	3(10)	15(50)	5(16.7)	6(20)	1(3.3)	30(100)
9	8(26.7)	7(23.3)	8(26.7)	3(10)	4(13.3)	30(100)
10	1(3.3)	0(0)	0(0)	0(0)	29(96.7)	30(100)
11	8(66.7)	4(33.3)	0(0)	0(0)	0(0)	12(100)
12	5(16.7)	6(20)	6(20)	9(30)	4(13.3)	30(100)
13	0(0)	7(23.3)	6(20)	17(56.7)	0(0)	30(100)
14	0(0)	2(6.7)	6(20)	11(36.7)	11(36.7)	30(100)
15	7(63.6)	0(0)	4(36.4)	0(0)	0(0)	11(100)
16	4(36.4)	1(9.1)	3(27.3)	0(0)	3(27.3)	11(100)
17	3(23.1)	2(15.4)	6(46.2)	2(15.4)	0(0)	13(100)
18	2(6.3)	9(28.1)	12(37.5)	7(21.9)	2(6.3)	32(100)
19	2(6.5)	1(3.2)	6(19.4)	18(58.1)	4(12.9)	31(100)
20	4(33.3)	3(25)	3(25)	0(0)	2(16.7)	12(100)
21	1(3.3)	2(6.7)	1(3.3)	7(23.3)	19(63.3)	30(100)
22	0(0)	2(10.5)	4(21.1)	7(36.8)	6(31.6)	19(100)
23	2(6.1)	2(6.1)	0(0)	23(69.7)	6(18.2)	33(100)
24	0(0)	1(20)	1(20)	1(20)	2(40)	5(100)
25	0(0)	0(0)	0(0)	2(6.7)	28(93.3)	30(100)
26	0(0)	1(3.1)	6(18.8)	24(75)	1(3.1)	32(100)
27	0(0)	13(43.3)	7(23.3)	6(20)	4(13.3)	30(100)
28	1(3)	1(3)	2(6.1)	15(45.5)	14(42.4)	33(100)
29	10(90.9)	0(0)	0(0)	0(0)	1(9.1)	11(100)
30	2(15.4)	0(0)	3(23.1)	7(52.8)	1(7.7)	13(100)
31	4(66.7)	1(16.7)	0(0)	0(0)	1(16.7)	6(100)
32	1(3.3)	2(6.7)	3(10)	18(60)	6(20)	30(100)
Total	128(16.6)	115(14.9)	114(14.8)	216(28.1)	197(25.6)	770(100)

Appendix V

Table B1: Perception of the Visitors based on the Accessibilies of the POS

S. No.	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	Total
1	0(0)	1(3.3)	7(23.3)	15(50)	7(23.3)	30(100)
2	0(0)	1(3.2)	12(38.7)	13(41.9)	5(16.1)	31(100)
3	0(0)	0(0)	8(26.7)	13(43.3)	9(30)	30(100)
4	0(0)	0(0)	11(36.7)	14(46.7)	5(16.7)	30(100)
5	0(0)	0(0)	12(40)	15(50)	3(10)	30(100)
6	0(0)	1(3.3)	20(66.7)	4(13.3)	5(16.7)	30(100)
7	0(0)	1(6.70)	9(60)	3(20)	2(13.3)	15(100)
8	0(0)	0(0)	9(30)	19(63.3)	2(6.7)	30(100)
9	0(0)	6(20)	10(33.3)	11(36.7)	3(10)	30(100)
10	0(0)	3(10)	18(60)	8(26.7)	1(3.3)	30(100)
11	0(0)	0(0)	7(58.3)	5(41.7)	0(0)	12(100)
12	0(0)	2(6.7)	9(30)	16(53.3)	3(10)	30(100)
13	0(0)	20(66.7)	4(13.3)	6(20)	0(0)	30(100)
14	0(0)	3(10)	11(36.7)	9(30)	7(23.3)	30(100)
15	0(0)	2(18.2)	6(54.5)	3(27.3)	0(0)	11(100)
16	0(0)	0(0)	6(54.5)	4(36.4(	1(9.1)	11(100)
17	0(0)	3(23.1)	5(38.5)	2(15.4)	3(23.1)	13(100)
18	0(0)	0(0)	6(18.8)	19(59.4)	7(21.9)	32(100)
19	0(0)	0(0)	6(19.4)	14(45.2)	11(35.5)	31(100)
20	0(0)	0(0)	2(16.7)	8(66.7)	2(16.7)	12(100)
21	0(0)	3(10)	14(46.7)	10(33.3)	3(10)	30(100)
22	0(0)	0(0)	15(78.9)	4(21.1)	0(0)	19(100)
23	0(0)	2(6.1)	6(18.2)	15(45.5)	10(30.3)	33(100)
24	0(0)	0(0)	2(40)	3(60)	0(0)	5(100)
25	1(3.3)	0(0)	22(73.3)	7(23.3)	0(0)	30(100)
26	0(0)	4(12.5)	16(50)	10(31.3)	-6.3	32(100)
27	0(0)	5(16.7)	16(53.3)	9(300	0(0)	30(100)
28	0(0)	2(6.1)	14(42.4)	16(48.5)	1(3)	33(100)
29	0(0)	1(9.1)	7(63.6)	3(27.3)	0(0)	11(100)
30	0(0)	2(15.4)	5(38.5)	5(38.5)	1(7.7)	13(100)
31	0(0)	0(0)	3(50)	3(50)	0(0)	6(100)
32	0(0)	3(10)	13(43.3)	13(43.3)	1(3.3)	30(100)
Total	1(0.1)	65(8.4)	311(40.4)	299(38.8)	94(12.2)	770(100)

Appendix V

Table B2: Perception of the Visitors Based on the Natural Attraction of the POS

S No.	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Vary satisfactory	Total
1	0(0)	0(0)	3	12	15	30
2	0(0)	0(0)	9(29)	5(16.1)	17(54.8)	31(100)
3	0(0)	0(0)	4(13.3)	13(43.3)	13(43.3)	30(100)
4	0(0)	0(0)	4(13.3)	22(73.3)	4(13.3)	30(100)
5	0(0)	1(3.3)	19(63.3)	3(10)	7(23.3)	30(100)
6	0(0)	0(0)	3(10)	11(36.7)	16(53.3)	30(100)
7	0(0)	3(20)	3(20)	7(46.7)	2(13.3)	15(100)
8	0(0)	0(0)	5(16.7)	19(63.3)	6(20)	30(100)
9	0(0)	4(13.3)	6(20)	12(40)	8(26.7)	30(100)
10	0(0)	0(0)	6(20)	10(33.3)	14(46.7)	30(100)
11	0(0)	5(41.7)	3(25)	4(33.3)	0(0)	12(100)
12	0(0)	0(0)	9(30)	12(40)	9(30)	30(100)
13	0(0)	0(0)	4(13.3)	15(50)	11(36.7)	30(100)
14	0(0)	0(0)	0(0)	8(26.7)	22(73.3)	30(100)
15	0(0)	0(0)	1(9.1)	4(36.4)	6(54.5)	11(100)
16	1(9.1)	0(0)	2(18.2)	3(27.3)	5(45.5)	11(100)
17	0(0)	0(0)	6(46.2)	4(30.8)	3(23.1)	13(100)
18	1(3.1)	0(0)	4(12.5)	9(28.1)	18(56.3)	32(100)
19	0(0)	0(0)	2(6.5)	6(19.4)	23(74.2)	31(100)
20	0(0)	0(0)	1(8.3)	4(33.3)	7(58.3)	12(100)
21	0(0)	0(0)	1(3.30	8(26.7)	21(70)	30(100)
22	0(0)	0(0)	0(0)	6(31.6)	13(68.4)	19(100)
23	0(0)	0(0)	1(3)	16(48.5)	16(48.5)	33(100)
24	0(0)	2(40)	2(40)	1(20)	0(0)	5(100)
25	8(26.7)	0(0)	0(0)	21(70)	1(3.3)	30(100)
26	0(0)	0(0)	8(25)	17(53.1)	7(21.9)	32(100)
27	5(16.7)	0(0)	8(26.7)	12(40)	5(16.7)	30(100)
28	9(27.3)	2(6.1)	4(12.1)	8(24.2)	10(30.3)	33(100)
29	1(9.1)	2(18.2)	1(9.1)	5(45.5)	2(18.2)	11(100)
30	0(0)	4(30.8)	4(30.8)	4(30.8)	1(7.7)	13(100)
31	0(0)	0(0)	2(33.3)	1(16.7)	3(50)	6(100)
32	8(26.7)	1(3.3)	2(6.7)	12(40)	7(23.3)	30(100)
Total	33(4.3)	24(3.1)	127(16.5)	294(38.2)	292(37.9)	770(100)

Appendix V

Table B3: Perception of the Visitors Based on the Cultural Attraction of the POS

S. No.	Cultural heritage					Total
	No satisfaction	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	2 (6.7)	5(16.7)	12 (40)	10 (33.3)	1 (3.3)	30 (100)
2	17 (54.8)	10 (32.2)	0	2 (6.5)	2 (6.50	31 (100)
3	6 (20)	4 (13.3)	8 (26.7)	10 (33.3)	2 (6.7)	30 (100)
4	4 (13.3)	12	9 (30)	5 (16.7)	0	30 (100)
5	0	2 (6.7)	16 (53.3)	9 (30)	3 (10)	30 (100)
6	8 (26.7)	8 (26.6)	13 (43.3)	1 (3.3)	0	30 (100)
7	5 (33.3)	7 (46.7)	0	3 (20)	0	15 (100)
8	3 (10)	14 (46.7)	9 (30)	4 (13.3)	0	30 (100)
9	8 (26.7)	5 (16.7)	10 (33.3)	6 (20)	1 (3.3)	30 (100)
10	5(16.7)	14 (46.7)	6 (20)	4 (13.3)	1 (3.3)	30 (100)
11	7 (58.3)	5 41.7)	0	0	0	12
12	0	3 (10)	7 (23.3)	17 (56.7)	3 (10)	30 (100)
13	2 (6.7)	13 (43.3)	11 (36.7)	3 (10)	1 (3.3)	30 (100)
14	1 (3.3)	0	4 (13.3)	11(36.7)	14 (46.7)	30 (100)
15	2 (18.2)	6 (54.5)	3 (27.3)	0	0	11 (100)
16	6 (54.5)	5 (45.5)	0	0	0	11 (100)
17	10 (76.9)	3 (23.1)	0	0	0	13 (100)
18	10 (31.3)	17 (53.1)	3 (9.4)	2 (6.3)	0	32 (100)
19	1 (3.2)	1 (3.2)	7 (22.6)	17 (54.8)	5 (16.1)	31 (100)
20	2 (16.7)	5 (41.7)	3 (25)	2 (16.7)	0	12 (100)
21	2 (6.7)	8 (26.7)	13 (43.3)	4 (13.3)	3 (10)	30 (100)
22	0	1 (5.3)	8 (42.1)	9 (47.4)	1 (5.3)	19 (100)
23	5 (15.2)	3 (9.1)	16 (48.5)	6 (18.2)	3 (9.1)	33 (100)
24	1 (20)	4 (80)	0	0	0	5 (100)
25	5 (16.7)	18 (60)	6 (20)	1 (3.3)	0	30 (100)
26	2 (6.3)	10 (31.3)	7 (21.9)	10 (31.3)	3 (9.4)	32 (100)
27	3 (10)	20 (66.7)	5 (16.7)	1 (3.3)	1 (3.3)	30 (100)
28	3 (9.1)	7 (21.2)	8 (24.2)	11 (33.3)	4 (12.4)	33 (100)
29	10 (90.9)	1 (9.1)	0	0	0	11 (100)
30	0	3 (23.1)	3 (23.1)	5 (38.5)	2 (15.4)	13 (100)
31	3 (50)	2 (33.3)	1 (16.7)	0	0	6 (100)
32	7 (23.3)	14 (46.7)	7 (23.3)	2 (6.7)	0	30 (100)
Total	140 (18.2)	230 (29.9)	195 (25.3)	155 (20.1)	50 (6.50)	770 (100)

Appendix V

Table B4: Perception of Visitors Based on Internal Layout of the POS

S. No.	Internal layout					Total
	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	3 (10)	5 (16.7)	15 (50)	4 (13.3)	3 (10)	30 (100)
2	12 (38.7)	10 (32.3)	5 (16.1)	3 (9.7)	1 (3,2)	31 (100)
3	0	7 (23.3)	13 (43.3)	7 (23.3)	3 (10)	30 (100)
4	0	0	15 (50)	12 (40)	3 (10)	30 (100)
5	0	2 (6.7)	11 (36.7)	10 (33.3)	7 (23.3)	30 (100)
6	4 (13.3)	19 (63.4)	6 (20)	1 (3.3)	0	30 (100)
7	4 (26.7)	5 (33.3)	5 (33.3)	1 (6.7)	0	15 (100)
8	0	10 (33.3)	14 (46.7)	6 (20)	0	30 (100)
9	4 (13.4)	6 (20)	10 (33.3)	10 (33.3)	0	30 (100)
10	9 (30)	15 (50)	4 (13.3)	2 (6.7)	0	30 (100)
11	4 (33.3)	7 (58.4)	1 (8.3)	0	0	12 (100)
12	0	2 (6.7)	16 (53.3)	11 (36.7)	1 (3.3)	30 (100)
13	0	14 (46.7)	16 (53.3)	0	0	30 (100)
14	0	1 (3.3)	3 (10)	16 (53.4)	10 (33.3)	30 (100)
15	1 (9.1)	6 (54.5)	2 (18.2)	1 (9.1)	1 (9.1)	11 (100)
16	0	3 (27.2)	7 (63.6)	1 (9.1)	0	11 (100)
17	2 (15.4)	8 (61.15)	2 (15.4)	0	1 (7.7)	13 (100)
18	3 (9.4)	6 (18.7)	11 (34.4)	11 (34.4)	1 (3.1)	32
19	0	1 (3.2)	7 (22.6)	19 (61.3)	4 (12.9)	31 (100)
20	3 (25)	4 (33.3)	3 (25)	2 (16.7)	0	12 (100)
21	5 (16.8)	10 (33.3)	10 (33.3)	4 (13.3)	1 (3.3)	30 (100)
22	2 (10.5)	3 (15.8)	10 (62.6)	4 (21.1)	0	19 (100)
23	0	4 (12.1)	12 (36.4)	13 (39.4)	4 (12.1)	33 (100)
24	2 (40)	3 (60)	0	0	0	5 (100)
25	8 (26.7)	10 (33.3)	12 (40)	0	0	30 (100)
26	4 (12.5)	9 (28.1)	14 (43.8)	4 (12.5)	1 (3.1)	32 (100)
27	13 (43.3)	12 (40)	3 (10)	2 (6.7)	0	30 (100)
28	1 (3)	7 (21.2)	18 (54.5)	5 (15.2)	2 (6.1)	33 (100)
29	9 (81.8)	2 (18.2)	0	0	0	11 (100)
30	0	0	10 (76.9)	3 (23.1)	0	13 (100)
31	6 (100)	0	0	0	0	6 (100)
32	0	5 (16.7)	13 (43.3)	10 (10.3)	2 (6.7)	30 (100)
Total	99 (12.9)	196 (25.5)	26 (34.8)8	162 (21)	45 (5.8)	770 (100)

Appendix V

Table B5: Perception of Visitors Based on the Sanitation of the POS

S. No.	Sanitation					Total
	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	0	10 (33.3)	12 (40)	8 (26.7)	0	30 (100)
2	1 (3.2)	6 (19.4)	21 (67.7)	3 (9.7)	0	31
3	1 (3.3)	9 (30)	10 (33.3)	7 (23.4)	3 (10)	30 (100)
4	0	2 (6.7)	13 (43.3)	13 (43.3)	2 (6.7)	30 (100)
5	0	0	18 (60)	7 (23.3)	5 (16.7)	30 (100)
6	0	4 (13.3)	16 (53.4)	9 (30)	1 (3.3)	30 (100)
7	1 (6.7)	5 (33.3)	8 (53.3)	1 (6.7)	0	15 (100)
8	0	2 (6.7)	23 (76.7)	5 (16.6)	0	30 (100)
9	0	6 (20)	14 (46.7)	10 (33.3)	0	30 (100)
10	1 (3.3)	4 (13.3)	20 (66.7)	4 (13.3)	1 (3.3)	30 (100)
11	2 (16.7)	6 (50)	4 (33.3)	0	0	12 (100)
12	0	5 (16.7)	11 (36.7)	14 (46.6)	0	30 (100)
13	0	3 (10)	18 (60)	7 (23.3)	2 (6.7)	30 (100)
14	0	0	6 (20)	11 (36.7)	13 (43.3)	30 (100)
15	0	1 (9.1)	5 (45.5)	3 (27.3)	2 (18.2)	11 (100)
16	3 (27.3)	1 (9.1)	6 (54.5)	0	1 (9.1)	11 (100)
17	0	4 (30.8)	8 (61.5)	1 (7.7)	0	13 (100)
18	2 (6.3)	7 (21.9)	12 (37.5)	9 (28.1)	2 (6.3)	32 (100)
19	0	1 (3.2)	7 (22.6)	12 (38.7)	11 (35.5)	31 (100)
20	0	4 (33.3)	5 (41.7)	1 (8.3)	2 (16.7)	12 (100)
21	0	5 (16.7)	14 (46.6)	8 (26.7)	3 (10)	30 (100)
22	0	1 (5.3)	11 (57.9)	7 (36.8)	0	19 (100)
23	2 (6.1)	1 (3)	10 (10.3)	15 (45.5)	5 (15.2)	33 (100)
24	0	2 (40)	3 (60)	0	0	5 (100)
25	0	6 (20)	18 (60)	6 (20)	0	30 (100)
26	0	6 (18.8)	17 (53.1)	7 (21.9)	2 (6.3)	32 (100)
27	0	5 (16.7)	22 (73.3)	3 (10)	0	30 (100)
28	0	7 (21.2)	12 (36.3)	9 (27.3)	5 (15.2)	33 (100)
29	11 (100)	0	0	0	0	11 (100)
30	0	4 (30.8)	7 (53.8)	2 (15.4)	0	13 (100)
31	0	3 (50)	2 (33.3)	1 (16.7)	0	6 (100)
32	1 (3.3)	4 (13.4)	16 (53.3)	9 (30)	0	30 (100)
Total	25 (3.2)	124 (16.1)	369 (47.9)	192 (24.9)	60 (7.8)	770 (100)

Appendix V

Table B6: Perception of Visitors Based on Safety and Security of the POS

S. No.	Safety and security					Total
	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	1 (3.3)	4 (13.3)	15 (50)	8 (26.7)	2 (6.7)	30 (100)
2	0	9 (29)	18 (58.1)	3 (9.7)	1 (3.2)	31 (100)
3	1 (3.3)	6 (20)	12 (40)	6 (20)	5 (16.7)	30 (100)
4	0	1 (3.3)	9 (30)	19 (63.3)	1 (3.3)	30 (100)
5	0	0	10 (33.3)	19 (63.3)	1 (3.3)	30 (100)
6	1 (3.3)	8 (26.7)	19 (63.3)	2(6.7)	0	30 (100)
7	1 (6.7)	1(6.7)	7 (46.7)	6 (40)	0	15 (100)
8	0	0	7 (23.3)	19 (63.3)	4(13.3)	30 (100)
9	1 (3.3)	6 (20)	15(50)	7 (23.3)	1 (3.3)	30 (100)
10	3 (10)	9 (30)	13 (43.3)	2 (6.7)	3 (10)	30 (100)
11	4 (33.3)	8 (66.7)	0	0	0	12 (100)
12	1 (3.30	4 (13.3)	13 (43.3)	12 (40)	0	30 (100)
13	0	3 (10)	12 (40)	14 (	1	30 (100)
14	1 (3.3)	1 (3.3)	10 (33.3)	13 (43.3)	5 (16.7)	30 (100)
15	3 (27.3)	4 (36.4)	3 (27.3)	1 (9.1)	0	11 (100)
16	0	4 (36.4)	5 (45.5)	2 (18.2)	0	11 (100)
17	0	5 (38.5)	7 (53.8)	0	1 (7.7)	13 (100)
18	0	9 (28.1)	8 (25)	13 940.6)	2 (6.3)	32 (100)
19	1 (3.2)	4 (12.9)	13 (41.9)	9 (29)	4 (12.9)	31 (100)
20	0	0	8 (66.7)	4 (33.3)	0	12 (100)
21	2 (6.7)	15 (50)	12 (40)	0	1 (3.3)	30 (100)
22	0	3 (15.8)	11 (57.9)	5 (26.3)	0	19 (100)
23	1 (3)	3 (9.1)	17 (51.5)	8 (24.2)	4 (12.1)	33 (100)
24	0	4 (80)	1 (20)	0	0	5 (100)
25	15 (50)	10 (33.3)	5 (16.7)	0	0	30 (100)
26	9 (28.1)	18 (56.3)	3 (9,4)	2 (6.3)	0	32 (100)
27	7 (23.4)	21 (70)	1 (3.3)	1 (3.3)	0	30 (100)
28	5 (15.2)	7 (21.2)	11 (33.3)	8 (24.2)	2 (6.1)	33 (100)
29	1 (9.1)	1 (9.1)	9 (81.8)	0	0	11 (100)
30	0	0	7 (53.8)	5 (38.5)	1 (7.7)	13 (100)
31	3 (50)	3 (500)	0	0	0	6 (100)
32	0	1 (3.3)	8 (26.7)	15 (50)	6 (20)	30 (100)
Total	61 (7.9)	172 (22.3)	289 (37.5)	203 (26.4)	45 (5.8)	770 (100)

Appendix V

Table B7: Perception of Visitors Based on Parking facilities of the POS

S. No.	Parking					Total
	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	6 (20)	8 (26.7)	11 (36.7)	5 (16.70)	0	30 (100)
2	17 (54.8)	13 (41.9)	1 (3.2)	0	0	31 (100)
3	3 (10)	8 (26.7)	12 (400)	3 (10)	4 (13,3)	30 (100)
4	3 (10)	17 (56.7)	7 (23.30	3 (10)	0	30 (100)
5	0	4 (13.3)	13 (43.4)	12 (40)	1 (3.3)	30 (100)
6	10 (33.3)	15 (50)	3 (10)	2 (6.7)	0	30 (100)
7	5 (33.3)	6 (40)	4 (26.7)	0	0	15 (100)
8	4 (13.3)	16 (53.6)	7 (23.3)	3 (10)	0	30 (100)
9	2 (6.7)	9 (30)	8 (26.7)	10 (33.3)	1 (3.3)	30 (100)
10	2 (6.7)	13 (43.3)	14 (46.7)	0	1 (3.3)	30 (100)
11	12 (100)	0	0	0	0	12 (100)
12	3 (10)	10 (33.3)	10 (33.3)	7 (23.3)	0	30 (100)
13	0	12 (40)	16 (53.3)	2 (6.7)	0	30 (100)
14	6 (20)	2 (6.7)	7 (23.3)	12 (40)	3 (10)	30 (100)
15	6 (54.4)	4 (36.4)	1 (9.1)	0	0	11 (100)
16	3 (27.3)	5 (45.5)	3 (27.3)	0	0	11 (100)
17	3 (23.3)	6 (46.2)	3 (23.1)	0	1 (7.7)	13 (100)
18	2 (6.3)	5 (15.6)	13 (40.6)	9 (28.1)	3 (9.4)	32 (100)
19	1 (3.2)	3 (9.7)	15 (48.4)	9 (29)	3 (9.7)	31 (100)
20	5 (41.7)	5 (41.7)	0	2 (16.6)	0	12 9100)
21	1 (3.3)	12 (40)	14 (46.7)	2 (6.7)	1 (3.3)	30 (100)
22	7 (36.8)	5 (26.3)	5 (26.3)	2 (10.5)	0	19 (100)
23	2 (6.1)	3 (9.1)	16 (48.4)	9 (27.3)	3 (9.1)	33 (100)
24	4 (80)	1 (20)	0	0	0	5 (100)
25	10 (33.3)	11 (36.7)	7 (23.3)	2 (6.7)	0	30 (100)
26	8 (25)	11 (34.4)	9 (28.1)	4 (12,5)	0	32 (100)
27	6 (20)	20 (66.7)	4 (13.3)	0	0	30 (100)
28	3 (9.1)	9 (27.3)	12 (36.4)	6 (18.2)	3 (9.1)	33 (100)
29	5 (45.5)	6 (54.5)	0	0	0	11 (100)
30	0	1 (7.7)	5 (38.5)	7 (53.8)	0	13 (100)
31	5 (83.3)	1 (16.7)	0	0	0	6 (100)
32	3 (10)	13 (43.3)	11 (36.7)	3 (10)	0	30 (100)
Total	147 (19.1)	254 (33)	231 (30)	114 (14.8)	24 (3.1)	770 (100)

Appendix V

Table B8: Perception of Visitors Based on Surrounding Environment of the POS

S. No.	Environment					Total
	No satisfactory	Less satisfactory	Acceptable	Fairly satisfactory	Highly satisfactory	
1	0	3 (10)	5 (16.7)	16 (53.3)	6 (20)	30 (100)
2	0	0	2 (6.5)	17 (54.8)	12 (38.7)	31 (100)
3	0	0	6 (20)	20 (66.7)	4 (13.3)	30 (100)
4	0	3 (10)	19 (63.3)	8 (26.7)	0	30 (100)
5	1 (3.3)	3 (10)	8 (26.7)	14 (46.7)	4 (13.4)	30 (100)
6	0	0	9 (30)	19 (63.3)	2 (6.7)	30 (100)
7	0	1 (6.7)	12 (80)	2 (13.3)	0	15 (100)
8	0	2 (6.6)	17 (56.7)	11 (36.7)	0	30 (100)
9	0	0	13 (43.3)	13 (43.3)	4 (13.4)	30 (100)
10	0	0	6 (20)	18 (60)	6 (20)	30 (100)
11	0	1 (8.3)	10 (83.4)	1(8.3)	0	12 (100)
12	0	1 (3.3)	8 (26.7)	18 (60)	3 (10)	30 (100)
13	0	1 (3.3)	11 (36.7)	15 (50)	3 (10)	30 (100)
14	0	0	5 (16.7)	12 (40)	13 (43.3)	30 (100)
15	0	0	2 (18.2)	7(63.6)	2 (18.2)	11 (100)
16	0	5 (45.4)	3 (27.3)	2 (18.2)	1 (9.1)	11 (100)
17	0	2 (15.4)	3 (23.1)	7 (53.8)	1 (7.7)	13 (100)
18	1 (3.1)	3 (9.4)	6 (18.8)	14 (43.8)	8 (25)	32 (100)
19	1 (3.2)	2 (6.5)	13 (41.9)	8 (25.8)	7 (22.6)	31 (100)
20	1 (8.3)	0	4 (33.3)	5 (41.7)	2 (16.7)	12 (100)
21	0	1 (3.3)	1 (3.3)	15 (50)	13 (43.3)	30 (100)
22	0	0	4 (21.1)	10 (52.6)	5 (26.3)	19 (100)
23	0	1(3)	13 (39.4)	13 (39.4)	6 (18.2)	33 (100)
24	0	0	3 (60)	2 (40)	0	5 (100)
25	0	0	15 (50)	15(50)	0	30 (100)
26	0	4 (12,5)	13 (40.6)	13 (40.6)	2 (6.3)	32 (100)
27	0	4 (13.3)	16 (53.4)	10 (33.3)	0	30 (100)
28	0	2 (6.1)	7 (21.2)	22 (66.7)	2 (6.1)	33 (100)
29	1 (9.1)	1 (9.1)	9 (81.8)	0	0	11 (100)
30	0	0	5 (38.4)	4 (30.8)	4 (30.8)	13 (100)
31	0	0	2 (33.3)	4 (66.7)	0	6 (100)
32	0	4 (13.3)	16 (53.4)	10 (33.3)	0	30 (100)
Total	5 (0.7)	44 (5.7)	266 (34.5)	345 (44.8)	110 (14.3)	770 (100)

Appendix VI

Table: Visitor's Suggestion for the Future Management

S. No.	*Physical Infrastructure	Information	Environment	Accessibility	Security	Parking	Beautification	Children Playing Site	Land use Planning	View tour	Management	Extent space	@Others	Total
1	15 (50)	1 (3.3)	6 (20)	0	0	0	5 (16.7)	1 (3.3)	0	0	2 (6.7)	0	0	30 (100)
2	24 (77.4)	0	2 (6.5)	0	0	1 (3.2)	2 (6.5)	0	0	0	0	2 (6.5)	0	31 (100)
3	5 (16.7)	0	14 (46.7)	0	3 (10)	3 (10)	4 (13.3)	0	0	1 (3.3)	0	0	0	30 (100)
4	14 (46.7)	0	2 (6.7)	0	1 (3.3)	1 (3.3)	2 (6.7)	1 (3.3)	1 (3.3)	0	8 (26.7)	0	0	30 (100)
5	2 (6.7)	2 (6.7)	2 (6.7)	0	0	0	6	2 (6.7)	0	0	16 (53.2)	0	0	30 (100)
6	19 (63.3)	0	1 (3.3)	0	8 (26.7)	0	2 (6.7)	0	0	0	0	0	0	30 (100)
7	12 (80)	0	2 (13.3)	0	0	0	1 (6.7)	0	0	0	0	0	0	15 (100)
8	21 (70)	1 (3.3)	1 (3.3)	0	1 (3.3)	2 (6.7)	0	2 (6.7)	0	0	0	2 (6.7)	0	30 (100)
9	27 (90)	0	1 (3.3)	0	0	0	2 (6.7)	0	0	0	0	0	0	30 (100)
10	7 (23.3)	4 (13.3)	1 (3.3)	1 (3.3)	11 (36.7)	0	2 (6.7)	0	0	4 (13.3)	0	0	0	30 (100)
11	12 (100)	0	0	0	0	0	0	0	0	0	0	0	0	12 (100)
12	5 (16.6)	0	2 (6.7)	6 (20)	2 (6.7)	0	6 (20)	0	3 (10)	0	6 (20)	0	0	30 (100)
13	16 (53.3)	1 (3.3)	2 (6.7)	0	0	0	2 (6.7)	0	0	0	0	4 (13.3)	5 (16.7)	30 (100)
14	4 (13.3)	1 (3.3)	0	2 (6.7)	2 (6.7)	3 (10)	0	0	0	0	18 (60)	0	0	30 (100)
15	6 (54.5)	0	0	0	0	1 (9.1)	2 (18.2)	0	0	0	0	0	2 (18.2)	11 (100)
16	7 (63.6)	0	2 (18.2)	0	0	0	0	0	0	0	0	0	2 (18.2)	11 (100)
17	9 (69.2)	0	0	0	0	2 (15.4)	2 (15.4)	0	0	0	0	0	0	13 (100)
18	8 (25)	2 (6.3)	16 (50)	0	4 (12.5)	0	2 (6.3)	0	0	0	0	0	0	32 (100)
19	5 (16.1)	1 (3.2)	2 (6.5)	0	4 (12.8)	0	2 (6.5)	0	0	2 (6.5)	15 (48.4)	0	0	31 (100)
20	12 (100)	0	0	0	0	0	0	0	0	0	0	0	0	12 (100)
21	16 (53.3)	0	0	0	0	0	0	0	0	3 (10)	2 (6.7)	0	9 (30)	30 (100)
22	17 (89.5)	0	0	0	0	0	1 (5.3)	0	0	0	0	0	1 (5.3)	19 (100)
23	8 (24.2)	2 (6.1)	3 (9.1)	0	0	1 (3)	7 (21.2)	2 (6.1)	0	0	10 (30.3)	0	0	33 (100)
24	5 (100)	0	0	0	0	0	0	0	0	0	0	0	0	5 (100)
25	21 (70)	0	0	0	0	0	0	0	1 (3.3)	0	0	0	8 (26.7)	30 (100)
26	15 (46.9)	0	7 (21.9)	0	6 (18.8)	0	1 (3.1)	0	2 (6.3)	0	0	0	1 (3.1)	32 (100)
27	13 (43.3)	0	4 (13.3)	0	10 (33.3)	0	1 (3.3)	0	0	0	0	0	2 (6.7)	30 (100)
28	12 (36.4)	4 (12.1)	3 (9.1)	0	3 (9.1)	6 (18.2)	3 (9.1)	0	0	0	0	1 (3)	1 (3)	33 (100)
29	9 (81.8)	0	2 (18.2)	0	0	0	0	0	0	0	0	0	0	11 (100)
30	3 (23.1)	4 (30.8)	2 (15.4)	0	1 (7.7)	3 (23.1)	0	0	0	0	0	0	0	13 (100)
31	0	0	0	0	6 (100)	0	0	0	0	0	0	0	0	6(100)
32	20 (66.7)	4 (13.3)	4 (13.3)	0	0	1 (3.3)	1 (3.3)	0	0	0	0	0	0	30 (100)
total	27 (3.5)	81 (10.5)	9 (1.2)	62 (8.1)	24 (3.1)	56 (7.3)	8 (1)	7 (0.9)	10 (1.3)	77 (10)	9 (1.2)	31 (4)	770 (100)	

*Infrastructure included- footpath, Compound, restroom, Benches, sheds, light.
@others- Parentheses illustrated the Percent

Appendix VII

Table C1: Perception inside the Patches by Age Groups

Visitors perception toward the patches	Age group				Total
	Below 19	20-39	40-59	Above 60	
No Satisfactory	4 (3.5)	35 (8.7)	35 (16.4)	11 (27.5)	85 (11.0)
less Satisfactory	33 (28.9)	56 (13.9)	39 (18.2)	12 (30.0)	140 (18.2)
Acceptable	42 (36.8)	141 (35.1)	75 (30.0)	11 (27.5)	269 (34.9)
Fairly Satisfactory	28 (24.6)	107 (26.6)	42 (19.6)	6 (15.0)	183 (23.8)
Highly satisfactory	7 (6.1)	63 (15.7)	23 (10.7)	0(0.0)	93 (12.1)
Total	114 (14.8)	402(52.2)	214 (27.8)	40 (5.2)	770 (100)

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	55.238[a]	12	.000
Likelihood Ratio	58.145	12	.000
Linear-by-Linear Association	14.101	1	.000
N of Valid Cases	770		
a. 2 cells (10.0%) have expected count less than 5. The minimum expected count is 4.42.			

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.268	.000
	Cramer's V	.155	.000
N of Valid Cases		770	
a. Not assuming the null hypothesis.			
b. Using the asymptotic standard error assuming the null hypothesis.			

Appendix VII

Table C2: Perception Inside the Patches by Gender

Visitors perception toward the patches	Gender		Total
	Female	Male	
No Satisfactory	18 (6.1)	67(14.1)	85 (11.0)
less Satisfactory	53 (18.0)	87 (18.3)	140 (18.2)
Acceptable	105 (35.6)	164 (34.5)	269 (34.9)
Fairly Satisfactory	83 (28.1)	100 (21.1)	183 (23.8)
Highly satisfactory	36 (12.2)	57 (12.0)	93 (12.1)
Total	295 (38.3)	475 (61.7)	770 (100)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.479[a]	4	.006
Likelihood Ratio	15.348	4	.004
Linear-by-Linear Association	7.723	1	.005
N of Valid Cases	770		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 32.56.

Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	.137	.006
	Cramer's V	.137	.006
N of Valid Cases		770	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Appendix VII

Table C3: Perception Inside the Patches by Caste/ Ethnic Groups

	Ethnicity and visitor's perception level					Total
Caste / ethinicity	**No Satisfactory**	**Less Satisfactory**	**Acceptable**	**Fairly Satisfactory**	**Highly satisfactory**	
Brahmin chhetri	48 (11.7)	75 (18.2)	143 (34.8)	96 (23.4)	49 (11,9)	411 (100)
Janajati	23 (9.8)	47 (20)	76 (32.3)	61 (26)	28 (11.9)	235 (100)
Scheduled	12 (16)	14 (18.7)	33 (44)	10 (13.3)	6 (8)	75 (100)
Foreigner	2 (4.1)	4 (8.2)	17 (34.7)	16 (32.7)	10 (20.4)	49 (100)
Total	85 (11)	140 (18.2)	269 (34.9)	183 (23.8)	93 (12.1)	770 (100)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	19.098[a]	12	.086
Likelihood Ratio	20.284	12	.062
Linear-by-Linear Association	1.523	1	.217
N of Valid Cases	770		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.41.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.157	.086
	Cramer's V	.091	.086
N of Valid Cases		770	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix VII

Table C4: Perception Inside the Patches by Occupations

Visitors perception toward the patches	Occupation						Total
	Employed	Business	Agriculture	Student	Unemployed	Others	
No Satisfactory	32 (14.4)	18 (15.4)	7 (18.4)	11 (4.8)	11 (11.3)	6 (9.1)	85 (11.0)
less Satisfactory	29 (13.1)	19 (16.2)	6 (15.8)	53 (23.0)	22 (22.7)	11 (16.7)	140 (18.2)
Acceptable	73 (32.9)	33 (28.2)	11 (28.9)	90 (39.1)	39 (40.2)	23 (34.8)	269 (34.9)
Fairly Satisfactory	54 (24.3)	29(24.8)	8 (21.1)	56 (24.3)	18 (18.6)	18 (27.3)	183 (23.8)
Highly satisfactory	34 (15.3)	18 (15.4)	6 (15.8)	20 (8.7)	7 (7.2)	8 (12.1)	93 (12.1)
Total	222 (28.8)	117 (15.3)	38 (4.9)	230 (29.8)	97 (12.6)	66 (8.6)	770 (100)

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	35.554[a]	20	.017
Likelihood Ratio	37.524	20	.010
Linear-by-Linear Association	.614	1	.433
N of Valid Cases	770		

a. 2 cells (6.7%) have expected count less than 5. The minimum expected count is 4.19.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.215	.017
	Cramer's V	.107	.017
N of Valid Cases		770	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix VII

Table C5: Perception Inside the Patches by Education Level

Visitors perception toward the patches	Education level			Total
	Literate	High School	Higher education	
No Satisfactory	30 (21.3)	30 (7.8)	25 (10.2)	85 (11.0)
less Satisfactory	24 (17.0)	79 (20.6)	37 (15.1)	140 (18.2)
Acceptable	51 (36.2)	147 (38.3)	71 (29.0)	269 (34.9)
Fairly Satisfactory	26 (18.4)	83 (21.6)	74 (30.2)	183 (23.8)
Highly satisfactory	10 (7.1)	45 (11.7)	38 (15.5)	93 (12.1)
Total	141 (18.3)	384 (49.9)	245 (31.8)	770 (100)

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	35.569[a]	8	.000
Likelihood Ratio	33.387	8	.000
Linear-by-Linear Association	17.364	1	.000
N of Valid Cases	770		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.56.

Symmetric Measures

		Value	**Approx. Sig.**
Nominal by Nominal	Phi	.215	.000
	Cramer's V	.152	.000
N of Valid Cases		770	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Appendix VIII

KI Interviews List

'Box 1

10/10/2019 ***Prof. Dr. Krishna K.C****., 65, Male, Pokhara 10, Geographer and planner.*

10/13/2018 ***Naresh Poudel****, 52, male, Pokhara 28, Geographer.*

10/14/2018 ***Prakash Poudel****, Chairmen ward no 15, Social worker*

10/15/2018 ***Kamal Thapa,*** *Chairmen ward no 31, Social worker*

10/17/2018 ***Sharad Parajuli*** *Chairmen ward no 01, Social worker*

10/18/2018 ***Yogendra Man Shrestha****, 62, male, Pokhara 13, Secretary of Bhadrakali management committee*

10/20/2018 ***Sishir Poudel****, 39, male, Pokhara 16, Manager of Mahendra cave*

10/22/2018 ***Durga Bogati****, 58, male, Pokhara 22, Social worker com management committee member World Peace Pagoda*

11/2 /2018 ***Jhamkanat Baral*** *Basundhara park 56 male, Social worker com adjoin business 30 years' long*

11/3/2018 ***Khim Lal Baral*** *55 male, Pokhara 26, Khaste Lake conservation member com neighbor resident'*

Appendix IX

Ward Level Questionnaire for Reconnaissance Survey of POS

Respected ward Chair person,

The public open spaces of this metropolitan city, such as parks, sports malls, religious space, water surface, caves, viewpoint etc., are the subjects for the study that is going to be done so it is requested to provide the information for personal purpose (student research). This study relating to the existing open spaces of the metropolis, therefore it is requested for the help of keeping the records of the mentioned spaces cited in the ward, by providing details of the public and open places (√ marks) of the open places

Place Name	Descriptions	1	2	3	4	5	6	7	8	9	10	11
Name of the Settlement (Tole)												
Plot no (Cadastral map)												
Accessibility	For all											
	Not for all											
Ownership	Government											
	Community											
	Individual											
Economic activity	Regular											
	Yes											
	No activity											
Entry fee	Yes											
	No Charge											
Security	Security											
	No security											
Per day visitors	Number											
Purpose of use	Park											
	Play ground											
	Picnic											
	Viewpoint											
	Recreational											
	Others											
Any specific Suggestions…… Thank you very much for your valuable time.												

Appendix X

Observation Sheet (Checklist)

Ward no: …. Tole…… Open space Name:

Spatial configuration	Park/ playground/ religious site/ waterfront/ viewpoint/ cave/river strip/ distnict spaces	Multiple use	Remarks
Location (X, Y)			
Shape and size			
Landforms			
Road accessibility			
Environment			
Vegetation			
Provision /infrastructure			
Drinking water			
Sheds			
Toilet			
Benches			
Foot path			
Parking			
Gardening			
Children Playing area			
Light			
Safety/ compound			
Main activities			
Number of visitors			

Appendix XI

KII Questionnaire

Questionnaire for Key Informant Information

Name of the open space: …….. Name of the Tole……. …Ward no: ……Interview Date: 2018/10./.

Name of the Visitor: First name: ……Family name: ……

Age…….. Gender- Male ….. Female ….. Profession …….

Marital status: ….. Unmarried ….. Married ☐ Single (separated)

….. Divorced ….. Widow

Education: Illiterate ….. Literate ….. SEE/SLC ….. Certificate ….. Bachelor ….. Master ….. M Phil/ PhD …..

Visitor's address**:** Country ……. Province ……. Metropolitan/ Rural Municipality……..ward....

1.Since when this space has been used as open space?

2.Though presently it has been used as POS but what was its usage before being used as POS? Barren land, Grass land, Agriculture, Others?

3.Did you find any changes at this place before and now?

If there are changes / how has it changed? Specify major agents of the change…….

4.What are vital processes for the change of this place? (Natural or Socio-economic factors)

5.Could you explain the magnitude of change (previous and present size of the space) of open space?

a. Reduced area b. increased area c. no change
b. If reduced what is major cause?.....
c. If increased what is major cause?.....

6.Has there been any encroachment loss of land in this premise? Yes/ no if yes…. Specify?

7. Could you tell which forces / drivers are responsible for the development of this place as an open space?

1…….. 2…… 3……..

a. Bio-Physical b. Socio-economic c. policy

If bio-physical: a….. b…….. c……. d……

If socio-economic, which of the following has the highest influence?

a. increase of population b. social concern c. economic condition. d. political set-up

e. Policy: a national policy f. local policy g. any specific …..

8. Can you tell major factors to bring these changes? (national policy, local policy, infrastructures development, management, community interest,
9. Can you explain in detail about the attitude and interest of the local community for the better use of this space?
10. Do you see any challenge in the management of this site? Yes/ no if yes…. Specify?

    If ……. factors how change it?.....
11. As a resident, user, planner decision maker how would you evaluate this place?
12. How can we make this place more attractive and more useful?
13. Which agent is most responsible for the sustainable development of this open space?
14. Do you have any suggestions for the further land use planning of this space? What are your suggestions as a visitor cum social activist for the community, visitors and Government?

Thank you very much for your valuable time

Appendix XII

Questionnaire for Public Open Space Visitors' Interview

I would like to request to fill the firm for Ph. D. Research (Student of T. U., Nepal)
Visitor's Perception

Name of the open space: ……... Name of the Tole……. ……Ward no: ……Interview Date: 2018/10./. Name of the Visitor: First name: ……Family name: …… Age……..Gender- ….. Male ….. Female Profession …… Marital status: ….. Unmarried ….. Married ….. Single (separated) ….. Divorced ….. Widow
Education: …..Illiterate …..Literate …..SEE/SLC …..Certificate …..Bachelor …..Master …..M Phil/ PhD
Visitor's address: Country ……. Province ……. Metropolitan/ Rural Municipality……..…….ward....

1. **Where are you from?** ….. PMPC ….. Outside from PMC (Nepal) ….. Foreigner
2. **How did you come here?** …..by car ….. by motorcycles ….. by the cycle ….. on foot ….. public bus ….. others specify …..
3. **What is your feeling for the process of entering this place?** ….. Easy access …..complex ….. No free ….. Expensive ….. No barrier
4. **How often do you come here with?** …..Single ….. Friends ….. Family
5. **What is your purpose behind coming here?**

….. Leisure time ….. Playing ….. Yoga ….. Walking ….. Attractive landscape ….. Enjoy with nature ….. community interaction ….. Religious …..Others (please specify)…….

6. **What is your frequency of visiting this place?** ☐ Daily ☐ Weekly ☐ Monthly ….. Annual ….. in every alternative year ….. First time
7. **How long do you stay here whenever you come here?**

….. Half an hour ….. One-hour ….. Two hours ….. More than two hours

8. **Please rate your perception/opinion on the following topics related to this destination**.

i. Accessibility ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

ii. Natural attraction ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

iii. Cultural heritages ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

iv. Internal decoration ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

v. Sanitation ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

vi. Surrounding environs ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

vii. Parking ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

viii. Safety ….. Highly satisfied ….. Fairly satisfied ….. Acceptable ….. Less satisfy ….. No satisfy

9. **What is your overall experience of this site** a_1. ….. Highly satisfied a_2. ….. Fairly satisfied a_3. ….. Acceptable a_4 ☐ Less satisfied a_5 ….. No satisfied

What is you're feeling about infrastructure development situation of this place?

10. a_1 ….. Highly satisfied a_2. ….. Fairly satisfied a_3 ….. Acceptable a_4 ….. Less satisfied a_5 ….. No satisfied

11. **Have you observed any specific problems during the visit?** (Specify).

i.....…… ii…… iii……

12. Do you have any specific suggestions for its better management?

1 i.....…… ii…… iii……

Thank you very much for your valuable time.

Appendix XIII

Spatial Characteristics and Provisions in Public Open Space

Landforms= 1 –sloping, 2-palin; **Ownership** = 1 -government. 2-community, 3- institution, 4-private, **Accessibility** = 1 –yes, 2-no; **Road access** = 1 –yes, 2-no; **Vegetation**= 1-trees, 2-bush, 3-no; **Security** = 1 –yes, 2-no; **Environment** = 1 –yes, 2-no; **Economic** Activities= 1-regular, 2-occasional, 3- no; **Management**= 1-yes, 2-no; **Drinking water**= 1 –yes, 2-no; **Foot path** = 1 –yes, 2-no; **Toilet** = 1 –yes, 2-no; **Bench** = 1 –yes, 2-no; **Shed** = 1 –yes, 2-no; **Gardening** = 1 –yes, 2-no; **Parking** = 1 –yes, 2-no; **Children playing** = 1 –yes, 2-no; **Light** = 1 –yes, 2-no; **Compound** = 1 –yes, 2-no

Typology = 1-park, 2- playground, 3- Religious- 4- Water surface, 5- Viewpoint, 6-Cave, 7- River corridor,8- Distnict space.

Ward no.	Name of POS	Latitude	Longitude	Area (H.)	Landforms	Ownership	Accessibility	Road access	Vegetation	Security	Environ	Economic activity	Management	Drinking water	Footpath	Toilet	Benches	Sheds	Gardening	Parking	Children playing site	light	Compound	Visitors	Sub typology	Typology
1	Dream Park	28.24537	83.9888	0.035	2	1	1	1	2	2	1	3	1	2	1	2	1	1	1	2	2	2	2	25	1	1
1	Gai Ghat	28.24613	83.9855	0.224	2	1	1	1	3	2	1	3	2	1	1	1	2	2	2	2	2	2	2	50	26	7
1	Guthi - Bindabasini	28.23572	83.9879	1.098	1	2	2	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	1	0	14	3
1	Indreni park	28.24595	83.9832	1.577	1	1	1	1	1	2	2	3	2	2	2	2	2	1	2	2	2	2	2	50	2	1
1	Guthi-Pandit Pauwa	28.24459	83.9882	0.893	1	2	2	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	0	14	3
1	Ritual (Kiriya Putri-site)	28.24639	83.9834	0.284	2	1	1	1	2	2	1	3	2	2	2	1	2	1	2	2	2	2	2	15	14	3
1	Simpani Paly ground	28.24957	83.9788	0.864	1	1	1	1	2	2	1	3	2	2	2	2	1	2	2	2	2	2	2	12	10	2
1	Tundikhel Bagar	28.24244	83.9858	1.034	1	1	1	1	2	1	1	2	1	1	1	1	1	2	2	1	2	2	1	500	9	2
2	Bhairab Temple	28.23292	83.985	0.105	1	1	2	1	3	1	1	3	1	1	2	1	2	1	2	2	2	1	1	60	14	3
2	Bindhabasini	28.2375	83.9844	1.345	2	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	1	1	800	12	3
2	Patangini	28.24263	83.984	0.026	1	1	1	1	2	1	1	3	1	2	1	1	1	1	1	2	2	2	1	35	1	1
3	Balmandir park	28.23255	83.991	0.286	2	3	2	1	2	1	1	3	1	2	1	2	1	2	1	2	2	2	1	45	1	1
3	Birendra park	28.23122	83.9921	0.272	1	1	1	1	2	1	1	3	1	2	2	2	1	2	1	2	2	1	1	70	1	1
3	Dharmasila Bihar	28.22898	83.9902	0.121	1	1	1	1	2	1	1	3	1	1	1	1	2	1	1	2	2	1	1	100	12	3
3	Jalbinayak park	28.22767	83.9903	0.151	1	1	1	1	2	1	2	3	2	2	2	2	1	2	1	2	2	1	2	80	1	1
3	Kopildhunga park	28.22974	83.9878	0.141	1	1	1	1	2	1	2	3	1	2	2	2	1	2	1	2	2	2	2	75	1	1
3	Narayan Sthan	28.23079	83.9926	1.093	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	1	1	70	14	3
3	Tulasi Ghat	28.23468	83.992	1.273	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	70	26	7
4	Scaut office and park	28.22569	83.9819	0.406	1	1	1	1	3	1	2	3	1	2	2	2	2	2	2	2	2	2	2	150	6	1
5	Akala Devi temple	28.27501	83.9557	0.215	1	1	1	1	2	2	1	3	1	1	2	1	1	2	2	2	2	2	1	250	14	3
5	Bangaicha	28.22371	83.9801	0.415	1	1	1	1	3	1	2	3	1	1	2	1	1	1	1	2	1	2	1	100	3	1

5	Malepatan ground	28.21687	83.9756	1.462	1	3	1	1	2	1	1	2	1	2	2	2	2	2	2	2	2	2	1	250	9	2
5	Manakamana temple	28.21923	83.9697	0.277	1	1	1	1	3	1	1	3	1	1	1	1	1	2	1	2	2	2	1	100	14	3
6	Basundhara park	28.20308	83.9646	5.98	1	1	1	1	3	1	1	2	1	2	1	1	1	2	1	2	2	1	1	396	3	1
6	Bulaundi green park	28.21267	83.968	0.07	2	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
6	Camping ground	28.21495	83.9572	1.912	1	3	2	1	2	1	2	1	2	2	2	1	2	2	2	2	2	1	1	350	5	1
6	Jarebar	28.21407	83.9607	0.306	1	1	1	1	3	1	2	3	2	2	2	2	1	2	2	2	2	2	2	120	1	1
6	Jestha Nagarik park	28.21121	83.9631	0.041	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	30	6	1
6	Kedareshwor Temple	28.2	83.9667	0.644	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	198	14	3
6	Komagane park	28.20123	83.9663	5.778	1	1	1	1	3	1	1	3	1	1	1	2	2	2	2	2	2	2	1	350	3	1
6	Phewa lake	28.21572	83.9455	434.089	1	1	1	2	2	2	2	1	2	1	1	1	1	1	1	1	2	1	2	800	15	4
6	School Patan park	28.21109	83.962	0.034	1	1	1	1	3	1	2	3	1	2	2	2	1	2	2	2	2	2	1	100	1	1
6	Talbarahi temple	28.20745	83.9536	0.262	1	1	1	2	2	2	1	1	1	1	1	2	1	1	1	1	2	1	1	350	14	3
6	Visit Nepal Year park	28.20816	83.9573	0.087	1	1	1	1	3	1	1	3	1	2	1	2	1	1	1	2	2	1	1	150	1	1
7	Gahate park	28.21095	83.9762	0.068	1	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
7	Jhapendra Smriti park	28.20269	83.9725	0.057	1	1	1	1	1	1	1	3	1	2	2	2	2	2	1	2	2	2	1	20	4	1
7	Milan park	28.20705	83.9731	0.049	1	1	1	1	1	1	1	3	1	2	2	2	1	2	2	2	2	2	1	100	1	1
7	Puskresowar Mahadev	28.20877	83.9727	0.095	1	1	1	1	2	1	1	3	1	1	2	1	1	1	2	2	2	1	1	200	12	3
7	Puspalal park	28.21285	83.9694	0.184	1	1	1	1	3	1	1	3	1	2	1	1	1	1	1	2	2	2	1	100	1	1
7	Radha Krishna temple	28.20012	83.9845	0.031	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	100	12	3
8	Ganeshman park	28.21158	83.9815	0.063	1	1	1	1	3	1	2	3	1	2	1	2	1	2	1	1	2	2	1	180	1	1
8	Harka Chock	28.20131	83.98	0.213	1	1	1	1	3	1	1	3	1	2	2	2	1	2	2	2	2	2	1	40	5	1
8	Pasupathi Nath Mandir	28.20986	83.9797	0.042	1	1	1	1	2	1	1	3	1	1	1	1	1	1	2	2	2	1	1	80	14	3
8	Radha Krishna temple	28.20683	83.9774	0.098	1	1	1	1	2	1	1	3	1	1	2	1	1	1	1	2	2	1	1	90	14	3
9	Pradrsani Kendra	28.21141	83.9894	2.674	1	1	1	1	2	1	2	1	1	1	2	1	2	1	2	1	2	1	1	500	31	8
9	Rammandir/Shivalaya Ramghat	28.21864	83.9919	0.136	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	1	1	100	12	3
9	Regional museum	28.21719	83.991	1.082	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	2	2	1	100	31	8
9	Shantiban	28.21022	83.9919	6.679	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	2	2	1	250	2	1
10	Amersingh ground(10)	28.2076	84.0003	1.684	1	1	1	1	2	1	2	1	2	2	2	2	2	2	2	2	2	2	1	88	9	2
10	Baudha Argau Sadan	28.21053	83.9944	0.54	1	1	1	1	3	2	1	3	1	1	1	1	1	1	1	1	2	1	1	150	14	3
10	Chor Sangu park	28.20237	83.9867	0.19	2	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	6	1
10	Gita temple	28.21146	83.996	0.309	1	1	1	1	2	2	1	3	1	1	1	1	1	1	1	2	2	1	1	100	14	3
10	Pokhara stadium	28.2041	83.9904	21.008	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	750	7	2
10	Radha Krishna temple	28.20161	83.9926	0.029	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	1	1	70	14	3
10	Ramghat	28.21459	83.9937	19.5567	2	1	1	1	3	2	2	3	2	1	1	1	1	1	2	1	2	1	1	450	26	7
11	Bhanu park	28.2238	83.9964	0.03	1	1	1	1	2	1	1	3	1	2	2	2	1	2	1	2	2	2	1	50	1	1
11	Chauri Danda	28.23629	84.0111	0.668	2	1	1	1	3	1	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
11	Fulbari open space	28.23028	83.9935	1.385	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	2	70	6	1
11	Kahun viewpoint	28.23829	84.013	2.306	2	1	1	1	2	1	1	3	2	2	2	2	1	1	2	2	2	2	1	40	21	5

11	Kola Chour	28.23523	84.0156	2.515	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
11	Life word Mission Church	28.22177	83.9989	0.038	1	1	1	1	1	1	1	3	1	1	2	1	1	1	1	1	2	1	1	35	14	3
11	Manipal (Fulbari) park	28.23585	83.9951	2.837	2	3	2	1	1	1	1	3	1	2	2	2	2	2	1	2	2	2	1	0	2	1
11	Pteni open field	28.23064	84.0028	1.067	2	1	1	1	3	1	1	3	2	2	2	2	2	2	2	2	2	2	2	35	6	1
11	Ramchautari	28.22721	83.9962	0.277	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	2	140	6	1
11	Water Tank open space	28.23017	83.9998	0.319	2	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	6	1
12	Amarsingh ground	28.20583	84.0017	3.077	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	2	400	9	2
12	Bairagi Ban	28.20954	83.9929	3.453	1	1	1	1	1	2	1	3	2	2	2	2	2	2	1	2	2	2	1	50	2	1
12	Sattyaharischandra Manch	28.21151	84.0021	0.09	1	1	1	1	2	1	1	3	1	2	2	1	1	1	2	2	2	2	1	25	1	1
13	Bhadrakali pond	28.21131	84.0079	0.698	1	1	1	1	2	1	1	3	1	2	2	2	1	2	2	2	2	2	1	70	17	4
13	Bhadrakali religious site	28.21226	84.0071	6.773	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	2	1	1	1	265	13	3
13	Dihi Aarba	28.22406	84.0296	0.2	2	1	1	1	2	1	1	3	2	1	2	2	2	1	2	2	2	2	2	50	14	3
13	Gumba Bijayapur	28.24755	84.037	0.087	2	1	1	1	2	2	1	3	1	1	2	1	1	1	1	2	2	1	1	25	14	3
13	Gumba Jayakot	28.21651	84.0073	1.075	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	1	1	300	12	3
13	Jame Masjid	28.20787	84.0095	0.056	1	1	1	1	2	1	1	3	1	1	2	1	1	1	2	2	2	1	2	150	14	3
13	Jayakot, Karki Danda	28.21892	84.0087	36.335	2	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	2	2	13	30	8
13	Kamal Pokhari	28.22044	84.013	0.578	1	1	1	1	2	1	2	3	2	2	1	2	1	1	2	2	2	2	2	11	16	4
13	Kundhar park	28.21139	84.0115	0.363	1	1	1	1	2	1	1	3	1	1	1	2	1	2	1	2	2	1	1	150	1	1
13	Mahaparbhu Dham	28.23294	84.0362	5.953	2	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	25	13	3
13	Mani Deep Aarba	28.23169	84.0405	1.009	2	1	1	1	3	1	1	3	2	1	2	2	1	1	1	2	2	2	2	50	14	3
13	Rupa wetland	28.1432	84.1078	6.792	1	1	2	2	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	20	32	8
14	Bhagabati temple	28.16746	84.0224	0.268	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	60	14	3
14	Bhoteko Chautaro	28.17424	84.0281	0.133	1	1	1	1	1	1	1	3	1	2	2	2	1	2	2	2	2	2	2	55	6	1
14	Gorkha Golf ground_1	28.17323	84.0307	3.579	1	4	1	1	2	1	1	1	1	1	2	1	1	2	1	1	2	2	2	40	7	2
14	Gorkha Golf ground_2	28.1727	84.0332	1.29	1	4	1	2	2	2	1	1	1	2	1	2	2	2	2	2	2	2	2	25	8	2
14	Kholako Gaundo	28.17562	84.0313	0.165	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	6	1
14	Majheriptan open space	28.17064	84.0216	2.572	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	50	6	1
14	Manohar park	28.17992	84.0179	0.077	1	1	1	1	2	1	1	3	1	2	2	2	1	1	1	2	2	2	1	35	3	1
14	Sani Patan open space	28.17557	84.0241	0.241	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	50	6	1
14	Mother community park	28.17159	84.0253	0.216	1	2	1	1	3	1	1	3	1	2	1	2	1	1	1	2	2	2	1	30	1	1
14	Radha Krishna temple	28.18264	84.0272	0.243	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	2	1	1	120	14	3
14	Rameshori playground	28.17655	84.0233	0.73	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	150	9	2
14	Shiva temple	28.17308	84.0254	0.101	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	50	14	3
15	Dhundgesangu chock park	28.18749	83.9966	0.098	2	1	1	1	3	1	1	3	1	2	1	2	1	1	1	2	2	2	1	75	1	1
15	Dhwareko Kharbari	28.16985	84.0022	22.735	2	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
15	Dumping site	28.16467	84.0096	4.473	1	1	1	1	2	2	2	1	2	2	2	2	2	2	2	2	2	2	2	11	29	8
15	Foresty Campus (Banpale)	28.18843	83.9883	30.461	2	3	2	1	1	1	1	3	1	2	2	2	1	2	2	2	2	2	1	10	5	1

15	Galeshwor chok park	28.18485	84.0039	0.269	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	30	3	1
15	Galeshwor Shivalaya	28.18239	84.0044	0.252	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	150	14	3
15	Miteri village park	28.19616	83.9843	0.277	1	1	1	1	3	2	1	3	1	2	1	2	1	1	1	2	2	2	2	40	1	1
15	Rete Khola	28.17739	83.9973	8.461	2	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
15	Sidheshwor Panchayan	28.18646	83.9961	0.277	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	100	13	3
15	Sukleswhor temple area	28.19827	83.9854	0.318	1	1	1	1	2	2	1	3	1	1	2	1	1	1	1	2	2	1	1	150	14	3
15	Thati	28.18528	83.9943	0.071	2	1	1	1	3	1	2	3	2	1	2	1	2	1	2	2	2	2	2	40	6	1
15	Tutunga open space	28.17962	83.9928	1.183	1	3	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	5	1
15	Ward Park Kolpatan	28.19518	83.9963	0.175	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	40	6	1
16	Armala viewpoint	28.34024	84.002	0.239	2	1	2	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	22	5
16	Bat cave	28.26773	83.9756	0.359	2	1	1	1	3	1	1	3	1	1	1	1	1	2	1	2	2	1	1	200	23	6
16	Deep United park	28.25106	83.9794	1.275	1	1	1	1	2	1	1	3	1	2	2	2	1	2	1	2	2	2	1	100	1	1
16	Jaubari Reservoir	28.2488	83.9833	1.937	1	1	2	1	2	2	1	3	1	2	2	2	2	2	2	2	2	1	2	11	18	4
16	Mahendra cave	28.272	83.9796	1.211	2	1	1	1	3	1	1	1	1	1	1	1	1	1	1	2	1	1	590	23	6
16	Maidan open space	28.26819	83.979	0.055	1	2	1	1	2	1	2	3	2	2	2	2	2	2	2	2	2	2	2	60	6	1
16	Seti gorge park	28.2457	83.9893	0.203	2	1	1	1	3	2	1	3	1	2	1	1	1	2	1	2	2	2	1	132	25	7
17	Dobilla Picnic spot	28.16373	84.0023	0.367	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	30	30	8
17	Dovilla Ghat	28.16295	84.0081	1.468	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	80	27	7
17	Golf playground	28.19827	83.9712	1.79	1	1	1	1	2	1	1	1	1	2	2	1	2	1	2	1	2	1	1	25	7	2
17	Gupteshwor cave	28.18913	83.9577	0.155	2	1	1	1	2	1	1	1	1	2	1	1	1	2	2	2	2	1	1	550	23	6
17	Harihar Dham (Birauta)	28.18798	83.9646	1.514	1	2	2	2	2	1	1	3	2	1	2	2	2	2	2	2	2	2	2	10	14	3
17	Housing complex park	28.19411	83.9724	0.111	1	2	1	1	2	1	1	3	1	2	2	2	1	2	2	2	1	1	2	150	1	1
17	Machhapuchre park (FRP)	28.19627	83.9689	0.477	1	1	1	2	1	1	1	3	1	1	1	1	1	2	1	2	2	1	1	150	3	1
17	Martyrs park	28.2011	83.9695	0.794	1	1	1	1	3	1	1	3	1	2	1	2	1	1	1	2	2	1	1	153	4	1
17	Mhatgauda Picnic spot	28.17363	83.9877	3.434	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	40	30	8
17	Mountain museum park	28.18934	83.9817	3.344	1	3	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2	1	1	200	5	1
17	Osho Upaban	28.166	84.0016	1.674	1	1	1	1	3	2	1	3	1	1	1	1	1	1	1	1	2	1	1	35	14	3
17	Davis' fall (Patle chhago)	28.18998	83.9591	0.538	2	1	1	1	2	2	1	1	1	1	1	1	1	1	1	2	2	1	1	450	19	4
17	Phew dem park	28.19736	83.9695	0.159	1	1	1	1	3	2	2	3	1	2	1	2	1	2	2	2	2	2	1	227	1	1
17	Phewa powerhouse water Fall	28.18036	83.9715	0.038	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	150	19	4
17	Phewa Power house park east	28.18128	83.9719	0.409	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	1	50	6	1
17	Phursekhola Picnic spot	28.184	83.9535	0.691	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	25	30	8
17	Phewa Powerhouse park west	28.18175	83.9709	0.19	2	1	1	1	3	2	1	3	1	2	1	1	1	2	2	2	2	2	1	150	1	1
17	Playground Tibetian Camp	28.18843	83.9567	0.666	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	100	10	2
17	Powerhouse Picnic spot	28.17977	83.9705	0.487	1	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	30	30	8
17	Powerhouse playground	28.18055	83.9699	0.516	1	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	75	10	2

17	Rammandir Birauta	28.19051	83.9704	0.125	1	1	1	1	2	1	1	3	1	1	1	1	1	1	2	2	2	1	1	250	14	3
17	Ratopahiro green space	28.18749	83.9854	13.785	2	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	2	1
17	Sahara playground	28.1644	84.0055	1.306	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	2	2	2	1	70	8	2
17	Thaune Ghat	28.1919	83.9834	0.254	2	1	1	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	26	7
18	Bhimsen Dahal S. Pratisthan	28.23094	83.9763	0.642	2	1	1	1	3	1	1	3	2	2	2	2	2	2	2	2	2	2	2	100	2	1
18	Lovely Hill	28.22868	83.979	7.375	2	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	168	6	1
18	Sarangkot P.G. flight area	28.24294	83.9488	0.555	2	1	1	1	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	89	11	2
18	Sarangkot viewpoint	28.24586	83.9485	0.641	2	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	2	1	1	372	20	5
19	Akala temple Tallo	28.26705	83.9646	0.275	1	1	1	1	3	1	1	3	1	1	2	1	1	1	1	2	2	2	1	100	14	3
19	Gharmi viewpoint	28.27192	83.9719	0.304	2	1	1	1	2	2	1	3	2	2	2	2	1	1	1	2	2	2	2	10	21	5
19	Kaule religious site	28.29826	83.968	2.355	2	1	1	1	1	1	1	3	2	1	1	1	1	1	1	2	2	1	1	150	14	3
19	Kaure cave	28.29779	83.9671	0.105	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	5	24	6
19	Kaure Gumba	28.29939	83.9584	0.367	2	1	1	1	3	1	1	3	1	1	1	1	1	1	1	2	2	1	1	10	14	3
19	Kaure pond	28.29921	83.9662	0.068	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	2	10	17	4
19	Marks study center (PatiGhari)	28.27088	83.9683	1.731	1	1	1	1	3	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
19	Martyrs park	28.26391	83.9738	0.094	1	1	1	1	3	1	1	3	1	2	2	2	2	2	2	2	2	2	2	50	4	1
19	Mnai Puranchour	28.29284	83.9477	1.009	1	2	1	1	3	2	1	3	1	1	1	1	1	1	1	2	2	2	2	25	6	1
19	Alka park	28.26278	83.9619	3.986	1	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	6	1
19	Raikar open space	28.29288	83.9397	0.071	1	2	1	1	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	100	6	1
19	Takmela open field	28.30428	83.9749	2.182	2	3	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	6	1
19	Thati park	28.30968	83.9585	0.077	1	2	1	1	3	2	2	3	2	2	2	2	2	2	2	2	2	2	2	50	30	8
20	Birendra cave	28.24748	84.0057	0.021	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	24	6
20	Devi temple	28.25281	84.0072	0.426	2	1	1	1	2	2	1	3	1	2	2	2	1	1	2	2	2	2	1	100	14	3
20	Gagham cave	28.2757	84.0361	1.536	2	1	1	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	24	6
20	Harihar religious site	28.25572	83.9933	2.191	1	1	1	1	1	1	1	3	1	1	1	1	1	1	1	1	2	1	1	50	13	3
20	Patan playground	28.25255	83.9952	0.294	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	85	10	2
20	Shiva temple	28.25554	84.0087	0.112	2	1	1	1	1	1	1	3	1	1	2	2	2	1	2	2	2	2	2	20	14	3
20	Upallo Patan playground	28.25449	83.9947	0.106	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	85	10	2
20	Water spring area	28.25465	84.0088	0.074	2	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
21	Annapurna park	28.16326	83.9719	0.021	2	1	1	2	2	1	1	3	2	2	2	2	1	2	2	2	2	2	1	10	1	1
21	Bamdi playground	28.16332	83.9428	0.153	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	40	10	2
21	Bangi Pokhari	28.15441	83.994	0.045	1	1	1	1	2	1	2	3	2	2	2	2	2	2	2	2	2	2	2	20	17	4
21	Chhuchiko Gaundo Ghat	28.1616	84.02	1.721	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	60	27	7
21	Dandi Pokhari	28.1471	84.013	0.237	2	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	10	2
21	Jaldevi playground	28.14701	83.9958	0.187	2	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	25	9	2
21	Manakamana temple	28.17399	83.9571	0.243	2	1	1	1	2	1	1	3	1	2	2	2	1	1	1	2	2	2	1	50	14	3
21	Mattikhan Kot	28.16072	83.931	1.607	2	1	1	2	1	1	1	3	1	2	2	2	1	1	1	2	2	2	2	20	14	3
21	Mattikhan view tour	28.16048	83.9273	0.459	2	1	1	2	2	1	1	3	1	2	2	2	1	1	2	2	2	2	2	45	21	5

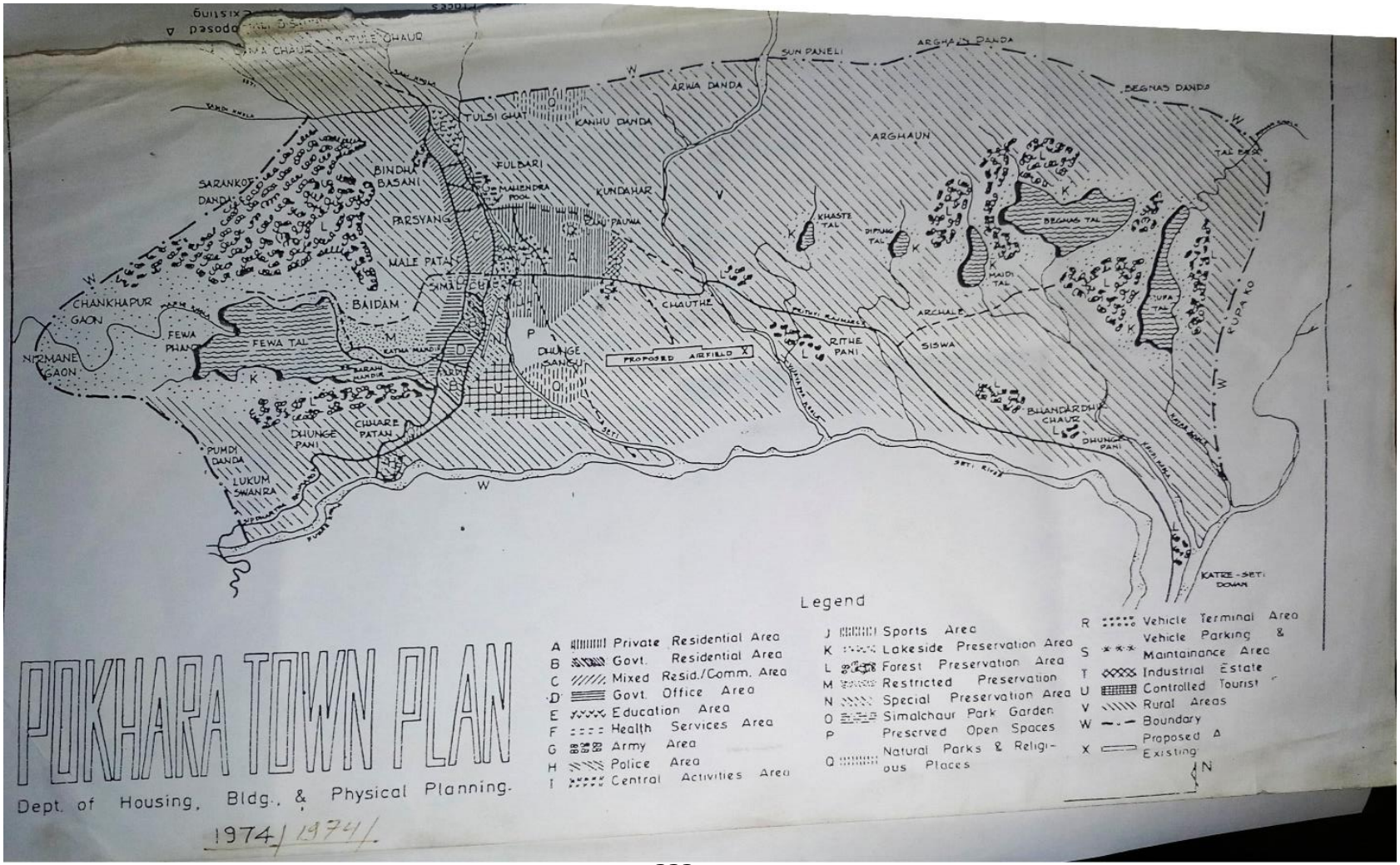
21	Phoksing Kot	28.15927	83.9767	0.106	2	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	1	35	21	5
21	Phoksing viewpoint	28.16132	83.9726	0.084	2	1	1	2	2	2	1	3	2	2	1	2	2	2	2	2	2	2	2	10	22	5
21	Puspalal Study center/ park	28.17124	83.9912	2.25	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
21	Shiba Dhunga (Janti Kiche Stone)	28.16114	83.9372	0.074	2	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	13	3
21	Thamadanda viewpoint	28.16482	83.9613	0.285	2	1	1	2	3	2	1	3	2	2	2	2	1	2	1	2	2	2	2	10	22	5
22	Bhulbhule	28.19383	83.9244	4.178	2	1	1	1	3	2	1	3	2	1	2	2	2	2	2	2	2	2	2	20	6	1
22	Puumdi Kot	28.20227	83.9227	0.61	2	1	1	2	2	2	1	3	2	1	2	1	1	1	2	2	2	2	2	40	22	5
22	Kodi Danda	28.19691	83.9444	7.412	2	1	1	1	3	1	1	3	1	2	2	2	2	2	2	2	2	2	2	100	6	1
22	Odare Chour	28.20436	83.9205	1.155	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
22	Pokhara viewpoint	28.18818	83.9313	0.099	2	1	1	1	3	2	1	3	2	2	1	2	1	1	2	2	2	2	1	125	21	5
22	Terso lake	28.20906	83.8707	8.182	2	1	1	2	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
22	Ward area open space	28.20805	83.9117	3.861	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	1	20	6	1
22	World Botanical Garden	28.20016	83.9562	165.528	2	1	1	1	1	1	1	3	1	2	1	2	2	2	2	2	2	2	1	105	2	1
22	World Peace Pagoda	28.20086	83.9451	1.903	2	1	1	1	2	1	1	3	1	1	1	1	1	1	1	1	1	1	1	680	12	3
23	Aaiselu Chour park	28.23051	83.8287	0.777	2	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
23	Bat cave Tamagi	28.25372	83.8306	0.028	2	1	1	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	5	24	6
23	Deurali temple	28.22455	83.8263	0.089	2	1	1	2	2	2	1	3	2	1	2	2	2	1	2	2	2	2	2	30	14	3
23	Stupa Tamagi	28.25337	83.8333	0.020	2	1	1	2	2	1	1	3	1	2	2	2	2	1	2	2	2	2	2	10	14	3
23	Harpan Kot (Purpose park)	28.25176	83.8625	0.039	2	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
23	Phewa wetland	28.22492	158.44	161.109	1	1	1	2	2	2	2	1	2	1	1	1	1	1	1	1	2	1	2	6	32	8
23	Play Ground Bamadi	28.23897	83.8881	0.181	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	1	50	9	2
23	Tamagi viewpoint	28.25392	83.8244	0.128	2	1	1	2	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	22	5
24	Ghakri Sthan	28.2689	83.908	0.085	2	1	1	2	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	13	3
24	Gupta Kalika temple	28.27217	83.9045	0.212	2	1	1	2	2	1	1	3	1	2	1	1	1	1	2	2	2	2	1	50	13	3
24	Kasyap lake (Thuli Pokhari)	28.26662	83.9082	0.912	1	1	1	1	2	2	1	3	2	1	2	2	2	2	2	2	2	2	2	30	16	4
24	Khadka village pond	28.27498	83.8935	0.14	1	1	1	1	2	1	2	3	2	2	2	2	2	2	2	2	2	2	2	50	17	4
24	Maghthum Tapoban	28.24677	83.8782	2.122	2	1	1	1	1	1	1	3	1	1	1	1	1	1	1	2	2	1	2	100	13	3
24	Maula pond	28.26821	83.9047	0.153	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	17	4
24	Phulpati Selaune temple	28.26647	83.9162	0.022	2	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	10	14	3
24	Purposed park area	28.26691	83.9087	0.389	2	1	1	2	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	25	6	1
24	Sani (Pokhari) pond	28.27033	83.9042	0.153	1	1	1	1	2	1	2	3	2	2	2	2	2	2	2	2	2	2	2	20	17	4
24	Sarang playground	28.26797	83.9043	0.721	1	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	50	9	2
24	Shiva temple	28.26593	83.908	0.342	1	1	1	1	2	1	1	3	1	2	2	2	2	1	2	2	2	1	1	20	14	3
25	Babiya Tahara Ghat	28.27395	83.9543	1.098	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	27	7
25	Bishnu Paduka temple	28.27835	83.9383	0.075	1	1	1	1	2	1	1	3	2	1	1	1	1	1	2	2	2	1	1	35	14	3
25	Danda Surka temple	28.28565	83.9325	0.137	2	1	1	2	2	2	1	3	2	1	1	1	1	1	2	2	2	2	2	10	14	3

25	Dovilla Ghat (Mardi)	28.29041	83.9345	1.111	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	27	7
25	Gauri Sankar playground	28.28063	83.9387	1.002	1	3	1	1	2	1	2	3	2	2	2	2	2	2	2	2	2	2	1	200	9	2
25	Hemja cave	28.26358	83.9475	0.159	2	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	5	24	6
25	Hemje Gumba	28.25701	83.9609	1.777	1	1	1	1	2	1	1	3	1	1	1	1	1	1	1	2	2	1	1	50	14	3
25	Jaisi Chour	28.25894	83.9598	1.529	1	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	2	50	6	1
25	Mani Ghat	28.28127	83.9462	0.574	2	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	27	7
25	Matrikeshwor temple	28.28086	83.9279	0.052	2	1	1	2	2	2	1	3	2	1	2	1	1	1	1	2	2	2	2	20	14	3
25	Melbote park	28.28453	83.9331	0.41	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
25	Radha Krishna Temple	28.26978	83.9498	0.066	1	1	1	1	2	2	1	3	2	1	2	1	1	1	2	2	2	1	1	20	14	3
25	Tulasitra Ghat	28.28749	83.9366	0.424	2	1	1	1	3	2	1	3	2	2	2	2	2	1	2	2	2	2	2	150	27	7
26	Chandi temple	28.21029	84.0391	0.469	2	1	1	1	3	1	1	3	2	1	2	1	1	1	2	2	2	2	1	10	14	3
26	Gunde lake	28.19155	84.0414	8.914	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	30	16	4
26	Khaste lake	28.19454	84.0506	11.821	1	1	1	1	2	2	2	3	2	2	1	2	1	1	2	2	2	2	2	13	16	4
26	Niureni lake	28.19156	84.0486	3.825	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	35	16	4
27	Dharapani Chour	28.18915	84.0615	1.403	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
27	Dipang lake	28.18069	84.0696	12.128	1	1	1	1	2	2	2	3	2	2	2	2	1	2	2	2	2	2	2	50	16	4
27	Dipang wetland	28.17946	84.0686	3.267	1	1	2	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	32	8
27	Phalnu Khane Chour	28.18801	84.062	0.394	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	6	1
28	Durako Rukh open space	28.19907	84.0775	0.151	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
28	Kalika pond	28.21414	84.074	0.167	1	1	1	1	2	1	2	3	1	2	2	2	2	2	2	2	2	2	2	10	17	4
28	Kalika temple	28.21378	84.0742	0.089	1	1	1	1	3	2	1	3	2	1	2	2	1	2	2	2	2	1	1	15	14	3
28	Kaule Danda park	28.20763	84.0821	3.384	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
28	Manakamna temple	28.21009	84.1045	0.088	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	14	3
28	Shiva temple	28.20402	84.1122	0.144	2	1	1	1	2	2	1	3	2	2	2	2	1	1	2	2	2	2	2	10	14	3
28	Sunpandali	28.22019	84.0543	0.113	1	1	1	1	2	1	2	3	1	1	1	1	1	1	1	2	2	1	1	20	14	3
28	Thulakot viewpoint	28.21209	84.0824	1.052	2	1	1	2	2	2	1	3	2	1	2	1	1	1	2	2	2	2	2	19	21	5
29	Bhandardhik playground	28.14947	84.0664	2.657	2	1	1	1	2	1	1	3	1	2	2	2	2	2	2	2	2	2	1	120	8	2
29	Chirgadi Ghat	28.14916	84.0504	0.895	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	27	7
29	Kuile viewpoint	28.15461	84.0734	2.278	2	1	1	1	3	1	1	3	2	2	1	2	2	2	2	2	2	2	2	12	21	5
29	Narmadeshwor temple	28.14738	84.0539	0.988	2	1	1	1	3	2	1	3	2	2	1	2	1	1	2	2	2	2	1	10	14	3
29	Pandit Danda open space	28.15333	84.0716	3.908	2	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	2	2	2	20	6	1
29	Parbati temple	28.16734	84.0732	0.065	1	1	1	1	2	1	1	3	1	1	1	1	1	1	2	1	2	1	1	30	14	3
30	Gahte playground	28.1461	84.0873	0.525	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	20	9	2
30	Maidi lake	28.17696	84.0816	0.719	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	16	4
30	Maidi wetland	28.17675	84.0819	10.31	1	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	32	8
30	Manakamna temple	28.17034	84.0806	2.086	1	1	1	1	2	1	1	3	1	1	2	2	1	1	1	2	2	2	1	45	14	3
30	Temple	28.16541	84.0774	0.669	2	1	1	1	2	2	1	3	2	2	2	2	1	1	2	2	2	2	1	15	14	3
31	Begnas Kot	28.19224	84.1151	0.095	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	22	5
31	Begnas lake	28.17468	84.0999	305.267	1	1	1	1	2	2	1	1	2	1	1	2	1	2	2	1	2	2	2	550	15	4
31	Begnas wetland	28.1905	84.0965	5.651	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	32	8

31	Deurali park	28.18594	84.1247	0.861	2	1	1	1	2	1	1	3	2	2	2	2	2	2	2	2	2	2	2	15	6	1
31	Gorakhnath temple	28.15351	84.0933	0.395	2	1	1	1	2	1	1	3	2	1	2	1	1	1	2	2	2	2	1	50	13	3
31	Kandel Tundo	28.18084	84.0979	2.318	2	1	1	2	1	2	1	3	2	1	2	2	2	2	2	2	2	2	2	20	2	1
31	Purposed Zoo	28.15007	84.1036	134.281	2	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	2	1
31	Rupa lake	28.15221	84.1123	108.923	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	15	4
31	Sundari Danda viewpoint	28.16654	84.1168	0.103	2	1	1	1	3	1	1	3	1	2	2	1	1	1	2	1	2	2	2	55	21	5
31	Sunil Pata	28.19134	84.11	6.346	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
31	Thulipokhari	28.18604	84.1249	0.123	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	10	17	4
32	Martyrs park	28.09344	84.077	2.559	1	1	1	1	3	1	2	3	2	2	2	2	2	2	2	2	2	2	1	50	4	1
32	Shyaltara playground	28.11144	84.1031	0.463	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	40	10	2
32	Sita cave	28.14182	84.097	0.021	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	5	24	6
33	Adaita Pramhansa Sasntha	28.14043	84.0202	0.251	2	1	1	1	3	1	1	3	1	1	2	1	2	1	2	2	2	2	1	20	30	8
33	Amma Chour	28.15264	84.043	3.142	1	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	6	1
33	Bagmara park	28.1439	84.0436	0.387	1	1	1	1	2	1	2	3	2	2	2	2	2	1	2	2	2	2	2	50	6	1
33	Barpandethum viewpoint	28.13401	84.0317	0.18	2	1	1	2	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	15	22	5
33	Bharatpokhari p. ground	28.13526	84.0296	0.065	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	20	9	2
33	Golatarnga Gairegaun	28.13875	84.0233	0.056	2	1	1	1	3	2	1	3	1	2	2	2	2	2	2	2	2	2	2	20	6	1
33	Hundikot	28.12578	84.047	0.639	2	1	1	2	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	10	22	5
33	Shiva temple	28.14535	84.0531	0.095	1	1	1	1	2	1	1	3	1	2	2	1	1	1	2	2	2	2	1	30	13	3
33	Tallo Pundi open space	28.08772	84.0742	4.953	2	1	1	1	2	2	1	3	2	2	2	2	2	2	2	2	2	2	2	20	6	1
33	Tallo Pundi playground	28.08499	84.0719	3.143	1	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	40	9	2
33	Sidheshwir cave	28.1331	84.0658	0.687	2	1	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	5	24	6
River strip	Bijayapur Khola	28.21274	84.0429	75.813	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	150	28	7
	Harpan Khola	28.2413	83.8865	131.53	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	25	7
	Kalikhola	28.25912	83.9899	34.659	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	50	25	7
	Khudi and Kotre Khola	28.11629	84.1015	108.434	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	100	25	7
	Phusre Khola	28.17866	83.9641	99.912	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	240	28	7
	River Seti Gandaki	28.1818	84.018	310.884	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	500	28	7
	Suraudi Khola	28.11589	84.0056	57.125	2	1	1	1	3	2	1	3	2	2	2	2	2	2	2	2	2	2	2	80	28	7
																								24455		

Appendix XIV

Historical Sketch Map with POS (Pokhara Town Plan, 1974)



Appendix XV_a

Nearst Nerighbor Index (NNI)

Formula: $$NNI = 2 \times 125.07 \sqrt{\frac{275}{464.24}} = 0.700$$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{0.4548}{0.5\sqrt{\frac{464.24}{274}}} = 0.700$$

Average Nearest Neighbour

Ratio = $$ANN = \frac{0.4548}{0.650} = 0.700$$

The Z_{AAN} - Score for the statistic is calculated as:

Z score:

$$z = \frac{\overline{D}_O - \overline{D}_E}{SE}$$

$D_O - D_E$ = 0.4548 – 0.650 = 0.1949

Standard Error:

$$SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{75625}{464.24}}} = 0.2048$$

$$Z_{AAN} = \frac{0.1949}{0.2048} = -9.515$$

Observed Mean Distance:	454.7999 Meters
Expected Mean Distance:	756.5732 Meters
Nearest Neighbor Ratio:	0.601131
z-score:	-12.653981
p-value:	0.000000
Average Nearest Neighbor Summary	
Input Feature Class:	Public open Space
Distance Method:	EUCLIDEAN
Study Area:	629643375.924316
Selection Set:	False
Dataset Information	

Appendix XV_b

Nearest Neighbor Index (NNI) Park

Formula: $$NNI = 2 \times 0.78\sqrt{\frac{97}{464.24}} = 0.71$$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{0.78}{0.5\sqrt{\frac{464.24}{96}}} = 0.70$$

Average Nearest Neighbour

Ratio = $$ANN = \frac{0.78}{1.03} = 0.76$$

The Z_{AAN} – $$Z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$$

Score for the statistic is calculated as:

Z score: $D_O - D_E = 0.78 - 1.03 = -0.25$

Standard Error: $$SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{9409}{464.24}}} = 0.058$$

$$Z_{AAN} = \frac{-0.25}{0.058} = -4.31$$

Average Nearest Neighbor Summary

Observed Mean Distance:	777.3225 Meters
Expected Mean Distance:	1033.4923 Meters
Nearest Neighbor Ratio:	0.752132
z-score:	-4.694232
p-value:	0.000003

Average Nearest Neighbor Summary

Input Feature Class:	Park
Distance Method:	EUCLIDEAN
Study Area:	418697651.396724
Selection Set:	False

Dataset Information

Appendix XV_c

Nearest Neighbor Index (NNI) Playground

Formula: $NNI = 2 \times 1.823 \sqrt{\frac{27}{464.24}} = 0.879$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{1.823}{0.5\sqrt{\frac{464.24}{26}}} = 0.863$$

Average Nearest Neighbour

Ratio = $ANN = \frac{1.823}{1.567} = 1.163$

The Z_{AAN} – $z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$

Score for the statistic is calculated as:

Z score: $D_O - D_E = 1.823 - 1.567 = 0.256$

Standard Error: $SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{667}{464.24}}} = 0.218$

$$Z_{AAN} = \frac{-0.256}{0.216} = 1.185$$

Average Nearest Neighbor Summary

Observed Mean Distance:	1823.5874 Meters
Expected Mean Distance:	1567.2005 Meters
Nearest Neighbor Ratio:	1.163595
z-score:	1.626238
p-value:	0.103899

Average Nearest Neighbor Summary

Input Feature Class:	Playground
Distance Method:	EUCLIDEAN
Study Area:	265260677.145029
Selection Set:	False

Dataset Information

Appendix XV_d

Nearest Neighbor Index (NNI) Religious site

Formula: $NNI = 2 \times 0.893\sqrt{\frac{69}{464.24}} = 0.68$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{0.893}{0.5\sqrt{\frac{464.24}{68}}} = 0.67$$

Average Nearest Neighbour

Ratio = $ANN = \frac{0.893}{1.210} = 0.74$

The Z_{AAN} – $z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$

Score for the statistic is calculated as:

Z score: $D_O - D_E = 0.893 - 1.210 = -0.317$

Standard Error: $SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{4489}{464.24}}} = 0.084$

$$Z_{AAN} = \frac{-0.317}{0.084} = -3.77$$

Average Nearest Neighbor Summary

Observed Mean Distance:	893.9522 Meters
Expected Mean Distance:	1210.7343 Meters
Nearest Neighbor Ratio:	0.738355
z-score:	-4.127596
p-value:	0.000037

Average Nearest Neighbor Summary

Input Feature Class:	Religious sites
Distance Method:	EUCLIDEAN
Study Area:	398718687.832848
Selection Set:	False

Dataset Information

Appendix XV_e

Nearest Neighbor Index (NNI) Water surface

Formula: $NNI = 2 \times 1.814\sqrt{\frac{22}{464.24}} = 0.79$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{1.814}{0.5\sqrt{\frac{464.24}{21}}} = 0.77$$

Average Nearest Neighbour

Ratio = $ANN = \frac{1.814}{1.83} = 0.991$

The Z_{AAN} –

$$z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$$

Score for the statistic is calculated as:

Z score:

$D_O - D_E$ = 1.814– 1.83 = - 0.016

Standard Error: $SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{441}{464.24}}} = 0.268$

$$Z_{AAN} = \frac{-0.016}{0.268} = -0.059$$

Average Nearest Neighbor Summary

Observed Mean Distance:	1814.4587 Meters
Expected Mean Distance:	1830.3954 Meters
Nearest Neighbor Ratio:	0.991293
z-score:	-0.078126
p-value:	0.937728
Average Nearest Neighbor Summary	
Input Feature Class:	Water surface
Distance Method:	EUCLIDEAN
Study Area:	294830562.356923
Selection Set:	False
Dataset Information	

Appendix XV_f

Nearest Neighbor Index (NNI) Viewpoint

Formula: $$NNI = 2 \times 3.409\sqrt{\frac{17}{464.24}} = 1.3$$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{3.409}{0.5\sqrt{\frac{464.24}{16}}} = 1.27$$

Average Nearest Neighbour

Ratio = $$ANN = \frac{3.409}{2.646} = 1.288$$

The Z_{AAN} – $$z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$$

Score for the statistic is calculated as:

Z score:

D_O - D_E = 3.409– 2.646 = 0.763

Standard Error: $$SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{256}{464.24}}} = 0.352$$

$$Z_{AAN} = \frac{0.763}{0.352} = 2.167$$

Average Nearest Neighbor Summary

Observed Mean Distance:	3409.3232 Meters
Expected Mean Distance:	2646.9481 Meters
Nearest Neighbor Ratio:	1.288020
z-score:	2.271845
p-value:	0.023096

Average Nearest Neighbor Summary

Input Feature Class:	Viewpoint
Distance Method:	EUCLIDEAN
Study Area:	476430715.135650
Selection Set:	False

Dataset Information

Appendix XV_g

Nearest Neighbor Index (NNI) Cave

Formula:

$$NNI = 2 \times 4.125\sqrt{\frac{10}{464.24}} = 1.21$$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{4.125}{0.5\sqrt{\frac{464.24}{9}}} = 1.148$$

Average Nearest Neighbour

Ratio = $ANN = \frac{4.125}{2.966} = 1.39$

The Z_{AAN} –

$$z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$$

Score for the statistic is calculated as:

Z score:

$D_O - D_E$ = 4.125 – 2.966 = 1.159

Standard Error: $SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{81}{464.24}}} = 0.625$

$$Z_{AAN} = \frac{1.159}{0.625} = 1.85$$

Average Nearest Neighbor Summary

Observed Mean Distance:	4125.2183 Meters
Expected Mean Distance:	2966.6588 Meters
Nearest Neighbor Ratio:	1.390527
z-score:	2.362553
p-value:	0.018150

Average Nearest Neighbor Summary

Input Feature Class:	Cave
Distance Method:	EUCLIDEAN
Study Area:	352042573.626206
Selection Set:	False

Dataset Information

Appendix XV_h

Nearest Neighbor Index (NNI) River corridor site

Formula: $$NNI = 2 \times 2.084\sqrt{\frac{19}{464.24}} = 0.75$$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{2.084}{0.5\sqrt{\frac{464.24}{14}}} = 0.72$$

Average Nearest Neighbour

Ratio = $$ANN = \frac{2.084}{1.817} = 1.15$$

The Z_{AAN} – $$z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$$

Score for the statistic is calculated as:

Z score:

$D_O - D_E$ = 2.084– 1.817 =0.267

Standard Error: $$SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{196}{464.24}}} = 0.4$$

$$Z_{AAN} = \frac{0.267}{0.4} = 0.667$$

Average Nearest Neighbor Summary

Observed Mean Distance:	2084.9400 Meters
Expected Mean Distance:	1817.2509 Meters
Nearest Neighbor Ratio:	1.147304
z-score:	1.091421
p-value:	0.275088

Average Nearest Neighbor Summary

Input Feature Class:	River corridor sites
Distance Method:	EUCLIDEAN
Study Area:	198144054.028388
Selection Set:	False

Dataset Information

Appendix XV_i

Nearest Neighbor Index (NNI) Distinct Space

Formula: $NNI = 2 \times 1.506\sqrt{\frac{15}{464.24}} = 0.593$

The formula used to test the randomness is giiven by Clark and Evans (1954) =

$$\frac{1.506}{0.5\sqrt{\frac{464.24}{17}}} = 0.576$$

Average Nearest Neighbour

Ratio = $ANN = \frac{1.506}{1.476} = 1.02$

The Z_{AAN} – $z_{ANN} = \frac{\bar{D}_O - \bar{D}_E}{SE}$

Score for the statistic is calculated as:

Z score:

$D_O - D_E$ = 1.506– 1.476 =0.03

Standard Error: $SE = \frac{0.26136}{\sqrt{\frac{n^2}{A}}} = \frac{0.26136}{\sqrt{\frac{289}{464.24}}} = 0.33$

$$Z_{AAN} = \frac{0.03}{0.33} = 0.09$$

Average Nearest Neighbor Summary

Observed Mean Distance:	1506.9375 Meters
Expected Mean Distance:	1476.8967 Meters
Nearest Neighbor Ratio:	1.020340
z-score:	0.165093
p-value:	0.868871

Average Nearest Neighbor Summary

Input Feature Class:	Distinct space
Distance Method:	EUCLIDEAN
Study Area:	157048126.059319
Selection Set:	False

Dataset Information

Appendix XVI_a

Quadrt Analysis

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(x_i - \bar{x})^2$
0	403	0.26	103.36
1	75	0.24	18.27
2	32	2.23	71.38
3	16	6.22	99.49
4	6	12.20	73.23
5	6	20.19	121.15
7	2	42.17	84.33
8	2	56.15	112.31
9	1	72.14	72.14
∑	543	211.81	755.66

Here, Pokhara Metropolitan Area: 464.24 Km^2

Total no. of POS: 275

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{275}{543} = 0.506$

Variance (s^2) = $\frac{755.66}{542} = 1.394$

VMR = $\frac{1.394}{0.506}$ = 2.752

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(2.752-1) = 28.856$$

Appendix XVI_b

Quadrat Analysis (Parks)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(x_i - \bar{x})^2$
0	480	0.03	15.32
1	42	0.67	28.33
2	13	3.32	43.13
3	5	7.96	39.80
4	1	14.60	14.60
5	2	23.25	46.49
$\sum$	543	49.83	187.67

Total no. of POS: 97

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{97}{543} = 0.178$

Variance (s^2) = $\frac{187.67}{542} = 0.346$

VMR = $\frac{0.346}{0.178}$ = 1.938

$$z = \left(\sqrt{\frac{543 - 1}{2}}\right)(1.938 - 1) = -15.44$$

Appendix XVI_c

Quadrat Analysis (Playground)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(x_i - \bar{x})^2$
0	519	0.00	0.00
1	21	1.00	21.00
2	3	4.00	12.00
$\sum$	543	5.00	33.00

Total no. of POS: 27

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{27}{543} = 0.05$

Variance (s^2) = $\frac{33}{542} = 0.06$

VMR = $\frac{0.06}{0.05}$ = 1.224

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(1.224-1) = 3.695$$

Appendix XVI_d

Quadrat Analysis (Religious sites)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(xi - \bar{x})^2$
0	490	0.02	7.91
1	40	0.76	30.48
2	11	3.51	38.59
3	2	8.25	16.51
$\sum$	543	12.54	93.49

Total no. of POS: 69

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean $(\bar{x}) = \frac{69}{543} = 0.127$

Variance $(s^2) = \frac{93.49}{542} = 0.0234$

$VMR = \frac{0.0234}{0.127} = 0.182$

$$z = \left(\sqrt{\frac{543 - 1}{2}}\right)(0.182 - 1) = -13.468$$

Appendix XVI_e

Quadrat Analysis (Water surface)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(xi - \bar{x})^2$
0	526	0.00	0.79
1	15	0.92	13.86
3	2	8.77	17.54
∑	543	9.68	33.11

Here, Pokhara Metropolitan Area: 464.24 Km^2

Total no. of POS: 21

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{21}{543} = 0.038$

Variance (s^2) = $\frac{33.11}{542} = 0.0178$

VMR = $\frac{0.0178}{0.038}$ = 0.462

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(0.462-1) = -8.847$$

Appendix XVI_f

Quadrat Analysis (Viewpoint)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates (x_i - $\bar{x}$)^2	Total Deviates f(xi - $\bar{x}$)^2
0	526	0.00	0.52
1	17	0.94	15.95
$\sum$	543	0.94	16.47

Total no. of POS: 17

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{17}{543} = 0.0313$

Variance (s^2) = $\frac{16.47}{542} = 0.00173$

VMR = $\frac{0.00173}{0.0313}$ = 0.05536

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(0.0553-1) = -15.55$$

Appendix XVI_g

Quadrat Analysis (Cave)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(xi - \bar{x})^2$
0	533	0.00	0.18
1	10	0.96	9.64
$\sum$		0.96	9.82

Total no. of POS: 10

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean $(\bar{x}) = \frac{10}{543} = 0.0184$

Variance $(s^2) = \frac{9.82}{542} = 0.00178$

VMR = $\frac{0.00178}{0.0184}$ = 0.0965

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(0.0965 - 1) = -14.872$$

Appendix XVI_h

Quadrat Analysis (River corridor site)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(xi - \bar{x})^2$
0	529	0.00	0.65
1	13	0.93	12.11
2	1	3.86	3.86
∑	543	4.79	16.62

Total no. of POS: 19

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean $(\bar{x}) = \frac{19}{543} = 0.035$

Variance $(s^2) = \frac{16.62}{542} = 0.00884$

$VMR = \frac{0.00884}{0.035} = 0.252$

$$z = \left(\sqrt{\frac{543 - 1}{2}}\right)(0.252 - 1) = -12.301$$

Appendix XVI_i

Quadrat Analysis (Distinct space)

POS Per Quadrat (x)	No. Quadrat Cell (f)	Cell Deviates $(x_i - \bar{x})^2$	Total Deviates $f(xi - \bar{x})^2$
0	529	0.00	0.40
1	11	0.95	10.40
2	2	3.89	7.78
3	1	8.84	18.58
$\sum$	543	13.67	37.17

Here, Pokhara Metropolitan Area: 464.24 Km^2

Total no. of POS: 15

Total Quadrat (*m*): 543 (Cell size 1000x1000m)

Degree of freedom (*df*) = *m*-1 = 542

Mean ($\bar{x}$) = $\frac{15}{543} = 0.0276$

Variance (s^2) = $\frac{37.17}{542} = 0.0252$

VMR = $\frac{0.0252}{0.0276}$ = 0.913

$$z = \left(\sqrt{\frac{543-1}{2}}\right)(0.913-1) = -1.43$$

Appendix XVII: Photos

(PC: Sabitri Devi Pokharel/Pragya Pokharel/Aayush Pokharel)

Plate 1: Basundhara Park

Plate 2: Lovely Hill

Plate 3: Phewa Demside Park

Plate 4: Martyrs Park, Sahid Chock

Plate 5: Mountain Measum Park

Plate 6: World Botanical Garden

Plate 7: Amarsingh Playground

Plate 8: Bhandardhik Playground (Cultural Fair)

Plate 9: Pokhara Stadium 2018

Plate 10: Pokhara Stadium 2020

Plate 11: Sarangkot Recration Area (Paragliding)

Plate 12: Simpani Playground

Plate 13: Bhadrakali Temple Premises

Plate 14: Kedareshwor Temple

Plate 15: World Peace Pagoda

Plate 16: Jaubari Reservoir

Plate 17: Kamal Pokhari

Plate 18: Khaste Lake

Plate 19: Phewa Lake

Plate 20: Davi's Fall

Plate 21: Khuile Viewpoint

Plate 22: Sarangkot Viewpoint (Inetrview with Forigners)

Plate 23: Thulakot Viewpoint

Plate 24: Mahendra Cave Premise

Plate 25: Sita Cave Premises

Plate 26: Cemetry at Seti River

Plate 27: Interview with Associate Professor (Ramghat)

Plate 28: Seti Gorge

Plate 29: Dumping Site

Plate 30: Jayakot (Karki Danada) Premises

Plate 31: Phew Wet Land

Plate 32: Pradrasani Kendra, Nayabazar (Trade Fair)