International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-10 Issue-1, May 2021

Challenges of Urban Green Space and Its Accessibility in Planning District-12, Mysuru City

Yashaswini S, Shankar B

Abstract: ***Improving the Accessibility of Urban Green Space (UGS) is an integral part of city planning system. People with better access to green space enjoy a wide range of health benefits. Therefore, it is a crucial element to be taken care and nourished in a land use framework. Mysore City is one of the planned large cities in India. The City had a population of about 0.9 million in 2011 and it is estimated to cross the million mark by 2021. There is a growing consciousness on health and wellbeing among the people resulting an increasing demand for urban green spaces both at neighbourhood and city levels. The accessibility helps in promoting usage of UGS and maintaining the balance in environment within the city areas. The main aim of this paper is to study the existing scenario of the UGS within the planning district-12 and to analyse the green space accessibility. The land use of Mysuru city is analysed to understand the city and the micro level land use analysis of Planning district-12 is made. The existing scenario of the UGS within the study area and its accessibility is analysed using different accessibility indicators. Considering the key findings, issues and challenges are identified. Later the suggestions and recommendations for the identified issues is proposed to enhance the green spaces quality and accessibility at neighbourhood levels. The Accessible Natural Green space Standard (ANGst) type of accessibility analysis has been carried to know UGS functionality. Henceforth urban green space network at Planning District levels (local levels) in the City of Mysuru is prepared as a model which can be implemented to the city as whole at the later stages***

Keywords**:** ***Urban Green Space, Accessibility, Network, Challenges, Connecting Spaces.***

I. INTRODUCTION

Green spaces are the spaces within the urban areas filled with neighbourhood parks, play areas, cemeteries, etc., and the Open spaces refers to the areas filled with natural or manmade landscape areas and generally vegetated and open spaces to include squares, market places, amenity land, civic/public spaces, and sports areas. The Green space network is the interconnected space which creates network within many urban green spaces and offers a wide range of social, health, economic and environmental benefits.

Manuscript received on May 06, 2021.
Revised Manuscript received on May 12, 2021.
Manuscript published on May 30, 2021.
* Correspondence Author
Yashaswini S*, Assistant Professor, Department of Architecture, School of Planning and Architecture, University of Mysore, Mysore. Email: yashaswiasha02@gmail.com
Shankar B, Director, School of Planning and Architecture, University of Mysore, Mysore. Email: doddi43@gmail.com

Access to green spaces and open areas is one of the bliss for a city. It makes the city appealing, healthier and greener, helps enhance human well-being.

Enhancement of urban green space network helps assist development in assessing the quality and quantity of green infrastructure which can create functional and sustainable spaces. The development of green space network helps in preserving and restoring the breathing spaces of the city and benefits the wider community to support a healthy economy. According to Sandström et al. (2006) [1] and Kong et al. (2010)[2] the functional network of UGS contributes to the preservation of ecological balance and the sustainable use of biological resources. The public green spaces provide tremendous health benefits for human habitat. The enhanced and accessible green space provision is a cost-effective infrastructure which is a pro-mental health [3]. Enhancing urban green space network can be a tool for current socio-ecological challenges faced within city.

II. BACKGROUND OF MYSURU CITY

Mysuru City lies in the southern plateau at the southernmost part of Karnataka state. It consists of gently rolling plains, with several large rivers that rise in the Western Ghats and flow towards eastward to merge Bay of Bengal. Mysuru is the second largest city and lies in the base of Chamundi Hills. The city is well known for its heritage and culture growing rapidly and spreads across an area of 509.03 sq. Kms. It is one of the major tourist destinations. It is an educational, commercial and administrative hub. It is located at 12.30°N 76.65°E and has an average altitude of 770 metres (2.526 ft). The temperature ranges from 16° C to 27°C in winter and 27° C to 35°C in hot summer and has an average rainfall of 800 mm (86 centimetres of rain annually, most of it during the monsoon, in the June-October period). Percentages of total land area in Mysore city occupied by park and open spaces and water bodies are 13.74 percent and 2.02 percent respectively.

Mysuru being a well-planned city since 1947 from the 'Wadiyars' (Royal family of Mysuru) rule, the then Government of Mysore State. Lush green spaces were the major attraction of the city. Many rare trees like Dillenia Indica (Bettada Kanagale) a beautiful white flower with a gentle fragrance bearing tree, Dillenia Pentagyna (Kadu Kanagale) yellow coloured flower bearing tree, Cochhosperrum Gossypium (Arisina Buruga) golden yellow coloured silk cotton tree adds-on to the scenic beauty of the city[4].

Mysuru is undergoing the tremendous land use and land cover change since it has become an attraction for all the investors including Housing, Industries and Information Technology hub.

These scenarios are leading towards the conversion of agricultural to non-agricultural in the outskirts of the city. The green spaces within the city are also vanishing due to high rise and high intensity developments and also demand for housing etc. However, the percentage of green spaces has been shrinking more every year due to the horizontal development of the city. The local planning area of Mysuru-Nanjangud is 292.42 sq kms, out of which the green areas (including parks, open spaces, agriculture land, forest area) sums up to 149.94 sq kms that is 51.2%. However, the public green spaces are not equally or fairly distributed with respect to its accessibility and also neither provides user's satisfaction nor supports the ecological function of the city. The city is presently undergoing a large-scale urbanisation in many dimensions attracting many investors for spatial expansions in the near future for its housing needs. There is an urgent need for strategies to enhance the urban green space network which should be practical and adaptable.

III. URBAN GREEN SPACE IN MYSURU

Urban Green Space (UGS) in Mysuru city are heterogeneous in nature and has its own kind of functional aspects according to their character, type and location. Urbn Forest areas like 'Chamundi hill reserve forest' acts as a major 'Lung Space' of the city. Many UGS like neighbourhood parks helps building up local interaction and helps socialize the community. The Boulevards, Institutional greens, landscape greens will add on to the aesthetics of the city. The Integrated green spaces which are adjacent to the urban water bodies are acting as a tourist attraction and an economy budding spaces. Many vacant spaces which are not even green are used as a play spaces and as parking areas.

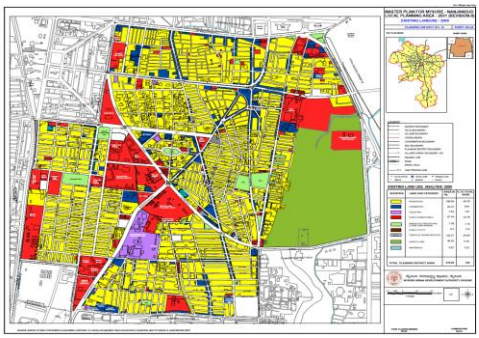

Fig.1 Planning District No.12, Mysuru, 2009
Source: Master Plan of Mysore City- 2031

IV. PLANNING DISTRICT NO 12

The Planning District No. 12 is situated in the southern part of central business district of Mysuru City. It has an extent of 416.95 hectares. It is bounded by Chamaraja double road on the northern side, railway and Dr. B.R. Ambedkar Road on northern side, the National Institute of Engineering college and Janshi Rani Laxmi Bai Road on the southern side and Bangalore- Nilgiri Road on eastern side.

The Planning District 12 has 40.76% of residential use followed by 24.33% traffic and transportation, 13.78% public and semi-public use and 11.61% Agriculture use. The parks and playground including open spaces constitute 1.70% which is below the planning standards of 10-15% as per the Mysore Urban Development Authority guidelines.

Table- I: Land Use of Planning District-12: 2009

Land use Category	Area in ha	Percentage
RESIDENTIAL	169.95	40.76
COMMERCIAL	23.37	5.61
INDUSTRIAL	7.54	1.81
PUBLIC/SEMI-PUBLIC	57.44	13.78
PUBLIC UTILITY	0.00	0.00
PARKS, PLAYGROUNDS AND OTHER OPEN SPACES	7.08	1.70
TRAFFIC & TRANSPORTATION	102.27	24.53
AGRICULTURE	48.42	11.61
WATERBODY	0.87	0.21
FOREST	0.00	0.00
Total Area	**416.95**	**100.00**

Source: Master Plan of Mysore City- 2031

V. URBAN GREEN SPACE IN PLANNING DISTRICT-12

The green spaces within the Planning district-12 to consist neighbourhood parks, greeneries in roundabouts, Boulevards and a huge green space which is a cemetery for the Royal families of Mysuru. Open space constitutes 7.08 ha, which constitutes 1.70% of developed area. There are few well developed parks in residential pockets, viz. Ambedkar Park, Mysore Anantha Swamy Park and few other parks. However, there is no much 'relative ease' space for all the residents to access the greeneries present in the same locality within 5 minutes of time which is called as a non-linear distance travelled by the users. As the planning district is well compacted built land use and lies just next to the CBD of Mysuru, enforcing the people to use local park nearer to their residences is the biggest challenge. Though, it appears to be quite challenging there are many different strategies that can be implemented to enhance the quality, quantity and accessibility of green spaces in the area.

Fig no 2: Urban green spaces in Planning district-12
Source: Compiled by author

Retrieval Number: 100.1/ijrte.A58020510121
DOI: 10.35940/ijrte.A5802.0510121
Journal Website: www.ijrte.org

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication

VI. URBAN GREEN SPACE ACCESSIBILITY ANALYSIS

The Accessibility analysis plays a vital role in evaluating the urban green spaces at ward levels. The accessibility is evaluated based on ANG standards, which states a minimum of 2 hectors of UGS must be accessible for all the inhabitants of the society within their 5minutes of walk. An Adult of 18-50 years of age can walk up to 500 to 650 number of steps within 5 minutes of their time. Whereas children less than 10 years of age and senior citizens above 50 years of age can walk 70 to 90 number of steps within the time span of 5 Minutes. The private gardens and the agriculture land are not considered as UGS as they don't have an access for public.

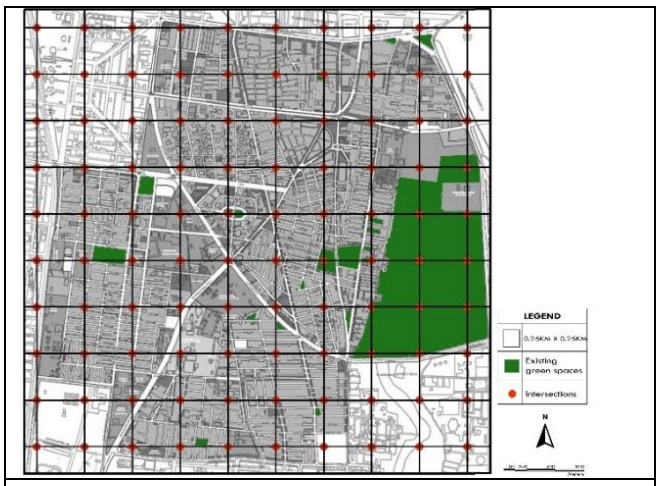

Fig 3: Urban Green Spaces (Compiled by Author)

The UGS indicators are categorised according to its functionality. There is total 19 numbers of UGS within the study area. Ranging from 565.43 sqm to 12537.48 sq.m of size. But the functionality is analysed according to different levels and methods of usage of the UGS. After creating different nodes at equal interval of 0.25 kms, the accessibility and the functionality is analysed. This analysis is made into 3 categories like, High functional, Average functional and Low functional range. Where both accessibility and usage is rationalised.

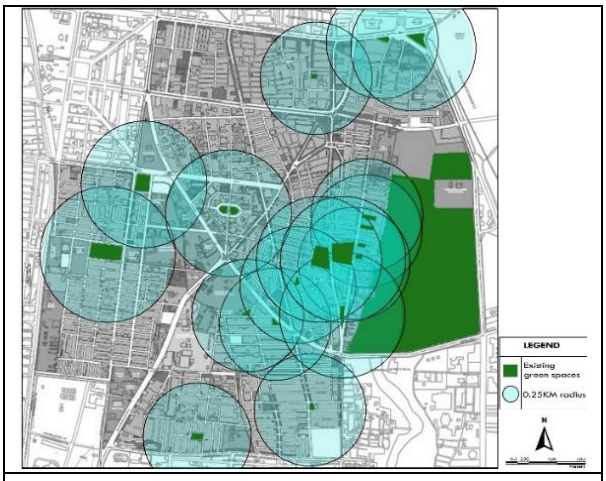

Fig.4: Green Spaces Accessibility in Planning District -12 (Compiled by Author)

Analysing the time span for accessibility is the first indicator, whereas the distance of a UGS should be within 300 meters from habitation will be the second indicator to analyse the existing UGS of the study area. However less than 7% of the total inhabitants have access to green space of which 2 hectare size, 25% of the inhabitants has an access followed by 47% of Inhabitants has an accessibility to UGS within 300 meters or can access UGS within 5 minutes of walk from their habitat.

VII. ACCESSIBILITY INDICATOR

One of the basic accessibility indicators is to measure the average green space per capita. The World health Organisation defines this further and mandates minimum of 10 to 15 sq.mts of green space per capita. Planning District has 3081 inhabitants and the per capita UGS works out to be 564.7 persons per sq.m, which is achieved as though it has a dense residential land use. The huge green space accounted which is mainly due to large area stipulated as cemetery for royal family (Madhuvana Garden). The planning district has an acute shortage of accessible UGS though it has adequate agricultural land in which cemetery is housed and which cannot be considered as a public space and categorised under forest land use.

VIII. KEY CHALLENGES AND SUGGESSIONS

The total area of the Planning district 12 is 4169500.06 sqm and the green spaces within is 501100.01 sqm. Each individual in this planning district has around 162.64 sqm per capita green space. Although the per capita green space is achieved remarkably more, distribution and accessibility are unequal and unsatisfactory.

The distribution and accessibility to the green spaces within planning district 12 almost 50% of the residents do not have an access to the urban green spaces. The distribution of the urban green spaces is also unsatisfactory. About 32% of the residents have accessibility to urban green space which has been highlighted (light blue colour) in fig.4 within the statistical circles, which are less than 10 to 15 sqm of the urban green space per capita. And only 14% of the residents have an access to the urban green spaces which are 2 Hectares and above.

Henceforth, rather than considering the per capita UGS it is ideal to consider the urban green spaces accessibility. Accessibility of UGS for the residents and its evaluation can be considered as an important aspect of analysing the urban green spaces standards.

1. "*Madhuvana Gardens'* which belong to the royal family of Mysuru has a great potential to attract tourism and can be an efficient economy generator of Mysuru city if it is rejuvenated and used as one of the tourist destinations of Mysuru and same has also been proposed in the Master plan of Mysore 2031.

Retrieval Number: 100.1/ijrte.A58020510121
DOI: 10.35940/ijrte.A5802.0510121
Journal Website: www.ijrte.org

Published By:
Blue Eyes Intelligence Engineering and Sciences Publication

2. The potential vacant lands, which are now being used by street hawkers(Opposite to JSS hospital), a portion of which are now being used as dumping yards has the scope of getting rejuvenated as potential green spaces. This intern helps in creating a network of green space with the average distance of 0.3 kms. The same could be developed through public-private-people-partnerships by involving the stakeholders who can take care of the green space and tax rebate could be incentives to encourage them.

[a.] Fig No.4 : Urban green spaces under litigation

Fig No.6: Vacant land Occupied by Street Hawkers

3. The private institutions which are owning the green are to be encouraged to develop institutional green space with proper networking for which incentives or tax rebate could be extended by the local authority.

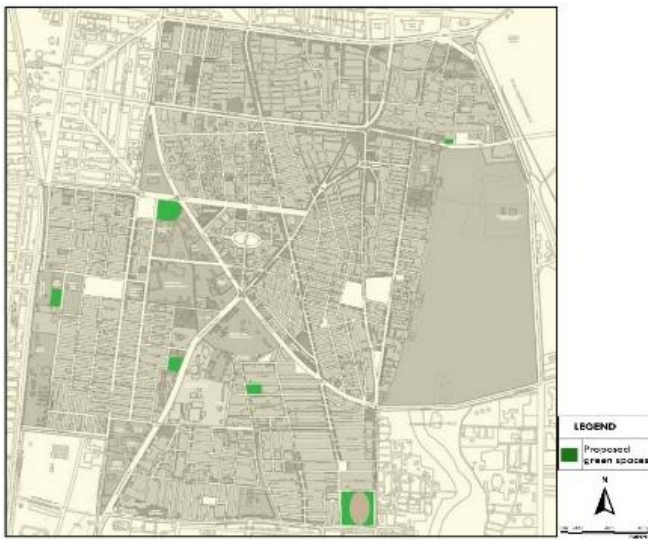

Fig no 7: Identified Potential Vacant Land within PD-12 (Compiled by Author)

4. The Major part of Mysuru's Public space is identified within this planning district, which ha is less built space and a higher ratio of open spaces around. This could be identified to enhance by pitching few competitions for well-maintained green spaces and they could be rewarded.
5. Many existing and proposed green areas are located around the major institutions of Mysuru, henceforth the green spaces can include sustainable libraries, a space for few stages shows and also can act as yoga training centres.
6. Students of these institutions could be involved and encouraged to adopt different vacant lands and enriching the same could be a part of their curriculum.

IX. CONCLUSION

Although the ratio of the overall built-up area of Planning district 12 and the urban green areas within is 1:8.3, not all the quality of green spaces is maintained well nor they are accessible by all the inhabitants of the study area. Each Individual inhabitant has around 162.64 sqm of urban green space (Primary survey results). The accessibility indicator and the inhabitant's satisfaction with respect to its accessibility point has dissimilarities. Though the Scope for enhancing the green space network is much in the Planning District 12 by connecting the high potential agricultural/forest areas, vacant areas (that can be greened and maintained), including the institutional areas to be undertaken development and improvement of the quality of Urban green spaces can be connected by the avenue greens and the buffer greens spaces on either sides of the nala's to achieve Urban green space network. This would greatly improve wellbeing of the neighborhoods and inhabitants of the study area.

ACKNOWLEDGMENT

I consider this as an opportunity to express my sincere and absolute gratitude to my guide Dr B Shankar, Director of SPA, Professor in Urban and Regional Planning, School of Planning and Architecture, University of Mysore, Manasagangotri, Mysuru. Without his guidance, encouragement, and persistent support this research work would not have been successfully completed.

REFERENCES

1. Kong, F., Yin, H., Nakagoshi, N., Y. Zong, 2010: Urban green space network development for biodiversity conservation: Identification based on graph theory and gravity modelling, Landscape and urban planning 95 (1): 16-27.
2. Sandström, U. G., Angelstam, P., G. Mikusiński, 2006: Ecological diversity of birds in relation to the structure of urban green space, Landscape and urban planning 77 (1): 39-53.
3. Jo Barton and Mike Rogerson, The Importance of Green Space for Mental Health BJPsych Int. 2017 Nov; 14(4): 79–81.
4. John Cameron, FLS, The forest trees of Mysore and Coorg, Mysore Government Botanical Garden. Bangalore https://archive.org/details/cu31924001712169/page/n3/mode/2up
5. P. Boland and H. Sven, 1999, Ecological services in Urban Areas, Vol.29, pp.293-301
6. M.Sorensen, J.Smit, V.Barzetti and J.Williams, 1997 "Good Pracices for Urban Greening" Inter-American Development Bank.
7. M.Neuonen, T.Sievanen, T.Susan and K.Terhi, 2007, "Access to green Areas and the frequency of Visits: A Case Study in Helsinki," Elsevier: Urban Forestry and Urban Greening, Vol.6, No.4, pp.235-247
8. Silvija Šiljeg, et.al., October 2018, Accessibility analysis of Urban Green Spaces in the settlement of Zadar (Croatia), www.researchgate.net, DOI: 10.31298/sl.142.9-10.4
9. Chiesura, A., 2004: The role of urban parks for the sustainable city, Landscape and urban planning, 68 (1):129-138.

AUTHOR'S PROFILE

Yashaswini S, received the Bachelor of Architecture degree in 2012, M.Tech URP degree in Urban and Regional Planning in 2015 and presently pursuing Ph.D degree in Urban and Regional Planning from the University of Mysore, Mysore. She is working as Assistant Professor in the department of Architecture at School of Planning and Architecture, University of Mysore, Mysore. Her research interest to include Urban Planning, Urban Green space accessibility, Urban green space network and Sustainability.

Prof. Dr. B Shankar, received the B.E. degree in Civil Engineering in 1984, M.U.R.P degree in Urban and Regional Planning in 1989 and Ph.D degree in Urban and Regional Planning in 1997 from the University of Mysore, Mysore. He is presently working as Director of School of Planning and Architecture, University of Mysore, Mysore. His research interests to include Urban Planning, Planning Legislation Urban Poverty, Community Development, Heritage Conservation, and Urban Green Space