Journal of Contemporary Urban Affairs

2024, Volume 8, Number 2, pages 529–545

Original scientific paper

Economic Implications and Public Readiness for Urban Green Space Development in Agra: A Strategic Evaluation in the City of Taj

[1] **Deeksha Sharma** , [*2] **Uttam Kumar Roy**

[1& 2] Department of Architecture and Planning, Indian Institute of Technology Roorkee, Uttarakhand, India

[1] E-mail: deeksha_s@ar.iitr.ac.in, [2] E-mail: ukroyfap@ar.iitr.ac.in

ARTICLE INFO:

Article History:
Received: 28 July 2024
Revised: 1 September 2024
Accepted: 2 September 2024
Available online: 5 September 2024

Keywords:
Urban Green Spaces (UGS);
Urban life;
Green city;
Impacts of UGSs;
Public Participation.

ABSTRACT

Urban green spaces (UGSs) improve the environmental value of the city as well as the quality of life for citizens. Unfortunately, many major cities in India are lagging behind the minimum standard of UGS required in the city. For example, Agra city in India, one of the most famous tourist destinations in the world, represents two distinct realities of UGS in the same city. One is the focus of tourism, and the rest is the place of common people with very limited public green spaces, leading to multiple social issues (like spatial polarization, etc.). The secondary data concludes that the PPGC of Agra is lower than the standards, and the ongoing schemes are approached through quantitative methods. Despite having many UGS development schemes, Agra's UGS shows stalled growth. This research examines the policies and programs of UGS development (AMRUT, SCM, etc.) and reviews them to understand the unique gaps and possible regulatory interventions. The study includes an assessment of stakeholders' readiness to accept plausible UGS strategies using an analytical analysis approach. The primary data shows that PPP is the requirement for the integrated development of UGSs. The planners can make policies highlighting citizen's rights and responsibilities to enhance UGSs in Agra.

JOURNAL OF CONTEMPORARY URBAN AFFAIRS (2024), ***8***(2), 529–545.
https://doi.org/10.25034/ijcua.2024.v8n2-14

www.ijcua.com

Highlights:	Contribution to the field statement:
- Public participation in urban green space (UGS) development enhances the economic value and sustainability of urban areas. - Addressing policy gaps and spatial disparities is crucial for effective UGS implementation in high-density areas. - Roof gardens and green walls can significantly increase per-person green cover in space-constrained cities. - Inclusive UGS strategies can reduce social inequalities and improve the quality of urban life in Agra.	The article contributes to urban planning by highlighting the economic benefits of urban green spaces (UGS) in Agra, emphasizing increased property values and reduced urban heat effects. It advocates for public participation in UGS development, addressing policy gaps and proposing innovative solutions like roof gardens and green walls to enhance urban sustainability.

***Corresponding Author: Uttam Kumar Roy**
Department of Architecture and Planning, Indian Institute of Technology Roorkee, Uttarakhand, India
Email address: ukroyfap@ar.iitr.ac.in

How to cite this article:
Sharma, D., & Roy, U. K. (2024). Economic Implications and Public Readiness for Urban Green Space Development in Agra: A Strategic Evaluation in the City of Taj. *Journal of Contemporary Urban Affairs*, 8(2), 529–545.
https://doi.org/10.25034/ijcua.2024.v8n2-14

1. Introduction

1.1 Background and Context

The urban green spaces (UGSs) play a crucial role in the society. UGSs help shape the city and provide different social, environmental, psychological, and other benefits. Having appropriate availability and access to UGS in neighbourhood can positively impact the mental and physical health of the urban population (Dipeolu, Ibem, & Oriola, 2022). A writer, philosopher, and art critic of the Victorian era, John Ruskin, says the civilization's greatness can be measured through its cities, and the greatness of the cities is found in the quality of open and green public spaces (Gangwar, 2018). The rapid growth of urbanization is helping increase opportunities and better life but is also becoming one of the reasons for decreasing per-person green cover in cities (Ahirrao & Khan, 2021). The UGSs are decreasing in many Indian cities (Ministry of Urban Development, 2014) and global cities. The decrease in UGSs leads to many social and economic issues, such as a lack of community engagement, negative effects on physical and mental well-being, a decrease in property values in the surrounding, etc. In this research, the role of the policymakers and urban planners with citizen's rights and responsibilities has been highlighted to overcome this issue through an example case of Agra city.

Agra is a city with great cultural significance, heritage value, and great urban spaces. Agra is a city that has the features of a unique and typical Indian city. With the city's three UNESCO World Heritage sites, including one of the world's wonders, 'The Taj Mahal', the city describes uniqueness as being the face of the country from one aspect. On the other hand, Agra has a few features of many different typical Indian cities in terms of its history, culture, industries, etc. Agra has a great history from the Mahabharata period to the colonial period (Perk, 2008) and (Directorate of census operations Uttar Pradesh, 2016), Agra is also well known for its shoe industry, petha (a type of sweet) industry and other (handicraft, carpet weaving, etc.) industries and Agra is well known for its tourism industry (Directorate of census operations Uttar Pradesh, 2016). Therefore, Agra becomes a great case study for this research as it shows many different features or qualities, which can be similar to many other Indian as well as foreign cities to duplicate the results because the lack of urban green spaces is not only an Indian issue.

The heritage of Agra City belongs to different eras, showing layers of history (Perk, 2008). The city was cherished during the Mughal era, and it is well known that the architecture and urban planning in Mughal times were well thought out and focused on luxurious spaces (inside and outside). Agra also has similar features on one side of the city. However, the other part of the city (focusing on the parts with more population density) shows a different picture. Figure 1 shows the two different parts of the city, one where the UGSs show the multi-purpose use (near the heritage sites) and the other where the UGSs show the ghosting of the spaces (old city areas with high population density). Figure 1 also shows the population density map, which describes that the UGS that are ghosted for different reasons are also in the high population density areas. This describes the UGS in high population density areas being ghosted because of the monotonous design and accessibility.

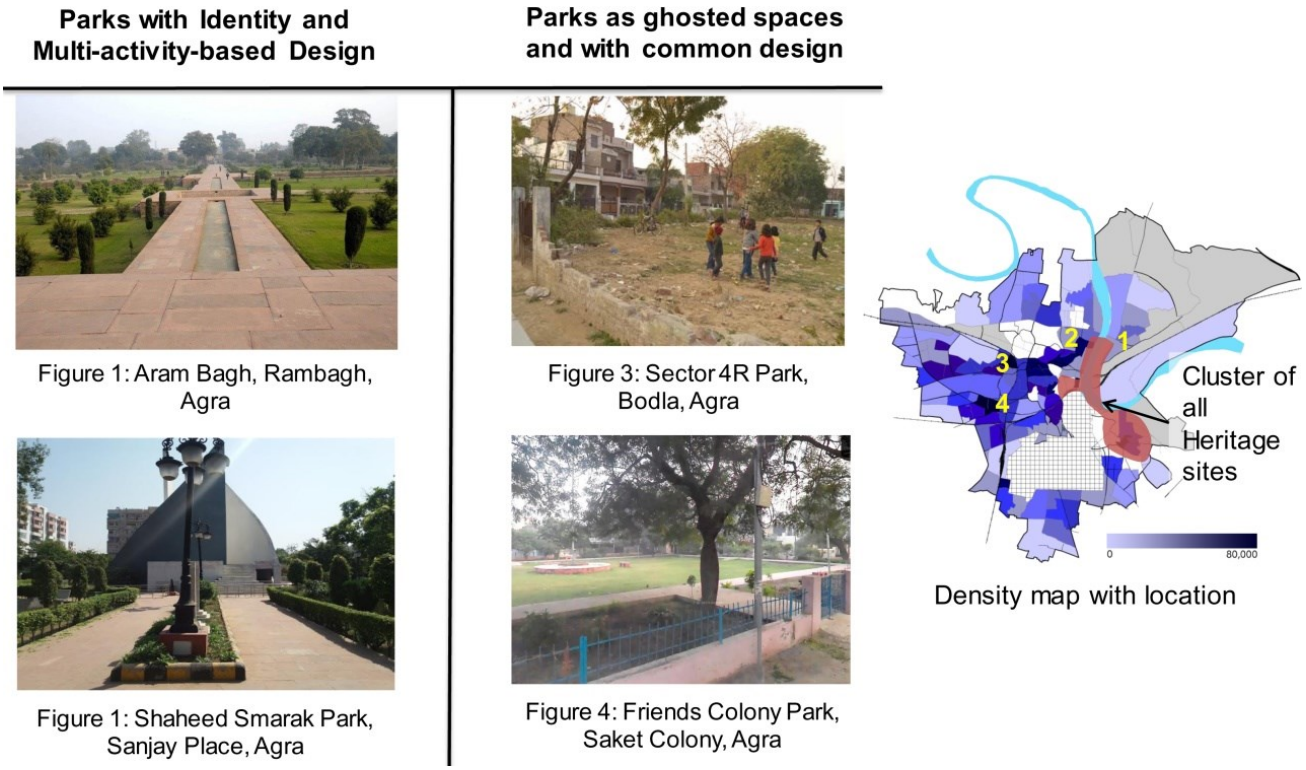

Figure 1. Spatial disparity in UGS in different parts of the city.

1.2 Problem Statement and Research Gap

The increased urbanization in Agra city has shown growth and development in different sectors. Policies and programs like AMRUT, Smart City Mission (SCM), etc., continuously enhance the city's urban green spaces. The executive engineer in Agra Nagar Nigam (Agra Municipal Corporation), Mr. Ravindra Kumar Singh, mentioned a significant increase in urban greenery in Agra, but the areas with high population density are not in focus because of the lack of space availability. He and the deputy director from the forest department, Agra Adarsh Kumar, mentioned that the survival rate of the plantation is around 60 to 65% per year in and around the city. Additionally, they mentioned that this situation is because the people do not anticipate the process. They sometimes remove the plants initially or do not let the workers take care of them, making the plants die, etc. An Agra-based NGO head Mr. Satyam Dixit also mentioned that when people willingly ask him to plant trees in front of their house or their locality, they take care of it independently. These statements clarify that if all the stakeholders (government officials, NGOs and the public) come together, there is a possibility for enhancing the situation. Redevelopment cannot be the first choice for the high population density parts of such rich culture, history, and heritage cities. This research includes discussions with different stakeholders (the government offices responsible for UGS development directly or indirectly), NGO (working on UGS development), and local people to understand their perception of the situation and their solutions for improvement. Ultimately, this research will combine the results and modify them into the initial step for policy planners to incorporate to improve the UGS condition in the city.

1.3 Objectives and Hypotheses

Aim: To review the available literature on the development of UGS in Agra city and discuss the outcome of people's readiness and their rights and responsibilities for UGS-enhancing strategies.
Objectives:

1. To understand the importance of the UGS and their existing condition in Agra, the city of Taj.
2. To review the current policies and programs related to UGSs for Agra city.

3. To identify the critical gaps in the current social, economic and spatial development programs.
4. To review the stakeholders' consultation, users' rights and responsibilities and conclude a road map for enhancing the UGS in Agra city.

1.4 Significance and Structure of the Paper

This research focuses on incorporating people's perceptions into strategies for enhancing UGS in Agra city. It includes a few steps that have been illustrated in Figure 2:

- Starting from data collection and analysing the existing policies/programs related to UGS development (like AMRUT, SCM, etc.) and their result in the city. As the research, understand the current situation (lack of UGS in the city) and its reason through secondary data. Then this research understands the gap between available policies and the current situation on the ground and why the policies are not giving a significant result.
    - The literature review includes a review of research papers to understand the importance of UGS and current conditions worldwide and in Agra (focused) and to identify the dimensions of this research.
    - The government policies and programs reviewed in this research are- AMRUT (Atal Mission for Rejuvenation and Urban Transformation), Smart City Mission (SCM), Urban green guideline and URDPFI guidelines by Indian Ministry of Urban Development, Action Plan by ANN (Agra Municipal Corporation).
- Next is to understand stakeholder's perceptions regarding the current situation and their suggestions to overcome the problem.
    - There are two sets of stakeholders- one who makes the policies (the government officials) and the other who lives the positive and negative consequences of these policies (the public).
    - Based on the literature review, the dimensions are finalised, and the samples are finalized based on dimensions.
- Finally, analyse the data and propose suggestions for policy and urban planners to incorporate in the enhancement process of UGS.

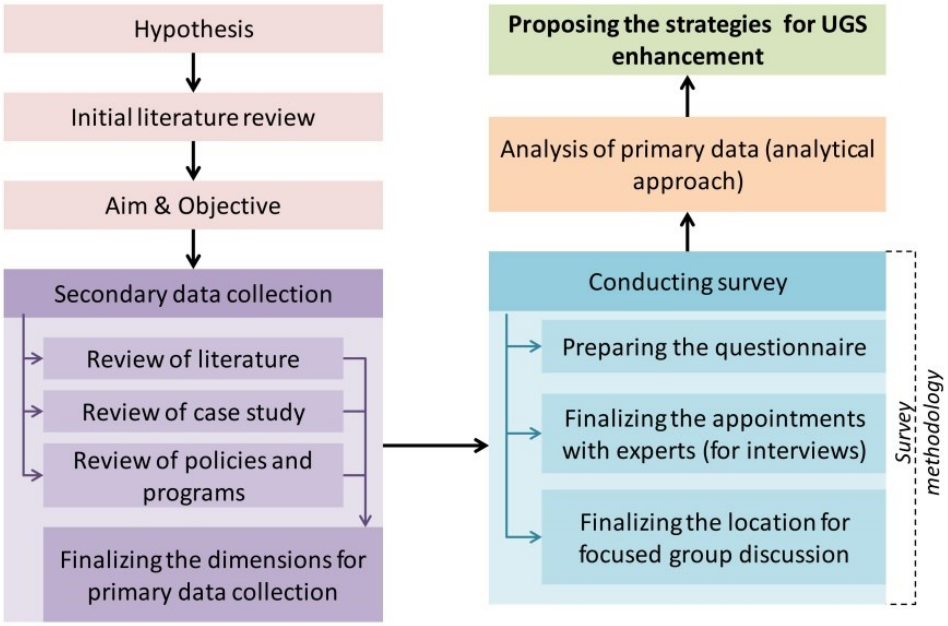

Figure 2. Research methodology.

This clarifies that Agra, a city with great historical and cultural value, needs more attention in UGS development. Therefore, this research focuses on the lack of UGS and their quality in the high

population density and old city areas, despite having many different UGS development policies and programs. It then solves the problem by involving people in the implementation and maintenance process. This research finds the steps for public-private partnership. It brings the citizen's rights and responsibilities towards the UGS development and maintenance process for enhancing the urban green spaces in Agra city.

2. Materials and Methods

2.1 Literature Review

Urban spaces have always been vital to different civilizations. Earlier societies valued public spaces for interaction and events, making them society-centric and multi-activity areas essential for growth, such as the Greek Agora and the Great Bath. Today, urban green and open spaces serve different purposes, becoming more individual-centric and mono-activity areas. This section will discuss the definition and benefits of UGSs and the current state of UGSs in Agra, as well as review existing policies and programs. Further, the methodology for the survey will be discussed in detail.

2.1.1. Definition, Benefits of UGS, and Connection with SDGs

The urban green spaces include urban green lands (partly or completely green), trees, shrubs, and other vegetation. It also includes parks, gardens (horizontal and vertical), meadows, forests, and blue-green zones (Haas, Hassink, & Stuvier, 2021). The UGSs help to improve the visual image of the surroundings, and at the same time, UGSs are necessary for the development and growth of the city and its residents.

Benefits of the UGSs

Urban green spaces provide social, physical, economic, ecological, and planning-based social benefits. As per 'Urban Green Guidelines', these benefits are discussed further in detail (Ministry of Urban Development, 2014):

1. Social-Physical benefit: UGSs reduce pollution and the urban heat island effect, improve water catchment in flood-prone areas, and influence city land use. They also provide spaces for social interaction, enhancing physical and emotional health.
2. Ecological benefit: UGSs improve air, water, and soil quality, reduce pollution and urban temperatures, and enhance the surrounding microclimate. They also help preserve local biodiversity.
3. Planning benefit: A well-designed hierarchy of green spaces integrated with various land uses enhances the attractiveness of the area. UGSs encourage walking, promote health, and reduce vehicle use, which benefits the environment.
4. Economic benefit: UGSs enhance the quality of the surroundings, increasing property values. They also reduce temperatures, lower buildings' energy load, and provide economic and environmental benefits.

Connection with SDGs

This research supports the SDGs 3, 11 and 13. SDG 3 (Good Health and Well-being) – enhancing UGSs in the city will increase communal interaction by providing physical activity space to improve mental health. SDG 11 (Sustainable Cities and Communities) – developing UGSs will enhance the city's sustainability. SDG 13 (Climate Action) – increasing green cover helps deal with climate change. Hence, the systematic development of the UGSs can help sustain the development of the surroundings.

2.1.2. Introduction to the study area

- **Introduction:** Agra city is situated on the Yamuna river bank in the state of Uttar Pradesh, India. Agra covers approximately 108 sq. km. of area, with a population of 15 lakhs and a population density of 14,683 people per sq.km., as per the Indian census of 2011

(Directorate of census operations Uttar Pradesh, 2016). Figure 3 depicts the location of Agra city.

- **Climatic condition:** The city falls into the composite climatic zone, which is known to be extreme and tropical. As per the district handbook of Agra city (Directorate of census operations Uttar Pradesh, 2016) Agra's maximum and minimum temperatures are 47˚C and 3˚C respectively. The average yearly rainfall of the city is 686mm. The ground level of Agra City RL varies from 150m to 170m. The river Yamuna stretch in the city is about 9.0 km.
- **Administrative boundary:** There are four major authorities working in Agra- Agra Development Authority (ADA), Agra Nagar Nigam (ANN), or Municipal Corporation of Agra, Nagar Palika Agra, and Agra Cantonment. Then, under the JNNURM scheme in 2006 (known as AMRUT now), Agra Smart City Limited was also formed, a semi-government unit that works in collaboration with other departments.

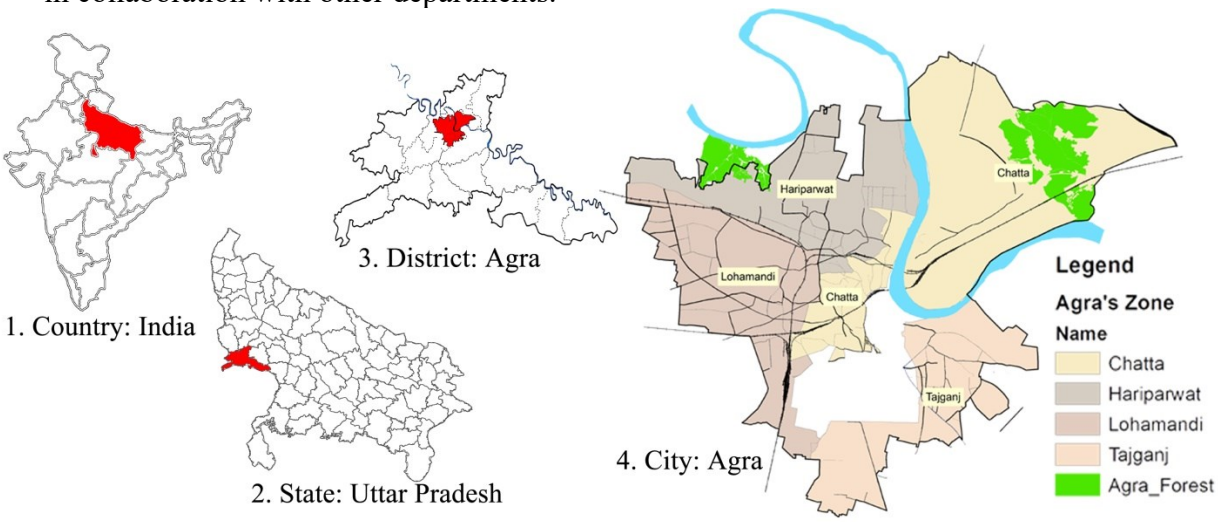

Figure 3. Location and administrative boundaries of Agra city.

2.1.3. Existing green cover condition in Agra

The per capita availability of green cover and open spaces, as outlined in various Indian and international guidelines, has been examined according to sources such as the Ministry of Urban Development (2015), Agra Nagar Nigam, and the work of Gujar, Deshmukh, & Gupta (2022).

1. URDPFI: 10- 12 sq.m. per person
2. WHO: 9 sq.m. per person
3. LEED-ND: 12.5 sq.m. per person

Agra City's per-person green cover (PPGC) is just 2.13 square meters, as reported by the Ministry of Urban Development (2016). This is significantly lower than the standards set by organizations such as URDPFI, WHO, and LEED, indicating a serious shortfall in green cover that requires immediate attention. Additionally, there is a noticeable spatial polarization of Urban Green Spaces (UGSs) within the city, with most green areas clustered around heritage sites and forests. In contrast, other parts of the

city, particularly those with high population densities and in the older city areas, fall well below the minimum standards for green cover per person, as illustrated in Figure 4.

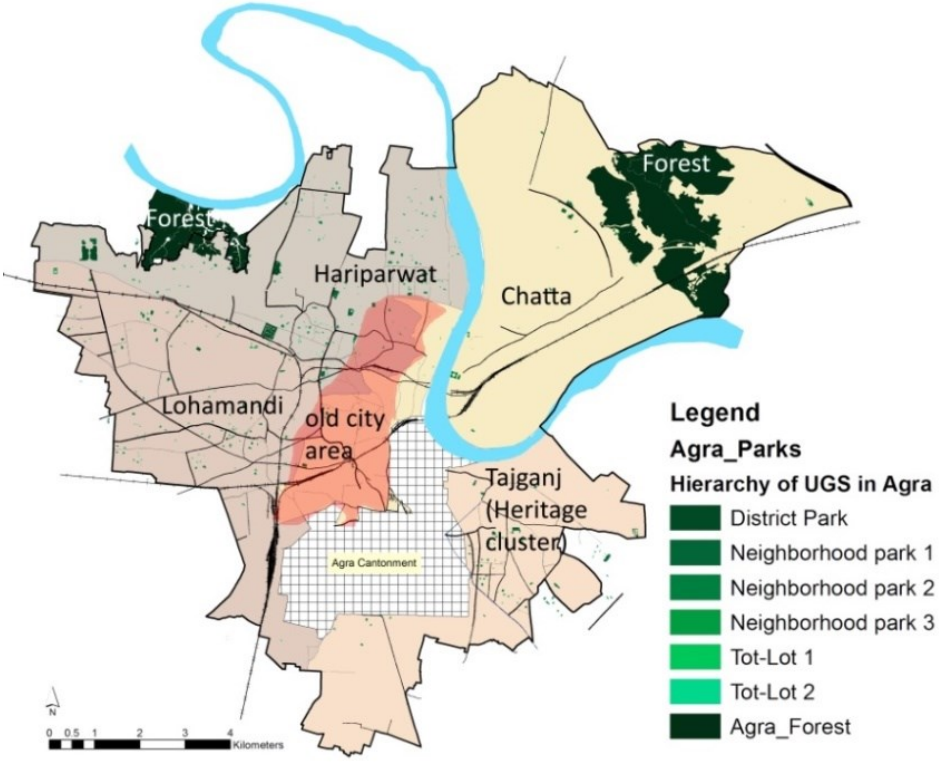

Figure 4. Spatial polarization of the UGS in Agra city.

The lack of urban greenery in Agra city can also be understood through the NDVI (Normalized Difference Vegetation Index) map of the city, depicting the changes over a decade. This explains that green cover development and maintenance are focused on the few parts of the city where heritage sites and forest areas exist. The other part of the city, especially the old city area (marked with the blue line in Figure 5), is experiencing a lack of greenery and has not shown any changes (increase) over the past decade. This explains the spatial polarization of urban green spaces in the city. This spatial polarization initiates socio-economic polarization, noticeable through the social inequity of urban green spaces across the city.

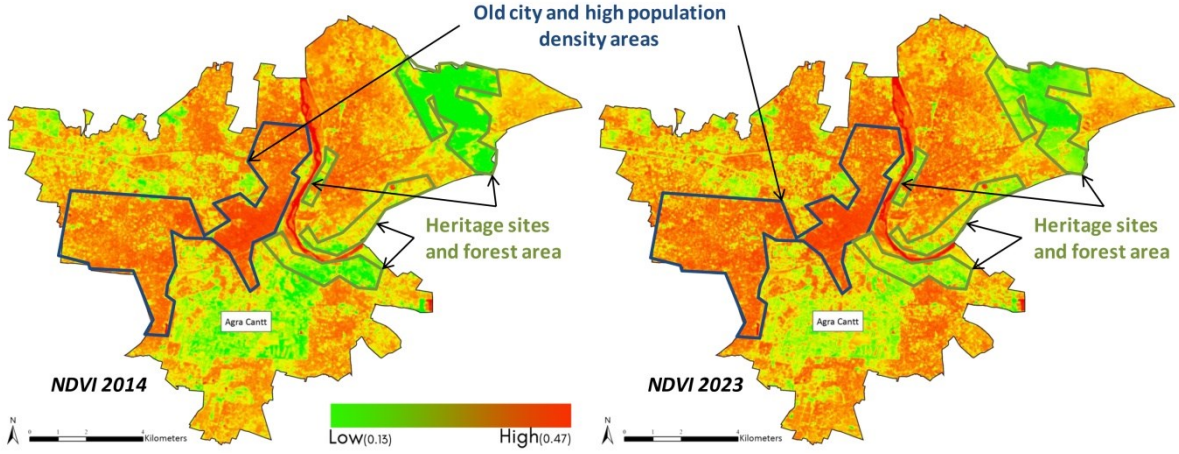

Figure 5. Stalled growth of UGS in Agra city, depicted with the help of NDVI mapping.

The government of India is working on developing UGS under different national policies and programs such as AMRUT, Smart City Mission, etc. However, the increased population becomes one of the major restrictions in the development process.

As per the urban green guideline, a hierarchy and typology of urban green spaces are mentioned, based on which the UGS in Agra were divided into categories (based on area) discussed in Table 1, illustrated in Figure 4.

Table 1: Area of UGS with hierarchy in Agra.

Type	Area division (sqm)	Total area of typology
District park	More than 40,000	0.20 sq. km.
Neighbourhood park 1	5000-20000	0.20 sq. km.
Neighbourhood park 2	2500-5000	0.23
Neighbourhood park 3	1000-2500	0.18
Tot-lot 1	400-1000	0.11
Tot-lot 2	Less than 400	0.02
Forest area	As per the GIS layer	8.46 sq. km.

As mentioned in Table 1, the overall green cover is affected by the forest area available within the city boundary. The major concern is that the old city areas do not show much greenery (referred to from the NDVI map). However, to get more specific information, a ward-wise population density map and per-person green cover map have been developed (refer to Figure 6) and compared.

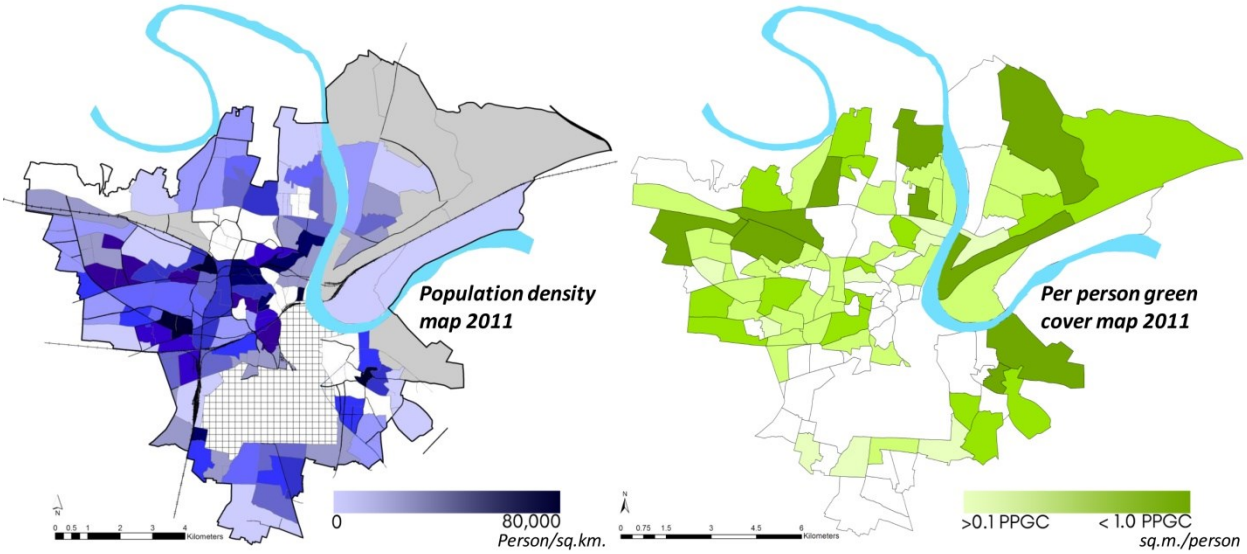

Figure 6. Population density and per person green cover of Agra- ward wise.

This map clearly illustrates that areas with high population density (such as the old city area) have green cover less than 0.5 sq.m. per person or lower green cover in comparison to other wards. Currently, there are active policies and programs aimed at enhancing UGSs. Moreover, the reasons for spatial arrangements will be discussed further in the review of current policies and programs section.

2.1.4. Reviewing the Current Policies and Programs

Many different policies and programs are being implemented at the national and city levels to improve the condition of the UGSs. In this research, the programs focused on Agra will be discussed in detail. A few major programs at the national level will be mentioned to understand the focused working strategies of these policies and programs.

National level:

1) AMRUT (Atal Mission for Rejuvenation and Urban Transformation) (Ministry of Urban Development, 2015):

- Providing infrastructure (physical and social aspects)
- Increase the amenity value of the city by developing green spaces and well-maintained open spaces (social, economic, and environmental aspects)
- Reducing pollution (environmental aspect)

City level (Agra):

1) SCP (Agra Smart City Plan) (Ministry of Urban Development, 2016):

- This plan has nine goals and sub-goals, which are focused on different infrastructural developments in Agra.

- The vision of this plan is "City of Taj – where history is preserved, environment is pristine, infrastructure is world-class, and opportunity is plenty – a safe place to live, a great place to tour" (Ministry of Urban Development, 2016).
- Goal 7 (G7) is- "Green Habitat", which has a total of four sub-goals. Goal G7.4 is about increasing the green cover from 2.13 sq.m. per person to 6 sq.m. per person.

2) Action Plan for increasing green cover (Agra Nagar Nigam):

- Agra has proposed an 'Action Plan to increase the green cover by 15% in Agra', and this document has shown the long-term strategies to achieve it.
- Increasing green in the existing neighbourhood-level planning
- Upgrading parks and gardens
- 15 minutes walk to the park
- Strict implementation of environmental policies
- The limitation is that the study is limited to municipal boundaries only.
- The issue of this plan is that there is limited space for tree planting and water scarcity impacts the growth of the trees.

3) AMRUT Annexure (Atal Mission for Rejuvenation and Urban Transformation) (Agra Nagar Nigam, 2020):

- Agra Nagar Nigam (ANN) in 2020 published 'Our Achievements', under AMRUT 2.0 shows the development of parks in Agra city.
- ANN has developed 18 parks from 2017 to 2020 out total of 346 parks (excluding the ASI protected or heritage sites).
- Under the AMRUT, different activities have taken place, which have also affected the urban green space in the city- heritage walk development, Beautification of Fatehabad road, Junction improvement, etc.

Gap identification: Based on these policies and programs, it is evident that the focus is primarily on environmental aspects, with indirect positive impacts on social and economic benefits. However, neglecting the old city area due to land constraints is apparent. Active policies are oriented towards increasing greenery without considering planning and physical and social benefits. It is also important to develop green spaces in the old city and high population density areas. However, the development officers claim that the people do not cooperate and the condition is not improving. This research will include people's perceptions to understand how their readiness can enhance UGS conditions in the city.

2.2 Survey and Indicators

As discussed (with maps), the major problem is around the old city area because of the high population density and lack of land available for UGS development. As per the literature review, a few important dimensions are formed and divided into indicators (see Table 4). These indicators will help in the formation of surveys and primary data collection. These 10 dimensions are as follows:

1) Demography: population density, income and age group.
2) Planning aspect: UGS-related hierarchy division, area, etc.
3) Cultural: quality aspect and behaviour of people toward the UGS.
4) Ecology and environment: biodiversity, per person green cover, plantation species, etc.
5) Public and private involvement: including people in UGS's development and maintenance process.
6) Norms and guidelines: upcoming strategic development plan for UGS of Agra.
7) Access to the UGS: accessibility and availability of UGS.
8) Institutional management: the current success rate of development of UGS and proposed development strategies and schemes.
9) Tools and technology: norms and guidelines section to increase the feasibility of the proposal.
10) Safety and security: Safety aspects of the use of UGS.

These dimensions define the aspects of UGS; based on these dimensions, departments were identified, and their respective dimensions were focused on preparing the questionnaire for interview.

2.3 Survey Methodology

The survey methodology was developed based on two types of stakeholders: the users and the experts. The users are the local people who will be using the facilities, and experts will be the government officials from all the Agra departments working on the development of UGSs.

The survey methodology included steps from finalizing the survey tool. Secondly, identifying the list of experts and locations for group discussions with users (random voluntary sampling). Thirdly, identify each expert's expertise and customize the survey tool accordingly for efficient and targeted data collection. Finally, analysis of the data collected.

The current policies and program provide quantitative material (like the number of trees, number of developed parks, etc.) and still, there is a huge gap in the required green cover in the city. This research focuses on the qualitative reasons to include the quantitative materials to overcome the gap, which is why interviews and discussions with stakeholders are chosen. The total time taken to complete this research was around 4 to 5 months, which 1 to 2 months were for the survey preparation, modification, and primary data collection as appointment from the right government officials from each department could have taken more time, so the timeline was structure in a way that the days where no interviews were scheduled the site visit and group discussions were conducted with the public on voluntary bases. The wards selected for these discussions were from each population density type (high to medium to low), with about 10% of the city's total population. In each ward, three to five places were identified for group discussion, and only discussions with more than 10 people were considered for the research.

A matrix made the identification of the area of expertise for each department (refer to Table 2), and based on that, the questionnaire was modified before each interview, for example, dimension 'planning' will be a focused criterion for ANN and ADA (municipal corporation and development authority), at the same time PWD and NGO will support their work and other departments will be related in case of need (somehow related), so this is how the matrix works. The questionnaire for focused group discussion with users was done after the interviews with experts so that the gaps mentioned by the experts could be discussed with the users. For example, the common concern raised by experts was that there is a lack of resources for the maintenance process of the UGS, which results in the poor condition of the UGS in the city. Additionally, this concern was raised to the users about their activity and suggestions for this problem.

Table 2: Expert's interview and dimensions matrix.

Dimensions	ANN	ADA	HD	FD	CPCB	NGO	PWD
Demography							
Planning							
Culture							
Ecology and Environment							
Public private partnership							
Institutional							
Tools and techniques							
Accessibility							
Safety and security							
Norms and standards							

Legend:

	Important		Partially related		Opinion/ Support		Somehow related

3. Results

The analysis of the interviews with experts and group discussions with users is based on the analytical approach. From the interviews and FGDs, the important points for recommendation have been identified.

3.1 Analysis of the People's Readiness in the Study (primary data analysis)

In-person interviews were conducted with the experts in each of the department. Additionally, focused group discussions were done with users. Here table 3 includes the results of the focused group discussion with the users, through which their readiness for improvement is brought up.

Table 3: The results of the FGDs with the users.

	Users Responses			
Wards	Expectations from the government	Will of using personal space for UGS	Involvement in the maintenance process	Vehicle free streets
Ward no: 6, 10, 29, 31, 34, 53, 69, 77, 79, 84, and 92.	• Free plants • The government will also be part of the process. • Online connectivity with the government.	• People are willing to use the roofs as gardens. • For green walls, somehow they showed curiosity towards this concept.	• 50% are willing to be part of the maintenance process.	• People have shown no objection to this concept.

The interviews are informed in a matrix (Table 4), aligning ongoing or proposed UGS strategies with relevant departments. This analysis reveals the indicator's criticality. For example, the population density only considered by the ADA makes it a critical indicator. At the same time, the use of local species is been considered by all the departments, which makes it an indicator that does not need immediate focus.

Table 4: Expert interview analysis matrix.

Indicators		**ANN**	**ADA**	**HD**	**FD**	**NGO**	**CPCB**	**PWD**
Considered in the process		*In future proposal*		*Not considered*				
Demography	Population density							
	Household density and age group							
Planning	Different typologies (hierarchy) of UGS							
	To increase the % of UGS							
Culture	Preservation of heritage							
	Physical and social benefit							
	Separation of zones in UGS as per age group							
	Space of community interaction							
	Improvement in the quality of the surrounding							
Ecology and Environment	Local species of the plantation							
	Environmental benefit							
	Per person green cover							
	Benefits for biodiversity							
Public Private Partnership	Participation of the citizens							
Norms and standards	Norm for green field development							
	Norms for brown field development based on land use							
	Norms for roads, streets and green strips							

	Norms for tree cover and green spaces (adjacent to roads)							
	Norms for tot lots and personal gardens							
	Norms for neighbourhood parks							
	Norms for roof garden and green wall							
	Use of nature based solutions							
Institutional	Financial support from government							
	Plantation by authorities							
	Maintenance by authorise							
Tools and Techniques	UGS development new techniques							
Accessibility	Universal accessibility of the UGS							
	Distance proximity of UGS							
Safety and Security	Safety in and around UGS							
	Availability of vehicle-safe area							

Table 4 clearly outlines the opinions and perspectives regarding the improvement of Urban Green Spaces (UGSs) in the city. Based on this review, several critical points have been identified by both experts and users as areas requiring focused attention.

Highlights (analysis) from the experts' interview:

- The public participation is not considered at any stage by any department.
- There are few vehicle-free market street proposals.
- Per-person green cover is not considered but overall greenery percentage increase is the aim of almost all the departments.
- NGO is currently working as a link between different departments and users.
- Physical and social benefits are not considered in the planning process by any department.
- Dense areas of the city are excluded from the process.
- No such hierarchical division also in the UGS development planning or execution process.

Highlights (analysis) from the discussion with users:

- People are willing to be part of the maintenance process in and around their houses to increase the UGS in the surroundings.
- People are agreeing to make roads vehicle-free for a few hours a day.
- They will prefer simple solutions that will not increase their daily chore.
- They agree to be part of the maintenance process if the government has taken care of the initial process.
- They do want a park or a green space for their kids to play (as most people from high-population areas mentioned there is no space for them to play).

Hence, these few highlights will be considered for the proposal.

3.2 Recommendations

The formation of strategies can be better when it considers three basic needs- the authoriser's suggestion, people's perception, and reinforced by the case examples. Here, the authorities' suggestions and people's perceptions have been collected through primary sources, and the case study (which is not included in this research due to the scope constraints) is done through secondary data, which will help in the formation of final strategies (refer Figure 7).

Figure 7. Approach to formation of strategies.

Before finalizing the strategies, it is essential to clarify the participation of government officials, urban planners, policymakers, NGOs, etc., in the process. Stakeholder involvement will entail engaging them, from forming the proposal to submitting reports regarding the condition and maintenance. This stakeholder participation will be elucidated through a flowchart in Figure 8.

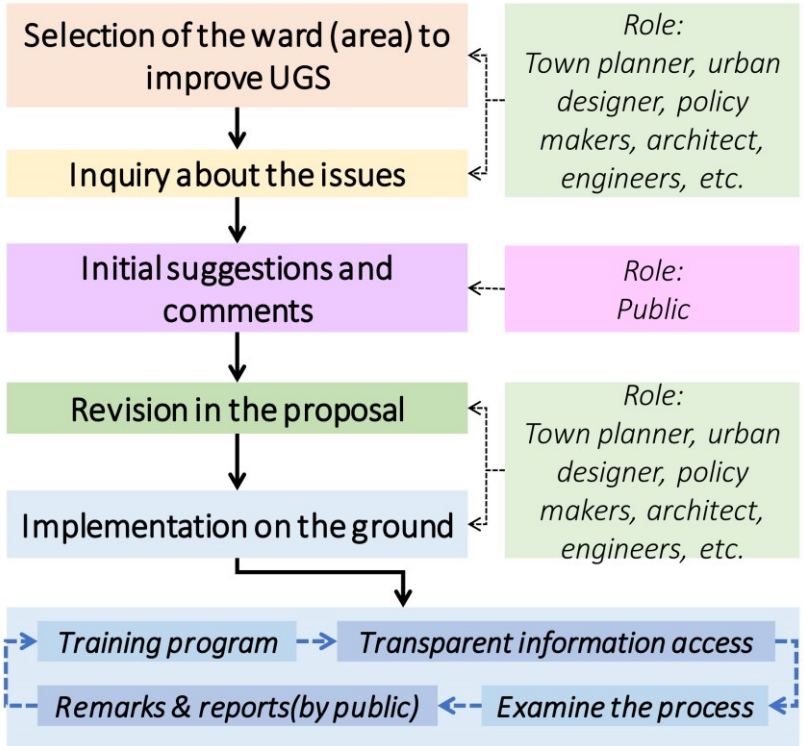

Figure 8. Stakeholders' participation in UGS enhancement process.

Now, this research will take the discussion towards the final strategic recommendations, which will help the policy planners to initiate the process, and later, they can modify the suggestions based on the requirements of the city and society:

1) For the high population density, the area of the roof garden and green wall will be a priority for developing UGS.
2) For low population density, area personal gardens and green spaces will be recommended to develop.
3) A manual for roof garden and green wall development and all the information related to green cover increase should be available 24x7.
4) Commercial buildings and group housing buildings will have to have a roof garden and green wall (all the roof and wall area except the area required for building services). Additionally, the developer will be incentivized with extra FAR.
5) The government will provide the irrigation system for the green wall.
6) Detached, Semi-detached, and row housing can develop 25-50% of the roof and wall area into a roof garden and green wall (as suggested by the city bylaws).
7) The government will provide plants for roof gardens, green walls, and personal gardens for residential buildings.
8) The local bodies will develop the parks and roads (ANN, ADA, Agra smart City Ltd.) under the ongoing schemes.
9) People will be given incentives (like free parking, free tickets, etc.) as they will participate in the planting and maintenance process.

These recommendations combine suggestions from authorities, people's perceptions and ground reality from the case study.

4. Discussion

Urban green spaces are a necessity of the city. A city having poor quality and lacking minimum requirements of UGS can seriously affect its citizens in different aspects like social, economic, psychological, etc. Agra, the city of Taj, is known for its heritage, culture, and industries. However, there are no reflections of the famous heritage in other parts of the city. Agra city shows major spatial and social disparity in UGS, few of the places have much more than the required green cover (especially heritage sites and city forest area) and other places have much less than the required green cover (especially the high population density and old city areas). Additionally, two major reasons for this disparity are the lack of space for UGS development and people's unethical reaction (destroying the plantation, furniture, etc.) to the development.

Space limitations are a significant challenge, necessitating innovative solutions and consideration of public response. This research examines public readiness and proposes creative approaches to improve the condition of Urban Green Spaces (UGSs) in the city. It identifies gaps in current policies and programs related to UGS development, which led to the central research question: "Despite available strategies, why is the condition of UGSs in the city, particularly in older areas, not improving?" The study involved stakeholders, including experts and users, to gather their perceptions and suggestions for enhancement. It serves as a conduit between the government and the public, facilitating mutual understanding of expectations.

Since green spaces are essential for urban areas, the research suggests that strategies are most effective when they integrate expert knowledge, public engagement, and lessons from existing examples. The study formulated strategies specifically for densely populated, older parts of the city, such as implementing roof gardens, green walls, personal gardens, and green strips, which could increase per-person green cover and reduce the urban heat island effect. Offering incentives is recommended to encourage public participation and provide the government with additional resources for maintenance. The research's framework could be adapted to other city areas, such as institutional land, market zones, and greenfield developments, with tailored guidelines for different building uses.

The study emphasizes the importance of simplifying guidelines and offering incentives that benefit both the public and the government, making this a priority for policymakers. Town planners are encouraged to identify issues and adapt strategies based on local conditions when developing new wards or zones. Additionally, the study highlights the need for stakeholder input before implementing any policy or program, as detailed in Chapter 3. While the research focuses on commercial and residential areas, it can be extended to other land uses, including incorporating river-adjacent areas into blue-green infrastructure guidelines to improve both UGS and river conditions, addressing issues like flooding.
The strategies focus on providing planning, and people will volunteer for maintenance. This process has been used by another Indian city with features similar to Agra' Allahabad (Prayagraj)'. Allahabad has a population density similar to that of Agra. It also has a significant heritage culture and is a famous tourist destination. The Allahabad municipal corporation launched a scheme 'free tree scheme', in which the people will voluntarily contact the ULB for tree plantation near their house, and ULB will take care of the charges of tree planting scalping and tree-guard building. As per the Forest Survey of India report, Allahabad city has increased green cover almost two times (from 30000 to 55000 trees) from 2017 to 2019 (Forest Survey of India, 2019). Similarly, in Agra, this result can be duplicated. Additionally, the incentives and official knowledge from experts in the strategies will help to increase the green cover and provide social, economic, psychological, and environmental value to the city.

5. Conclusion

The study of Urban Green Spaces (UGSs) in Agra, the city of Taj, reveals critical spatial and social disparities that challenge the city's ability to provide adequate green spaces, particularly in high-density and older urban areas. Despite the presence of various policies and programs aimed at enhancing UGSs, the implementation has been uneven, with a concentration of green spaces around heritage sites and a noticeable deficiency in other parts of the city. The research highlights the importance of public-private partnerships and the active involvement of citizens in the development and maintenance of these spaces as a key strategy to bridge this gap.

The findings emphasize the need for innovative approaches, such as the development of roof gardens, green walls, and small-scale green spaces, particularly in areas where land availability is limited. By fostering citizen participation and offering incentives, these strategies aim to improve the quality of urban life, enhance environmental sustainability, and reduce social inequalities associated with access to green spaces. The study underscores the necessity for urban planners and policymakers to integrate these considerations into future UGS development efforts, ensuring a more equitable distribution of green spaces throughout the city.
Moreover, the research suggests that the methodologies and strategies proposed could be adapted to other cities facing similar challenges, thereby contributing to broader urban sustainability goals. The study serves as a reminder of the critical role that well-planned and inclusive urban green spaces play in promoting a healthier, more sustainable urban environment.

Acknowledgements
I extend my gratitude to all the departments of Agra city (ANN, ADA, Horticulture Department, Forest Department, NGO, CPCB, PWD) and to all the users who participated in the survey process and contributed to this research. Lastly, I would like to thank my parents and my brother for their support and motivation.

Funding
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of Interest
The author(s) declare(s) no conflicts of interest.

Data availability statement
The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Institutional Review Board Statement
Not applicable.

CRediT author statement:
Conceptualization: D.S.; Data curation: D.S.; Formal analysis: D.S. and U.K.R.; Methodology: D.S. and U.K.R.; Supervision: U.K.R.; Roles/Writing - original draft: D.S. All authors have reviewed and approved the final version of the manuscript.

References
Adebara, T. M., Adebara, O. B., & Badiora, A. I. (2022, October 27). Informal Use of "Marginal Open Space" Along Residential Streets in a Nigerial City. *Journal of Contemporary Urban Affairs, 6*(2), 207-215. https://doi.org/10.25034/ijcua.2022.v6n2-7

Agra Nagar Nigam. (2020, January 5). *Hamari Uplabdhiya* [Our Achievements]. Agra, Uttar Pradesh, India: Agra Nagar Nigam. Retrieved from https://agra.nic.in

Agra Nagar Nigam. (n.d.). *Action Plan for Increasing Green Cover by 15% in Agra.* Agra: Agra Nagar Nigam.

Ahirrao, P., & Khan, S. (2021, April 29). Assessing Public Open Spaces: A Case of City Nagpur, India. *Sustainability, 13*(9), 1-24. https://doi.org/10.3390/su13094997

Dipeolu, A. A., Ibem, E. O., & Oriola, O. A. (2022, August 6). Influence of Green Infrastructure on Residents' Endorsement of the New Ecological Paradigm in Lagos, Nigeria. *Journal of Contemporary Urban Affairs, 6*(2), 159-173. https://doi.org/10.25034/ijcua.2022.v6n2-4

Directorate of census operations Uttar Pradesh. (2016). *Census of India 2011- Uttar Pradesh- Series 10- Part XII A- District Census Handbook, Agra.* Lucknow, Uttar Pradesh, India: Directorate of Census Operations Uttar Pradesh.

Farkas, J. Z., Hoyk, E., Morais, M. B., & Csomos, G. (2023, February 01). A systematic review of urban green space research over the last 30 years: A bibliometric analysis. *Heliyon, 9*(2), 1-14. https://doi.org/10.1016/j.heliyon.2023.e13406

Forest Survey of India. (2019). *India State of Forest Report 2019* (Vol. 2). Dehradun, India: Ministry of Enviroment, Forest & Climate Change, Government of India.

Gangwar, G. (2018, December 13). Fusion of Traditional and Modern Principles of Design for Public Spaces of Indian Cities. In A. I. Conference, & U. P. Babu (Ed.), *Urbanization Challenges in Emerging Economies: Resilience and Sustainability of Infrastructure* (pp. 275-289). New Delhi: ASCE India Conference. https://doi.org/10.1061/9780784482032.029

Govindarajulu, D. (2014, September 07). Urban green space planning for climate adaptation in Indian cities. *Urban Climate, 10*(1), 35-41. https://doi.org/10.1016/j.uclim.2014.09.006

Gujar, S., Deshmukh, A., & Gupta, R. (2022). Review of open space rules and regulations and identification of specificities for plot-level open spaces to failitate sustainable development: An Indian case. In IOP, *IOP Conference Series: Earth and Environmental Science* (Vol. 1084, pp. 1-13). Jaipur, Rajasthan, India: IOP Publishing Ltd. https://doi.org/10.1088/1755-1315/1084/1/012073

Haas, W. D., Hassink, J., & Stuvier, M. (2021, July 22). The Role of Urban Green Space in Promoting Inclusion: Experiences From the Netherlands. (E. Laszkiewicz, Ed.) *Frontiers in Environmental Science, 9*, 1-11. https://doi.org/10.3389/fenvs.2021.618198

Jureviciene, L. J., & Mlinkauskiene, A. (2021, December 16). Community Participation in Decision Making Process in Urban Planning: The Case of Kaunas. *Journal of Contemporary Urban Affairs, 5*(2), 197-208. https://doi.org/10.25034/ijcua.2021.v5n2-3

Lorenzo, M., Rodriguez, M. L., Suarez, E., Hernandez, B., & Rosales, C. (2023, February 22). Quality analysis and categorisation of public space. *Heliyon, 9*(3), 1-11. https://doi.org/10.1016/j.heliyon.2023.e13861

Ministry of Urban Development. (2014). *Urban Green Guidelines.* India: Ministry of Urban Development, Government of India.

Ministry of Urban Development. (2015). *Atal Mission for Rejuvenation and Urban Transformation, Mission Statement & Guidelines.* India: Ministry of Urban Development, Government of India.

Ministry of Urban Development. (2015). *Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines* (Vol. I). Ministry of Urban Development, Government of India.

Ministry of Urban Development. (2016). *The Smart City Challenge Stage 2.* India: Ministry of Urban Development, Government of India.

Perk, L. (2008). *Agra: The Architectural Heritage* (First ed.). New Delhi, India: Roli Books Pvt. Ltd.

Rahbarianyazd, R. (2017, January 02). Sustainability in Historic Urban Enviornments: Effect of Gentrification in the process of sustainable urban revitalization. *Journal of Contemporary Urban Affairs, 1*(1), 1-9. https://doi.org/10.25034/1761.1(1)1-9

Sangwan, A., Saraswat, A., Kumar, N., Pipralia, S., & Kumar, A. (2022). Urban Green Spaces Prospects and Retrospect's. In Intech, R. A. Castanho, & J. C. Fernandez (Eds.), *Urban Green Spaces* (pp. 1-182). Intech Open. https://doi.org/10.5772/intechopen.102857

Shaban, A., Kourtit, K., & Nijkamp, P. (2020, April 07). India's Urban System:Sustainability and Imbalanced Growth of Citites. *Sustainability, 12*(7), 1-20. https://doi.org/10.3390/su12072941

Yok, T. P., Wang, J., & Sia, A. (2013, June). Perspective on five decades of the urban greening of Singapore. *Cities, 32*, 24-32. https://doi.org/10.1016/j.cities.2013.02.001

Zhang, W., Yang, J., Ma, L., & Huang, C. (2015, August 07). Factors affecting the use of urban green spaces for physical activities: Views of young urban residents in Beijing. *Urban Forestry & Urban Greening, 14*(4), 851-857. https://doi.org/10.1016/j.ufug.2015.08.006

How to cite this article:
Sharma, D., & Roy, U. K. (2024). Economic Implications and Public Readiness for Urban Green Space Development in Agra: A Strategic Evaluation in the City of Taj. *Journal of Contemporary Urban Affairs*, 8(2), 529–545. https://doi.org/10.25034/ijcua.2024.v8n2-14