

Open space: Typology and distribution in Pokhara Lekhnath metropolitan city

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Open space is essential part of city life because it provides an opportunity for recreation, playing, religious activities, political activities, cultural activities and so on. This paper discusses the types of open space and its distribution in Pokhara Lekhanath Metropolitan City (PLMC). An inventory of open spaces was prepared based on the available analog maps with intensive field verification. There are eight major and 32 subtypes of open spaces with a total number of 246 within the PLMC. The main types of open spaces are park, playground, religious site, water surface, cave, aesthetic view point, river strip and messy places. Those open spaces vary in form, size, ownership and functions. The distribution of open spaces is not uniform among the 33 Wards in the Pokhara Lekhanath Metropolitan City. The number of open space varies from only one to twenty-one and total area of open space varies from only 51 ha to 4786 ha among those Wards. Per capita area of open space ranges from 0.16 to 659 m² among those wards. In many wards, per capita area of open space is less than 9 m² which is recommended by FAO. Such a poor situation is created mainly due to the lack of public land use planning, encroachment in open space for development of infrastructure such as public buildings, and lack of knowledge about the importance of open spaces among decision makers and local people and weak capacity of local people to protect and conserve open space from encroachment.

Keywords: Open space; typology; recreation; parks; playgrounds; religious site; cave; aesthetic view point

Introduction

Open space is physically defined as a land and water that is not covered by buildings, situated within the urban area (Gold, 1980; Crange, 1982). Open spaces are places in the city where cultural diversity intermingled with natural process and conserve memory (Ward Thompson, 2002). Urban open space is that place which is open to sky (Goettsch, 2015). Similarly, public open space is defined as open space, both green spaces and hard 'civic' spaces to which there is public access (Carmona, 2003). The accessibility is basic element of open space. Accessibility can be identified by statutory access, physical access and mental or psychological access (Staeheli and Mitchell, 2008). It also refers to public access with its legality and road access, time, distance and cost.

Typology is the study of existing elements which cannot be further reduced (Sandlack and Uribe, 2010). Open spaces are classified based on theory of classification and their combination. This is used to describe a group of objects according to the similarity of form and structure (Wang, et al; 2005). Moore (1996) attempted to develop open space typologies in modern urban areas. ILAM (1996) has classified the open spaces based on the types of land use and cultural and visual features. Lynch (1981) developed a typology to categorize open space such as square, plaza, adventure places, playground, and wetland. Carr and others (1992) made a list of open space typology in twelve main types and further subdivided it into 24 categories in western European cities. Similarly, Woolley (2003) prepared an open space typology of nine main categories and 22 sub categories. Stanley, et al., (2007) delineated seven types of open spaces on the basis with mix of form, function, scale and land cover in the modern urban area. Similarly, Carmon (2012) has classified twenty types of open spaces within four typologies.

Urban open spaces are important part of the urban landscape with its specific function. It contributes the quality of urban life (Burke and Evans, 1999). It has different functions. Open spaces are also important for disaster risk management. It is often used temporarily as the place of shelter during the disasters such as earthquake, flood, landslides etc. Though open spaces are very important elements particularly in urban areas, but information about the number, size, location, function and processes of change in open space is scanty. It is in this context that this study on open spaces in Pokhara Lekhanath Metropolitan City (PLMC) was proposed. This paper discusses the typology of public open space, their use, distribution and its management situation in PLMC.

Study area

PLMC is geographically the largest metropolitan city of Nepal (in terms of administrative boundary) and it is the center of the western part of Nepal, the headquarters

of Kaski district as well as the capital of province number 4 according to recent federal restructuring of Nepal. The elevation ranges from 505 m (Kotre) to 2650 m (Armala) above sea level. The total area of PLMC is 464.94 km² and which represents 23.01 percent area of the Kaski district and 0.31 percent area of the country. The average temperature in PLMC ranges from 7°C minimum to 31°C with an annual rainfall of 3800 mm. Pokhara Lekhnath lies within mid hill of western Nepal. This city is situated on the lap of Annapurna Himalayan Range. It is surrounded by green hills. There are 9 lakes, 10 caves, Seti river gorges, several holy places, aesthetic viewpoints which are playing vital role to make city gregarious. This metropolitan has 81456 households and 402995 populations (CBS, 2011). It is divided into 33 wards (Figure 1). PLMC is also known as a multi-cultural city. It is also the most popular tourist destination of Nepal. The number of tourists visiting PLMC has been increasing from 230,000 in 2010 to 301,200 tourists in 2016 (DOT). Similarly, the growth of domestic tourists visiting PLMC is also in increasing trend. Historically, PLMC had many open spaces with considerable size.

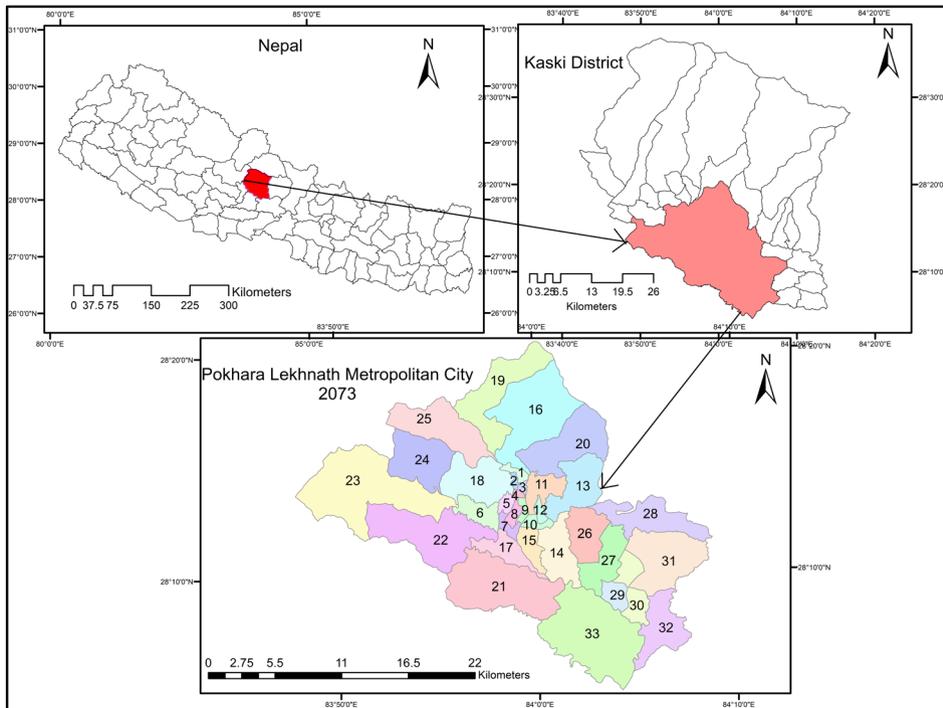


Figure 1: Location Map of Study Area

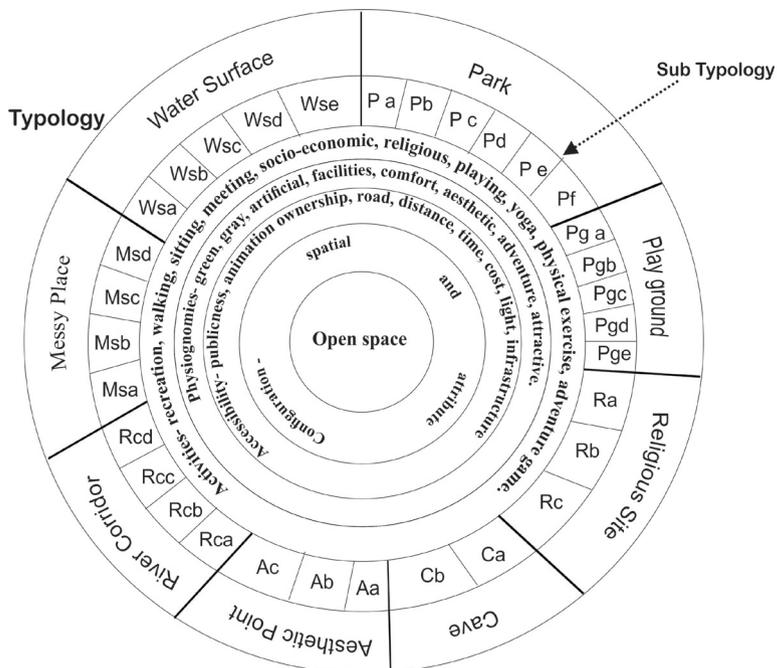
Until five decades ago, there were 26 plots of big open space called Chaur and Patan. Lamchaur, Batulchur, Simalchur, Bhimkali Patan, Malepatan, Bajhapatan, Lampatan, Gairapatan, Chhorepatan, Kolpatan, Phalepatan, Gharipatan, Majheripatan, Dhungepatan are some of the famous Patan in PLMC (Adhikari, 2004). By now, large areas of these Chours and Patans have been changed into built up areas.

Approaches and methods

Two approaches have been adopted while collecting and analysing the data. Those are inventory and classification. First of all, a reconnaissance survey was carried out in order to locate open spaces, understand their evolution processes and utilization. Based on experience from reconnaissance survey, a structured questionnaire was prepared. The questionnaire consisted questions regarding the location, size, ownership, accessibility for public use and connectivity with roads, infrastructure development, utilization and management of open space. The field work for data collection was carried out from August 2017 to October 2017 in two phases.

Recently elected Chairpersons of the respective ward office were requested to fill the form and return the completed form with signature and official stamp. After compiling the information obtained from the Chairpersons of all the wards, all the open spaces were visited with the help of local resource person for ground truthing. While visiting the place, locational information was generated with the help of the GPS (Global Positioning System). After having locational information those were plotted and overlaid into Google image (Landsat/Copernicus dated 12/14/2015) in order to prepare the polygons of open space. After preparing the polygon map, it was imported into GIS platform. ArcGIS 10.3 version was used to determine the area of each open space. In addition to these, relevant information was collected from secondary sources such as topographical map (1998), research articles, books, unpublished dissertations.

A scheme of classification of open space was developed with slight modification of the schemes proposed by Carr et al., (1992), Wolley (2003), and Addas (2015) considering the local situation of PLMC (Figure 2).



Code	Sub-typology	Code	Sub-typology	Code	Sub-typology
(Park -P) Pa	Mini park	(Religious site -R) Ra	Formal garden	(Aesthetic Point -A) Aa	Popular with high altitude
Pb	Green park	Rb	Green space	Ab	Aesthetic point less visitors
Pc	Formal garden	Rc	Open field	Ac	View point few visitors
Pd	Memorials	(Water surface -Ws) Wsa	Lakes popular	(River Corridor -Rc) Ria	Recreation
Pe	Institutional park	Wsb	Lakes	Rcb	Aesthetic
Pf	Purposed park	Wsc	Ponds	Rcc	Religious site river bank
(Play Ground -Pg) Pga	Well manage	Wsd	Waterfall	Rcd	Cemetery
Pgb	Manage	Wse	Reservoir	(Messy space- Ms) Msa	Wet land
Pgc	Poor manage	(Cave -C) Ca	Popular	Msb	Socio- economic site
Pgd	No manage	Cb	Less popular	Msc	Dumping site
Pge	Adventure			Msd	Others

Figure 2- Typology of open space in Pokhata Lekhnath Metropolitan City, 2074.

Source: Adapted form Carr et al., 1992. Woolley 2003; Addas, 2015 with slight modification.

Result and discussion

Number and types of open spaces

A total of 246 open spaces have been identified in the PLMC and the area of patches ranges from 0.0109 hectare to 4340.89 hectare. The number and the percentage of open space with their characteristics in terms of location, accessibility, ownership, and naturalness are given in Table 1. Nearly 58 percent of the total open spaces in the PLMC are located in the valley, 95 percent are accessible for all the time, 83 percent have access from the road, 93 percent are owned by the government, and 54 percent are of grey space without vegetative cover.

Table 1: Type of open spaces

Criterion	Configuration of open space	Total number	Percent
Landscape	Plain	142	57.72
	Sloppy	104	42.28
Public accessibility	All time	233	94.72
	No accessible	13	5.28
Road access	Yes	204	82.93
	No	42	17.07
Owner	Government	230	93.50
	Community & Institution	16	6.50
Naturalness	Cover by vegetation	89	37.40
	Gray space	157	54.47
	Water surface	20	8.13

Source: Field survey 2017

The open spaces in the PLMC are classified into eight-major types in terms of their attributes, function and use. Those are parks, playground, religious sites, water surface, aesthetic place, cave, river strips, and messy spaces (Table 2). The number and a brief description of their characteristics in the PLMC are given in Annex 1.

Table 2: Open space typology and their attributes;

Category/ Attribute	Parks	Play Ground	Religious Site	Water Body	Aesthetic	Cave	River Corridor	Messy Places	
Size (ha)	Tiny (< 1)	57	15	48	12	15	8	0	5
	Small (1-10)	33	10	14	3	3	2	0	6
	Medium (10-50)	3	1	0	2	0	0	0	2
	Large (> 50)	2	0	0	3	0	0	1*	1
Public Access	Open	91	26	60	19	17	10	1	7
	Closed	4	0	2	1	1	0	0	7
Ownership/ Management	Government	82	24	62	20	18	10	1	14
	Public	13	2	0	0	0	0	0	0
Management Quality	Well managed	44	2	42	5	5	3	0	2
	Poorly managed	51	9	20	15	13	7	1	12
Popularity	Highly popular	18	9	9	5	1	3	1	4
	Popular	30	10	38	6	4	2	0	6
	Less popular	47	7	15	9	13	5	0	4
Environment	Clean	82	21	62	7	12	3	1	5
	Not clean	13	5	0	13	6	7	0	9
Promise for future use	Recreation, aesthetic view point, yoga, playground, religious site, cultural and peace place, leisure time use, geological information, socio-economic activities, political activities, tourism promotion site, social wellbeing site, mental wellbeing site, etc.								

Source: Field survey 2017.

A brief description of major open spaces is given below.

Park

Park is a public place, where people meet and interact with each other, walk together, and use for social as well as private wellbeing. It provides several opportunities for the people of all age, gender, class, and religious groups. It is a place for active recreation and passive experiences with visual aesthetic resources. World Botanical Garden, Jayakot, Shantiban, Basudhara Park, Komaghane Park, martyr's parks, Puspalal park, Ganeshman park, Phewa dam park, etc. are major as well as famous parks found in PLMC.

Playground

Playground is a vital part of urban area which provides opportunities to carry out physical exercise for children and youth. Existing institutional playgrounds are not permitted

for public use. Available public access open field are used for different games. 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 PLMC there are 26 public access playgrounds. Pokhara Stadium, Bhandardhik, Saharapaly, Tundikhel, Malepatan, are major playgrounds. Among them Pokhara stadium is the largest in size and is used for various games and athletics.

Religious site

Mankind has always wanted to imitate the divine power in the physical world (Michell, 1994) thus they try to obtain the god by pilgrimages (Popi et al., 2012). Religious places are hobs of culture and civilization too. Bhadrakali, Bindabasini, Kedareswor, Matepani Gumba, Galeswor Shivalaya, Shanti Stupa, Harihar temple, Gita temple, Akala temple, are famous religious sites in PLMC.

Water surface

Water is a unique material for landscaping (Burmill et al., 1999). Water presents its aesthetic beauty to human beings generously (Campbell, 1978). It plays vital role for attraction of people. Pokhara is known as city of lakes because it has almost a dozen of lakes and several artificial ponds which are famous as recreational sites. Phewa, Begnas, Rupa are major lakes. Among them Phewa and Begnas are the most popular destination for visitors. There are some ponds basically around urban periphery.

Aesthetic points

The aesthetic value of an object is the value it possesses in virtue of its capacity to provide aesthetic gratification (Monroe, 1982). Attributes such as diversity, complexity, contrast, and variety are identified in the literature, either as formal or cognitive factors that contribute to an aesthetic experience (Ulrich, 1981). Aesthetic point gives an opportunity for pleasure. There are many sites with the panoramic view of snowcapped mountains, lakes and surrounding greenery hill in PLMC. The amazing view can be seen from these sites. Among them Sarankot, Kahun Danda, Phoksing hill, Mattikhan hill, Hundi Kot, Budha Kot, Sundari Danada are famous points. Sarangkot is the most famous for viewing Pokhara valley and close view of Macchapuchhre and Annapurna Himal.

Cave

Cave is often decorative by speleothems and it has significant recreational value. This is also the site for the establishment of religious temple which attracts millions of tourists due to its scenic environment (Hamilton, 1997). Caves are interesting geomorphological

feature. There are several mysterious caves in PLMC. The major ones are Mahendra, Gupteswor, Birendra, Kaur, Gagham, Bat caves. Some caves are long while others are quite short. Most of the caves have only one opening for its entry and exit but Gupteshwor cave is an exception with both sides opening. Mahendra, Gupteswor and Bat caves are very popular ones.

River strip

Most of the cities have been developed along river. The configuration of rivers usually results in their being equivalent to linear parks (Silva, 2004). 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. Pokhara city is developed along the Seti, Bijayapur and Phusre rivers. Seti river has diverse morphology – steep cliff with deep gorges and opening with terraces. Some sites of river bank such as Ramghat, Tulasighat, Gaighat, Sitapailaghat, Dovillaghat, are used for bathing purpose during the festivals and rituals ceremonies. Similarly, some sites of Seti river bank like Ramghat, Tulasighat, Gaighat, Sitapailaghat, Dovillaghat are used for cemetery. Bachhi Buduwa located in ward no 14 of PLCM is the main dumping site.

Messy open spaces

Massy open space includes all the areas with public, community and private ownership. These sites are not allowed to use for all as a public open space. For example, airport seem open but people can't amend it as a recreation place. Similarly, the areas used for government offices, schoolyards, hospitals, armed force yard are also seen as an open space but people do not have cognitive perception as public open space due to their inaccessibility. There are four types of messy open spaces in PLMC. Those are wetland (Phewa, Gunde, Rupa etc), sites important from socio-economic point of view such as exhibition centre, dumping site and others recreation area such as Matgaunda, Phewa Powerhouse, Begnas lake side, etc.

Distribution of open space

Table 3 shows ward-wise distribution of open spaces in PLMC. The number of open space ranged from only one to 21 among the 33 wards in PLMC (Figure 3). The area ranges of patches ranges from 0.0109 hectare to 4340.89 hectare. The space available among those wards ranges from 0.45 m² to 628.73 m² with the average per capita open space of 55.49 m². The United Nations Food and Agriculture Organization (FAO) has recommended 9 m² of open space per city dwellers as the minimum value requirement (Kuchelmeister, 1998). With this standard, ward no 1, 2, 3, 5, 7, 8, and 12 have less than this standard minimum value requirement of per capita area of open spaces. Wang and

others (2013) reported that per capita area of open space in developed countries is about 20 m². In PLMC out of 33 wards, 13 wards have per capita open space less than 20 m².

Table 3: Ward-wise distribution of open spaces

PLMC Ward	Patches Number of open spaces	Ward area (hectare)	Open space Area (hectares)	Population	Ward area in Hecator/ per 1000 Population	Open space area in Hecator/ per 1000 Population	Per capita open space (m ²)
1	5	154.54	13.85	15513	9.96	0.89	8.93
2	3	60.14	1.48	8729	6.89	0.17	1.69
3	6	63.49	6.26	9462	6.71	0.66	6.62
4	1	51.05	0.41	9119	5.60	0.04	0.45
5	4	178.42	2.37	14803	12.05	0.16	1.60
6	10	633.48	448.72	14729	43.01	30.47	304.65
7	7	197.59	2.95	12875	15.35	0.23	2.29
8	4	176.49	0.42	26080	6.77	0.02	0.16
9	2	122.46	17.97	16626	7.37	1.08	10.81
10	6	195.84	29.60	18470	10.60	1.60	16.02
11	9	697.89	29.35	14716	47.42	1.99	19.94
12	3	140.13	3.17	11613	12.07	0.27	2.73
13	12	1540.12	85.60	17077	90.19	5.01	50.12
14	10	1338.47	39.20	13225	101.21	2.96	29.64
15	11	512.61	73.01	17027	30.11	4.29	42.88
16	7	3473.7	30.18	20278	171.30	1.49	14.88
17	21	790.11	66.90	26752	29.53	2.50	25.01
18	5	1779.24	86.97	8354	212.98	10.41	104.11
19	14	2456.67	49.74	10624	231.24	4.68	46.82
20	8	2297.73	14.48	4022	571.29	3.60	35.99
21	14	3595.72	53.60	9090	395.57	5.90	58.96
22	9	3215.21	219.12	7391	435.02	29.65	296.47
23	8	4786.05	166.30	4917	973.37	33.82	338.21
24	12	1852.67	37.79	5892	314.44	6.41	64.14
25	10	2241.59	33.17	12262	182.81	2.71	27.05
26	4	1215.37	38.73	11394	106.67	3.40	33.99
27	5	1225.02	31.43	9583	127.83	3.28	32.80
28	7	1760.46	6.24	4727	372.43	1.32	13.20
29	6	422.42	22.16	8961	47.14	2.47	24.73
30	3	941.74	22.68	10823	87.01	2.10	20.96
31	7	2450.23	486.01	7378	332.10	65.87	658.73
32	3	1503.19	22.10	10677	140.79	2.07	20.70
33	9	4425.15	94.09	9806	451.27	9.60	95.95
Total	245+1	46494.99	2236.04	402995	115.37	5.55	55.49

Note: +1 refers River Corridor

Source: CBS 2011 and field survey, 2017.

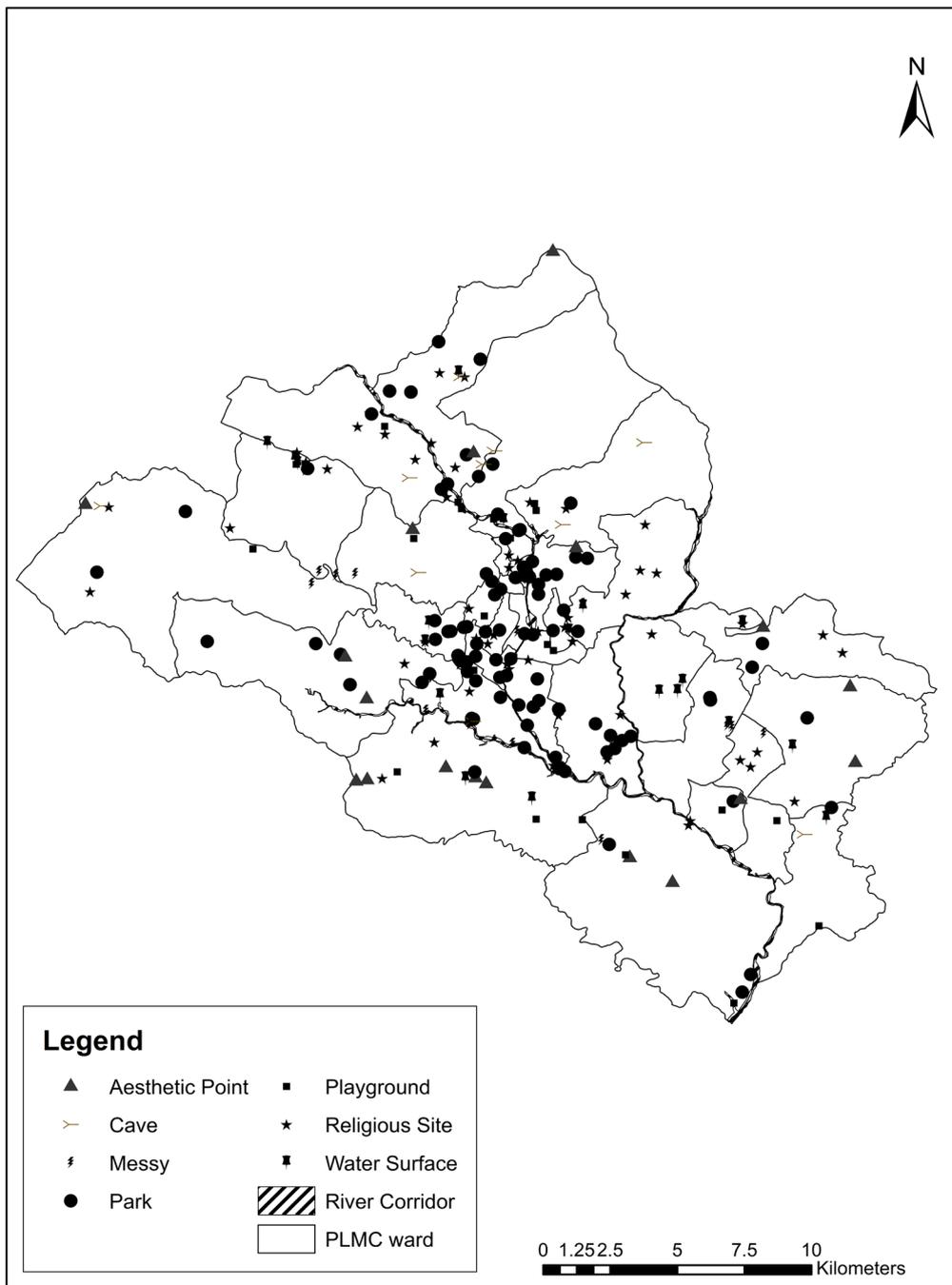


Figure 3- Spatial Distribution of open spaces in PLMC, 2017

Such an uneven distribution of open spaces among the wards in PLMC is due to the lack of public land use planning, encroachment in open space for development of infrastructure such as public buildings, and lack of knowledge about the importance of open spaces among decision makers and local people and weak capacity of local people to protect open space from encroachment.

Management of open space

Management is primary concern to make open space attractive and sustainable urban environment. Different types of open spaces require different types of management modalities. Generally, management activities for open spaces includes the construction for fencing, and the construction of sheds, footpath, sitting place, security areas, rest room, road, parking area, repair-maintenance, entry-exit management. In PLMC, only 44 percent open spaces have been found as managed open spaces with essential infrastructures (Figure 4). The remaining 56 percent sites do not have such infrastructure and they are not managed properly. Others are remaining in natural state.

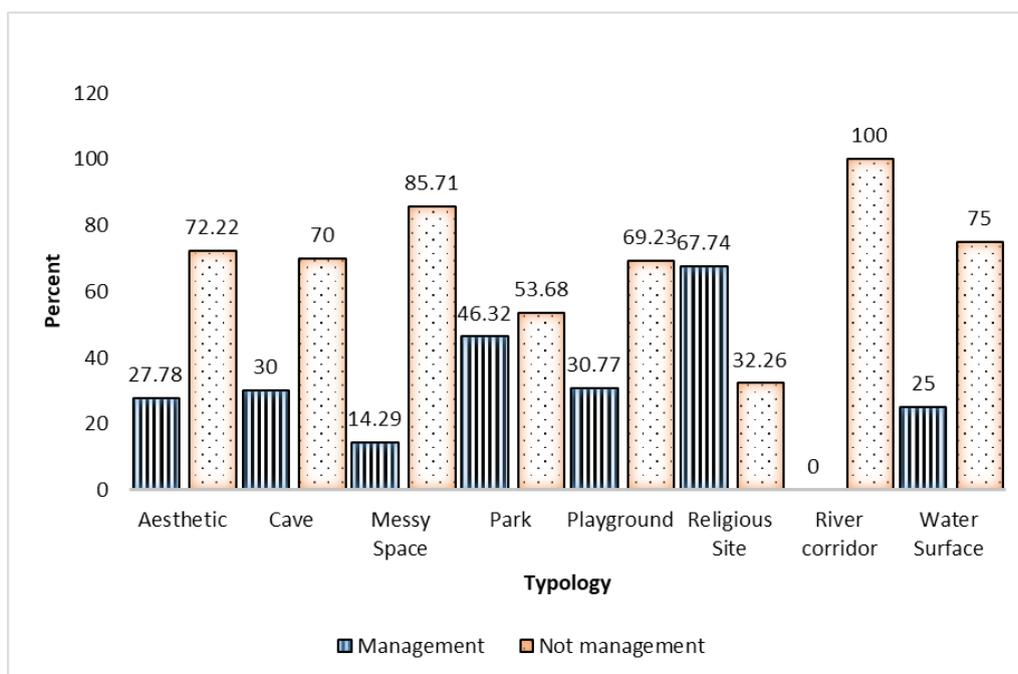


Figure 4: Percent of open space with the level of management

Figure 4 shows only 28 percent of aesthetic sites are managed whereas the remaining 72 percent sites are without any infrastructure. Similarly, 30 percent caves of PLMC are managed for visitors' purpose. Similarly, only 31 percent of the playgrounds are under proper management and also 68 percent of the total religious spaces are under well managed state. Water surface and messy spaces are less managed.

Conclusion

Open space is an inseparable part of urbanities. Open space is a place for having recreation, cognitive pleasure and carrying out, physical activities, social interaction, socio-economic activities, religious activities, and it also helps in beautification of the city.

The PLMC historically had many large areas of open spaces which are known as Chaur and Patan. But with the rapid urbanization and growth of infrastructure including private and public buildings, the areas of open space have been decreased drastically. At present, there are eight major and 32 subtypes of open spaces with a total number of 246 within the PLMC. The main types of open spaces are park, playground, religious site, water surface, cave, aesthetic view point, river strip and messy places. Those open spaces vary in form, size, ownership and functions.

Open spaces are unevenly distributed and in many wards, per capita area of open space is less than the values recommended by FAO and per capita open space reported from developed countries. Such a poor situation is created mainly due to the lack of public land use planning, encroachment in open space for development of infrastructure such as public buildings, and lack of knowledge about the importance of open spaces among decision makers and local people and weak capacity of local people to protect open space from encroachment.

Many open spaces in PLMC do not have infrastructure facilities to be fully utilized for different purposes and are not managed well. It is in this context that attention should be given to protect, conserve and develop the open spaces in order to improve the quality of urban life and livelihood of the local people.

References

Addas, Abdullah N. (2015). *Motivation and attachment in the use of public open spaces in Jeddha, Saudi Arabia*. Unpublished Ph.D. Dissertation, Landscape Department: The University of Sheffield.

- Adhikari, J. (2004). A social ecological analysis of the loss of public's properties in an urban environment: A case study of Pokhara, Nepal. *Contribution of Nepalese society*, 31(1): 85-114.
- Burmill, S., Danial T. C., & Hetherington J. D. (1999). Human values and perception of water in arid landscape. *Landscape and Urban Planning*, 44 (2): 99-109.
- Campbell, C. S. (1978). *Water in landscape architecture*. New York: Van Nostrand Reinhold Company.
- Carmona, Matthew (2003). *Public Places, Urban Spaces: The Dimensions of Urban Design*, Architectural press/Elsevier. Jordan Hill Oxford
- Crang, G. (1982). *The Politics of park design: A history of urban parks in America*. USA: The MIT Press, Cambridge, Massachusetts.
- Carr, S., Francis, M., Rivlin, L. G., & Stone, M. (1992). *Needs of public space*. Cambridge, UK: Cambridge University Press.
- CBS. (2011). National population and housing census 2011. Kathmandu, Nepal: Central Bureau of Statistics, National Planning Commission.
- DoT (2016). *Nepal Tourism Statistics, 2016*. Kathmandu: Department of Tourism.
- Goettsch, James (2015). Urban open space - A tower in the park and a park in the tower, Council on the tall Buildings and Urban. <http://global.ctbuh.org/resources/papers/download/2473-urban-open-space-a-tower-in-the-park-and-a-park-in-the-tower.pdf> (Accessed 5th November, 2017).
- Gold, S. M., (1980). *Recreation planning and design*. New York: Mc Graw-hill, Book Company, p152.
- Green, F. H. W. (1950). Urban hinterland in England and Wales: An analysis of bus services. *Geographical Journal*, 116: 64-81.
- Guo Qiwei, Xiaojian, Chen, & Yucong Zhu (2015) A study on urban growth boundary delimitation: The case of Baoji, Weinan and Ankang Urban Master Plan. *The Open Cybernetics & Systemics Journal*, 9: 1710-1715.
- Hamilton, S. Elery (1997). The IUCN guidelines for cave and karst protection, karst and cave management symposium. 13th National Cave Management Symposium Bellingham, Washington.
- Kuchelmeister, G. (1998). *Urban forestry: Present situation and prospects in the Asia and Pacific region*. FAO Asia-Pacific Forestry Sector Outlook Study, FAO Working Paper No: APFSOS/WP/44. Rome: Food and Agriculture Organization of the United Nations.

- Lynch, Kevin (1981). *A theory of good city form*. Cambridge, MA: MIT Press.
- Mahadeo P. D., & Jayshanker, D.C. (1969). The concept of city region-, an approach with a case study. *Indian geographical Journal*, 44: 15-22.
- Michell, G. (1994). City as cosmogrammes: *The circular plan of Warangal, Nati*. Gorge J. India.
- <http://www.sciencedirect.com/science/article/pii/S2095263517300262#bbib33>
(Accessed on 30 October 2017).
- Monroe C. Beardsley (1982). *The aesthetic point of view*. Ithaca and London: Cornell University Press.
- Moore, G., & Golledge, R. (eds.), (1996). *Environmental knowing: Theories, research and methods*. Stroudsburg. PA: Dowden, Hutchinson and Ross. (Retrieved on 4 November 2017).
- Popi, P., Sudaryono, A. D., & Heddy, S.A. P. (2012). Ritual and space structure: Pilgrimage and space use in historical urban kampong context of Luar Batang (Jakarta, Indonesia). *Social. Behavioral. Science*, 36: 350-360.
- Sandlack, B. A., & Uribe F. G. A (2010). Open space typology as a framework for design of the public realm. *The Face of the Urbanized Spaces*, 5: 35-61.
- Stanley, B. W., Stark, B. L., Johnston, K. L., & Smith, M. E. (2012). Urban open spaces in historical perspective: A trans-disciplinary typology and analysis. *Urban Geography*, 33 (8): 1089–1117.
- Staeheli, I., & Mitchell, D. (2008). *The people's property? power, politics, and the public*. New York: Routledge.
- Ulrich, R. S. (1981). Natural versus urban scenes: Some psychophysiological effects. *Environment and Behavior*, 13: 523-556.
- Wang, D., Metwo-Babiano, I., & Brown, G. (2007). *Rethinking accessibility in planning of urban open space using an integrative theoretical framework*. Conference paper submitted to State of Australian Cities.
- Wang, G., Jiang, G., Zhou, Y., Liu, Q., Ji, Y., Wang, S., Chen, S., & Liu, H. (2005). Biodiversity conservation in a fast-growing metropolitan area in China: A case study of plant diversity in Beijing. *Biodiversity and Conservation*, 16 (14): 4025-4038.
- Ward Thompson, C. (2002). Urban open space in the 21st century, landscape and urban planning. <http://sites.biology.duke.edu/wilson/EcoSysServices/papers/Thompson2002.pdf> (Accessed on 12 June, 2016).

Woolley, H. (2003). *Urban open spaces*. London, New York: Spon Press.

Zhang, Z., & Zhang, S. (2013). The ideas and methods of spatial structure-oriented urban growth boundary delimitation. *City Planning Forum*, 4: 33-41.

Annex -1

Typology and sub typology of open space:

	Sub-Typology	Existing Number	Name of major open spaces	Uses
Park	Mini park	25	Annapurna, Balmandir, Bhanu, Birendra, Dhungesangu, Deep united, Phewa dem, Phew powerhouse east and west, Ghari patan, Ghaneshman, housing complex, Jalinayak, Kopildhunga, Kundahar, Milan, Mitteri village, mother, Patangini, Puspalal, Sattyaharichandra, School patan, Seti gorge, Thati, Visit Nepal year.	Recreation, meeting, waiting.
	Green park	7	Bairagi Ban, Banpale, Jaya kot-Karkindada, Goltaranga, Kodi Danda, Shantiban, World botanical garden	Recreation, picnic, walking, Jungle safari
	Formal garden (park)	4	Bangaicha Basundhara Komagane, Manohar	Recreation, meeting, yoga, cultural activities, walking
	Memorial park	4	Martyrs park-2, Sahid chock, Vimsen Park	Recreation, meeting, walking
	Institutional park	4	Camping chock, Harka chock Mountain Museum, Tutunga,	Camping, sightseen, cultural activities, economic activities
	Purposed park	51	Lovely hill, Dhwareko Kharbari Pandit danda etc (51 Purposed sites).	Proposed park

Playground	Well managed	2	Golf ground, Pokhara Stadium (Rangasala)	Indoor and outdoor games national and international games
	Managed	2	Bhandardhik, Sahara play ground	Outdoor games
	Partially managed	12	Ammarsingh ground east, Ammarsingh ground west, Gahte, Gaurishankar, Jadevi, Malepatan, Bharatpokahri, Bamdi, Rameshwori, Sarang playground, Tallo pundi, Thundikhelbagar.	Games
	Without management	9	Bamdi, Danda Pokhari, Phewa Powerhouse, Patan Bensi, Simpani, shyaltara, Uppalo Patan, Yamdi-2	Occasional use for volleyball, football
	Adventure	1	Sarankot.	Use for flying paraglide
Religious site	With formal garden	6	Bindhabasini, Dharmasila Bhuddabihar, Gumba Jayakot, Radhakrishna Temple, Puskreshwor Mahadev, Shanti Stupa	Worship, recreation, cultural activities
	With green space	9	Bhadrakali, Harhar Gupha, Ghakristhan, Gupta kalika temple, Magthum tapoban, Jantikiche stone, Shidshwor Siva Panchyan, Shiva Temple, Talbaharai.	Worship, cultural activities, yoga
	Open field only	47	Mahaprahbu Dham, Osho Upaban, Galeshwor Shivalaya etc.(47 Religious sites)	Worship, yoga

Water Surface	Lakes popular	3	Phewa, Begnas Rupa,	Recreation, aesthetic water fun
	Lakes	7	Deepang, Gunde, Kamal Pokhari, Kasyap, Khaste, Maida, Niureni etc.	Water fun
	Ponds	8	Bhadrakali, Banjhi Pokhari, Kalika, Kaure, Khadka, Maula, Sani Pokhari, Thuli Pokhari.	Use by local people
	Waterfall	2	Devid fall, Phewa powerhouse, Bijayapur water fall	Recreation
	Reservoir	1	Jaubari	Sightseen
Aesthetic	Very active >300 visitors	1	Sarankot,	Closed view of Himalaya and Pokhara valley
	Active < 300 visitors	8	Gharmi, Kahun Danda, Mattikhan, Phoksing, Pokhara view point, Pumdikot Sundari, Thulakot, etc.	Surrounding view and mountain views
	View point not well developed	8	Armala, Barpandethum, Begnas, Bhumdikot, Hundikot, Kauile, Tamagi, Thamadanda	Surrounding view
Cave	Popular, long > 100 m.	3	Gupteshwor, Mahendra, Bat cave	Recreation, geological mysterious picnic, worship
	Less popular, long < 100 m.	7	Belghari Birendra Gagham, Hemja, Phewa Power house, Sita, Tamagi,	Geological mysterious

River strip (Corridor)	Recreation Aesthetic Religious and Cemetery	1	Seti river, Gaighat, Tulasi ghat, Ram Ghat, Sita Ghat, Dobilla, Thhangekuna, etc.	Rafting, swimming, fishing, rock climbing, green belt, Ghats for holy bathing and cemetary
Messy places	Wet land	8	Phew, Begnas, Gunde, Khaste, Niureni, Rupa, Kamlapokhari, Lakes side,	Biodiversity
	Site for exhibition	1	Pardarsani Kendra (Exhibition center)	Business and cultural activities
	Dumping site	1	Ward no 14, Bacchebududwa	Dumping of urban wastes
	Others	5	Karki Danda, Phewa Power house, Dobilla, Begnas lake, Kalikhola.	Picnic site