



Original Article

Urbanization and Changing Green Spaces in Indian Cities – A Case Study of Solapur City

Dr. D. S. Narayankar¹, Tahseen Mohmad Ishaque Shaikh²

¹Assistant Professor, Department of Geography, SSA College of Arts and Commerce, Solapur, Maharashtra, India, Research Guide under PAH Solapur University, Solapur, Maharashtra

²Research Scholar (Geography), Punyashlok Ahilyadevi Holkar Solapur University, Solapur, Maharashtra, India

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Correspondence Address:

Dr. D. S. Narayankar
Assistant Professor,
Department of Geography,
SSA College of Arts and
Commerce, Solapur,
Maharashtra, India,
Research Guide under PAH
Solapur University, Solapur,
Maharashtra
Email:
d.narayankar@gmail.com
ORCID ID: 0009-0008-
0398-0004

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Abstract

Urban green spaces (UGS) are essential components of any sustainable urban ecosystem. Despite their ecological, social, and recreational importance, these spaces are under increasing threat due to rapid urbanization in developing countries. Urban Green spaces are offers numerous benefits at the International, national, Local and individual levels. UGS also help to reduce urban heat island effects by providing shade and cool air. The current study investigates the distribution, size, and limitations of urban green spaces in Solapur city of Maharashtra, using GIS and field survey data. The research identifies zone-wise green space coverage, correlates it with population density, evaluates the per capita availability of green space, and compares it against the World Health Organization (WHO) standards. The findings reveal a significant shortfall in green space across all zones of Solapur. The study suggests integrated urban planning, public awareness, and effective governance as key strategies to enhance and preserve green infrastructure in the city. The study area are comprises 8 zones and 38 prabhags. Solapur is one of the cities from Maharashtra which comes under mission of Indian government as to develop smart city. In the present study attempt has been made to sort out zone wise number of parks, gardens, total area under green spaces and population and its impact of Green spaces.

Keywords: Urbanization, Urban Green Spaces, Solapur city, Per Capita Green Space, Environmental Sustainability

Introduction

Urbanization is rapidly altering the human-nature relationship. More than half of the world's population now resides in cities, with limited access to natural environments. This trend is particularly evident in developing countries like India, where cities face mounting pressure to provide housing, transportation, and infrastructure. In the process, green spaces—such as parks, gardens, and urban forests—are being lost or degraded. India's urban population increased from 286 million in 2001 to 377 million in 2011. Cities like Solapur are witnessing unprecedented growth, leading to increased demands for land, water, and resources. As a result, the destruction of green cover and environmental stress—including air pollution, rising temperatures, and reduced biodiversity—have become prevalent. Solapur has been selected under the Indian Government's Smart Cities Mission. This study focuses on evaluating the current green space scenario in Solapur and assessing its sufficiency in relation to urban population needs. In the present study attempt has been made to sort out zone wise number of parks, gardens, total area under green spaces and population and its impact of Green spaces.

Objectives of the Study

1. To analyze the distribution and size of green spaces in Solapur city.
2. To evaluate the correlation between population and green space availability zone-wise.
3. To assess per capita availability of green spaces in comparison with WHO guidelines.
4. To suggest mitigation measures for enhancing urban green infrastructure.

Urban Green Spaces: Definition and Importance

Urban green spaces are designated areas within cities aimed at recreation, conservation, and ecological balance.

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Urban green spaces are designated areas within cities aimed at recreation, conservation, and ecological balance. These include public parks, gardens, green belts, and urban forests. According to the Indian Council of Forestry Research and Education (ICFRE), such spaces play a crucial role in improving air quality, providing habitats for biodiversity, supporting mental and physical well-being, and mitigating urban heat island effects.

Benefits of UGS:

- Reduces urban heat
- Enhances biodiversity
- Supports recreation and mental health
- Functions as carbon sinks

- Promotes aesthetic and environmental quality

Study Area Profile: Solapur City

Solapur is located in southeastern Maharashtra near the Karnataka border, lying between 17°10'N latitude and 76°15'E longitude, at an elevation of 458 meters. It receives approximately 62 cm of annual rainfall and experiences temperatures ranging from 15°C to 45°C.

The Solapur Municipal Corporation (SMC) comprises 8 administrative zones and 38 electoral wards (prabhags). According to the 2011 Census, the city's population was 951,118. The urban landscape is shaped by its role as a regional economic hub, attracting migrants from various cultural and socio-economic backgrounds.

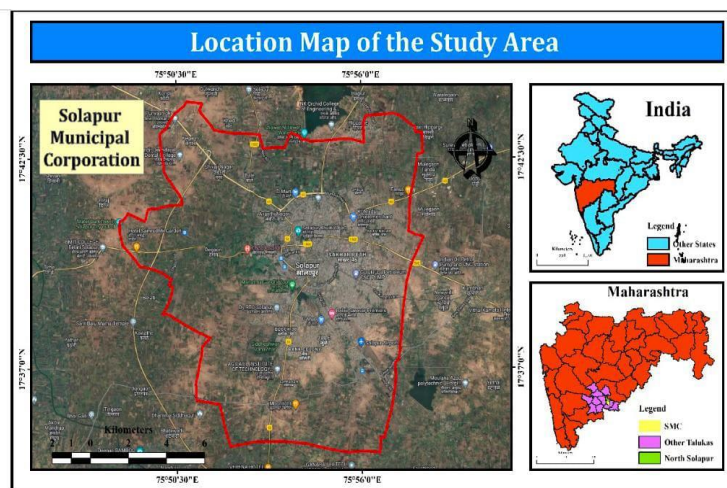


Fig. 1

Methodology

This study employs both qualitative and quantitative methods:

- **Primary Data:** Field observations of prominent parks and gardens.
- **Secondary Data:** Collected from Solapur Municipal Corporation, Census of India (2011), District Census Handbook, socio-economic reviews, and Gazetteers.

Per capita green space is calculated as: $\text{Total Green Space Area (sq.m)} \div \text{Total Population}$

GIS tools and statistical methods were used to visualize spatial data and analyze green space accessibility.

Major Urban Green Spaces in Solapur

1. Shree Sidheshwar Van Vihar

Located 2 km from the city center on Vijapur Road, this 2.1 sq.km forested park harbours over 100 bird species and abundant flora and fauna. It features a water body that attracts aquatic birds and is a popular destination for educational nature excursions.



Fig.2

2. Smruti Udyan

Near Sambhaji Lake, Smruti Udyan spans 228, 609 sq.m. It supports birdwatching and recreational

walking, with a dedicated play area for children. It serves as a heaven for migratory birds.



Fig. 3

fountains, children's play zones, and drinking water. It is well-lit and highly frequented by residents.

3. Hutatma Garden

Situated near Bhuikot Fort, this centrally located garden offers facilities like walking tracks, benches,

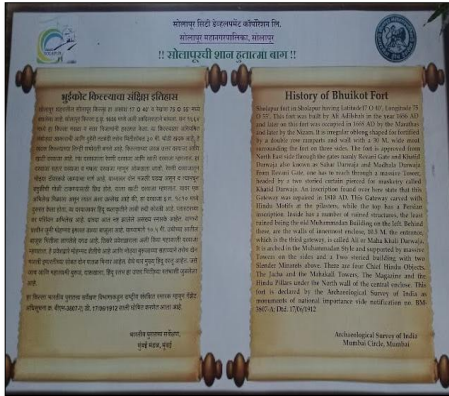


Fig. 4

Analysis and Interpretation

Zone-wise Green Space and Population Analysis

The Table 1.1 Shows parks, Gardens and population in SMC in Eight administrative zones. In SMC area total 18 Gardens, 8 Parks and 1 Zoo is present. World Health Organization given Green space guideline for Solapur city according to that minimum 9 square meters of green space per capita, ensure accessibility within 300 meters of homes, and prioritize green spaces in areas with high population or low existing green cover.

Per capita availability of the green space in the study area = Total area of green space/ Population.

Table 1.1 gives the detailed scenario of availability of green space in each zone. In the Table 1.1 It's clearly visible that all 8 zones are failed to meet WHO's Criteria per capita availability of the green space. Zone 5 having highest 3.51 sq.m area under green spaces but that is also not meet the needs of WHO standard. Zone 3 having lowest Green space zone only 0.11 sq.m. Table 1.2 Shows that the per capita Green spaces in Solapur below the standard set by WHO.

Sr. No	Zone No.	Green Spaces			Total area of green spaces (in sq.m)	Population (2011)	Per capita Availability of green space (in sq.m)	Comparing With WHO Norms	Comparing with overall Solapur per capita Space
		Gardens	Parks	zoo					
1	Zone I	4	2	0	141487	120321	1.17	9 sq. m per person	0.83 sq. m per person
2	Zone II	2	1	0	38590	131664	0.29		
3	Zone III	3	0	0	12683	110462	0.11		
4	Zone IV	0	1	0	9560	120023	0.08		
5	Zone V	2	2	0	459914	131110	3.51		
6	Zone VI	1	0	1	73079	127809	0.57		
7	Zone VII	2	1	0	11894	103084	0.12		
8	Zone VIII	4	1	0	44230	107085	0.41		
Total		18	08	01	791437	951558	0.83		

Table 1.1 Comparison the zone wise Per capita Availability of Green Space with the standards

Name of The city	Total Population (2011)	Total area of green space (sq.m)	Per capita green	Comparing with WHO Norms	Remarks
Solapur	9511558	791437	0.83	9 sq. m Per Person	Solapur city's per capita Green Space is below standards

Table 1.2 Comparing of Solapur City's per capita green space status with the standards

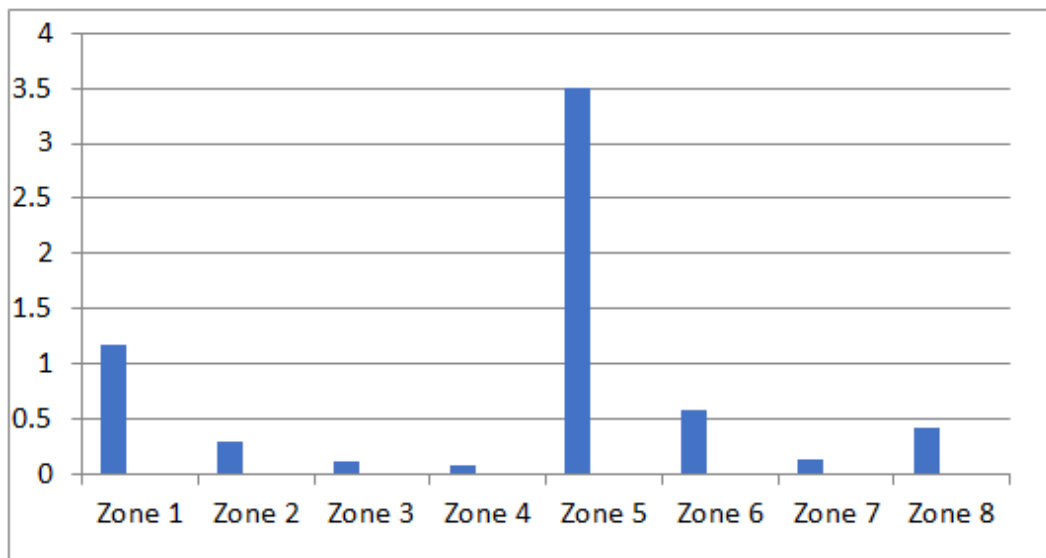


Fig5. Zone wise Status of UGS in Solapur, India

Conclusion

The study highlights a critical gap between existing green infrastructure and international standards in Solapur city. All eight administrative zones fall short of the WHO-recommended green space threshold. Urban planning must prioritize the development, protection, and equitable distribution of green areas. Integrating remote sensing, participatory governance, awareness campaigns, and community-based greening initiatives are crucial for achieving environmental sustainability in Solapur.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.



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