DESIGNING SUSTAINABLE URBAN LANDSCAPES: STRATEGIES FOR INTEGRATING GREEN SPACES INTO URBAN ENVIRONMENTS.

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ABSTRACT

The purpose of this article is to critically review study results from a variety of places in order to investigate the benefits and drawbacks of urban green zones. There are a variety of reasons why green spaces are essential to the concept of sustainable development. These reasons include social, economic, cultural, and environmental considerations. In the long term, urban green spaces may prove to be an all-encompassing tool for maintaining environmental sustainability. This is because of the many good impacts that they have on air quality, property value (due to the aesthetic qualities and amenities that they provide), and energy consumption (since they reduce the amount of cooling that is necessary for buildings). Additionally, urban green zones may offer ecosystem services, like as recreational and leisure facilities, which are greatly sought after by both residents of the city and tourists that come to visit the city. For the purpose of validating the several tasks that green spaces serve, it is vital to include a certain degree of qualitative development and the proper distribution of green spaces within the metropolitan area into the agenda for environmental sustainability. This is something that can only be accomplished if cities all over the globe adopt a cohesive policy to improve their environmental sustainability via the planning, monitoring, design, and management of urban green zones. Sustainable development has emerged as a central concept for addressing a myriad of environmental, economic, and social issues, including the alarming decline of green spaces in modern, densely populated cities, which pose serious threats to the sustainability of these areas. Urban green space may be seen through several disciplinary lenses; so, this work collects and analyses ideas and materials grounded on transdisciplinary and interdisciplinary methods. More green areas should be included into urban environments as part of green visions for urban rehabilitation and growth.

Keywords: Green Area, Open Space, Ecologically Sustainable Metropolitan Landscape, Urban Development.

INTRODUCTION

One of the most prized urban resources is the abundance of green space. Green areas, with their naturally occurring components, have been growing in significance in light of controversial topics like climate change, global warming, and urban environmental pollution. These places have the potential to lessen heat concerns

and air pollution in cities. Sustainable development and the liveability of cities for human civilisations have been at the forefront of important discussions in recent decades (Ramyar, 2019). Urban sustainable development, therefore, must take into account the possibilities of city parks and other green spaces. Quality of life and urban health are both enhanced when parks and other green areas in cities get the care and maintenance, they need to be comfortable places to live. When it comes to creating sustainable urban environments, urban green resources are crucial. Urbanisation and city populations are on the rise, making parks and other green areas increasingly vital for city dwellers. People in cities may experience the psychological and physiological advantages of being in nature by visiting parks, gardens, boulevards, and gardens. Numerous scientific studies have examined the link between green space and human health, and the findings consistently demonstrate that green space has a positive impact on people's physical and emotional well-being. Recreational and sporting events may be hosted in parks and other green areas. These areas are perfect for people to go on walks, ride bikes, work out, and play sports. A healthier heart and blood vessels, less stress, and better overall health are the results of engaging in these pursuits. Being in nature has a calming influence and may help alleviate tension and anxiety. Generally speaking, green space resources boost city air quality, lessen pollution, lessen respiratory illnesses, and make life easier for people. Furthermore, urban vegetation positively impacts biodiversity. Cities may enhance their biodiversity by making more room for parks and other natural areas, which provide homes for a variety of plant and animal species (Noël et al., 2021).

BACKGROUND OF THE STUDY

Urban green areas, including parks, forests, and private gardens, are essential habitats for a wide variety of animals and provide several advantages to city dwellers (Safaie Ghamsary et al., 2023). The presence of green areas may improve the health and wellness of city dwellers and workers by increasing physical fitness and decreasing depression. Landscape urbanism emerged as a theoretical framework in the late 1980s, when prominent figures in the fields of landscape architecture and urban planning, including Charles Waldheim, Richard Weller, and Peter Connolly, started to question the constraints of their fields in the context of large-scale city projects. The Dutch word "landscape"—"region, tract of land"—is where the English word "landscape" comes from. By the early 1500s, the word had taken on the artistic meaning of "a picture depicting scenery on land". It was only natural that the phrase would emerge in the Netherlands during this period, given that the country was an early adopter of landscape painting. The growing Protestant middle class was looking for secular art for their houses at the period, and landscapes were a great way to satisfy their interests (Kabisch et al., 2021).

PURPOSE OF THE RESEARCH

Sustainable design is an approach to building performance that prioritizes minimizing negative consequences on occupant health, the environment, and overall well-being. Minimizing waste, increasing productivity, and decreasing reliance on nonrenewable resources are the three main tenets of sustainability. Eliminate ambient noise and dirty air. Captures precipitation that might cause floods if left unchecked. Establishes a safe haven for native animals. Ensures that local carbon emissions are balanced. In the long run, society should strive for sustainability if it wants to fulfil the demands of its rapidly expanding economy while causing the least possible damage to the environment. However, protecting the earth and its delicate ecosystems is only the beginning. Public green areas and verdant vegetation are hallmarks of green cities and contribute to improved public health, less pollution, and more biodiversity. One-way eco-cities will cut down on pollution is by using environmentally friendly building practices.

LITERATURE REVIEW

For cities to be resilient, healthy, and environmentally friendly, green areas are a must. Incorporating green areas into urban surroundings is a crucial technique for enhancing the quality of life and supporting environmental sustainability, especially as cities keep growing. Research has shown that green spaces have many positive effects, such as mitigating the urban heat island effect, making the air and water more purified, increasing biodiversity, and providing recreational opportunities for locals (Bao et al., 2023). In light of the importance of green spaces in mitigating the negative effects of urbanization, climate change, and environmental degradation, architects, planners, and lawmakers in the field have been delving into new approaches to this problem. In order to improve environmental and human health, it is crucial to use solutions such as biophilic design, multifunctional landscapes, and green infrastructure (Meo et al., 2021).

RESEARCH QUESTION

What is the effect of water management on the Sustainable Urban Landscape?

RESEARCH METHODOLOGY

RESEARCH DESIGN

In order to analyse quantitative data, SPSS version 25 was used. When analysing the statistical association, the odds ratio and 95% confidence interval were used to determine its direction and size. A statistically significant threshold was suggested by the researchers at $p < 0.05$. The primary features of the data were identified by a descriptive analysis. Mathematical, numerical, or statistical evaluations using quantitative methodologies are often used for data gathered from surveys, polls, and questionnaires, or by modifying existing statistical data using computing tools.

SAMPLING

A convenient sampling technique was applied for the study. The research relied on questionnaires to gather its data. The Rao-soft program determined a sample size of 1463. A total of 1600 questionnaires were distributed; 1557 were returned, and 57 were excluded due to incompleteness. In the end, 1500 questionnaires were used for the research.

DATA AND MEASUREMENT

A questionnaire served as the primary data gathering tool for the study. The survey had two sections: (A) General demographic information and (B) Responses on online and offline channel characteristics measured on a 5-point Likert scale. Secondary data was acquired from many sources, mostly online databases.
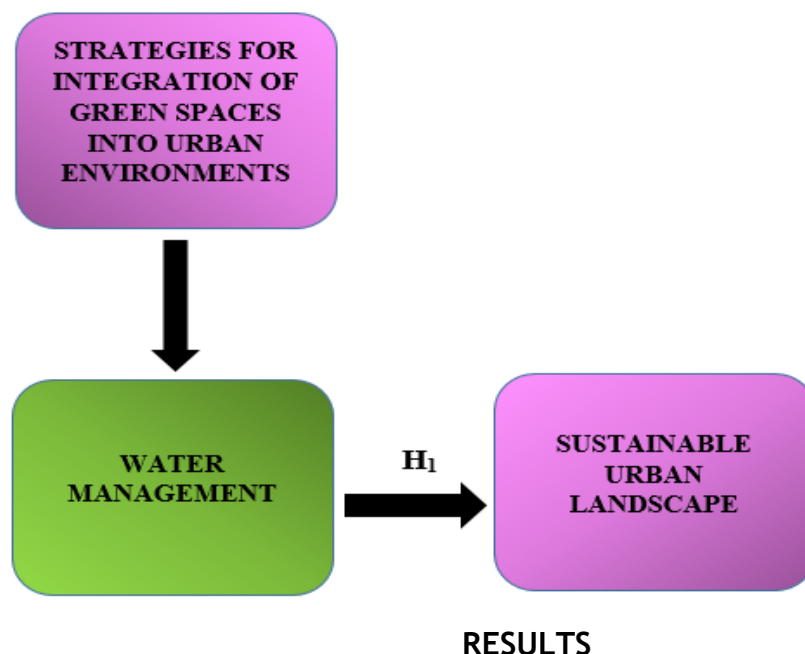
STATISTICAL SOFTWARE

The statistical analysis was conducted using SPSS 25 and MS-Excel.

STATISTICAL TOOLS

To grasp the fundamental character of the data, descriptive analysis was used. The researcher is required to analyse the data using ANOVA.

CONCEPTUAL FRAMEWORKS

RESULTS

Factor Analysis: One typical use of Factor Analysis (FA) is to verify the existence of latent components in observable data. When there are not easily observable visual or diagnostic markers, it is common practice to utilise regression coefficients to produce ratings. In FA, models are essential for success. Finding mistakes, intrusions,

and obvious connections are the aims of modelling. One way to assess datasets produced by multiple regression studies is with the use of the Kaiser-Meyer-Olkin (KMO) Test. They verify that the model and sample variables are representative. According to the numbers, there is data duplication. When the proportions are less, the data is easier to understand. For KMO, the output is a number between zero and one. If the KMO value is between 0.8 and 1, then the sample size should be enough. These are the permissible boundaries, according to Kaiser: The following are the acceptance criteria set by Kaiser: A pitiful 0.050 to 0.059, below average 0.60 to 0.69

Middle grades often fall within the range of 0.70-0.79.

With a quality point score ranging from 0.80 to 0.89.

They marvel at the range of 0.90 to 1.00.

Table1: KMO and Bartlett's Test

Testing for KMO and Bartlett's

Sampling Adequacy Measured by Kaiser-Meyer-Olkin .970

The results of Bartlett's test of sphericity are as follows: approx. chi-square

df=190

sig.=.000

This establishes the validity of assertions made only for the purpose of sampling. To ensure the relevance of the correlation matrices, researchers used Bartlett's Test of Sphericity. Kaiser-Meyer-Olkin states that a result of 0.970 indicates that the sample is adequate. The p-value is 0.00, as per Bartlett's sphericity test. A favourable result from Bartlett's sphericity test indicates that the correlation matrix is not an identity matrix.

Table 1: KMO and Bartlett's Test.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.970
Bartlett's Test of Sphericity	Approx. Chi-Square	3252.968
	df	190
	Sig.	.000

Bartlett's Test of Sphericity further substantiated the overall significance of the correlation matrices. The Kaiser-Meyer-Olkin measure of sampling adequacy is 0.970. Researchers determined a p-value of 0.00 via Bartlett's sphericity test. The researcher acknowledges the invalidity of the correlation matrix, since Bartlett's sphericity test produced a significant result.

INDEPENDENT VARIABLE

Strategies For Integration of Green Spaces into Urban Environments: Cities and towns are confronted with resource and capacity restrictions when they experience fast and irreversible growth, which makes it difficult for them to effectively manage the process of urbanisation (Zhou et al., 2022). One of the management tools that is used to establish the path that an organisation will take and the means by which it will get at its destination is strategic planning. Urban strategic planning is the process of determining the path that a city or urban region will take in terms of its growth, taking into account the city's present profile and conducting a SWOT analysis. Through the implementation of this strategy, the city is better able to adapt to events that occur quickly, to manage change, and to enhance the quality of life. It is not a process that remains unchanged; rather, it must evolve in order to accommodate the shifting circumstances in the city. Before reaching the ultimate collection of judgements, the process will always go through a number of iterations of forward and backward movement. The process of spatial planning and the spatial plans that are suggested to be developed at different levels are not in any way substituted for urban strategic planning and plans under any circumstances. Through the use of a consultative approach, the strategic planning process directs development in the direction of those strategic objectives that have been recognised by all of the stakeholders (Filimon et al., 2021).

FACTOR

Water Management: When the researchers talk about sustainable water management, the researchers are referring to the utilization of water in a manner that satisfies the present-day, ecological, social, and economic requirements without jeopardizing the capacity to fulfil those requirements in the future (Washbourne, 2022). For this reason, water managers are required to go beyond the limits of their jurisdictions and their local supply operations. They must manage water in a collaborative manner while simultaneously searching for resilient regional solutions that minimize risks. To put it another way, sustainable management is the process of combining management techniques with sustainability in order to develop a well-balanced company model that is beneficial to both the present generation and the generations to come. It is more necessary than ever before to practice greener management in this day and age, when sustainability is the top priority (Hsu et al., 2021). These three fundamental pillars—economic growth, social fairness, and environmental protection—are the foundation upon which sustainable

development is constructed. For a company to enjoy economic success, it is necessary for the company to take into mind social equality as well as the impact that it has on the environment. In addition, in order for an organisation to be considered sustainable, its operations need to be ethical and carried out in such a manner that they can be maintained over an extended period of time without having a significant negative influence on society, the environment, or the dynamic global economy (Zeng et al., 2023).

DEPENDENT VARIABLE

Sustainable Urban Landscape: Sustainable urbanism is an approach to city planning and design that prioritises the long-term health of communities by lessening negative effects on people and the environment via measures such as reduced consumption and waste. The goal of sustainable landscape design is to create an outdoor area that is both aesthetically pleasing and environmentally sound by adhering to certain guidelines (Li et al., 2022). Minimising water use, soil erosion, and trash are the cornerstones of environmentally conscious landscaping. A rainwater collecting station or a garden of native plants are two examples of sustainable landscape design. There are many advantages to sustainable landscapes, but in order to enjoy them, the researcher must have the elements that make them possible. So, let's examine some architectural features that may be derived from concepts of sustainable landscape design in more detail. When the researchers talk about building cities with sustainability in mind, we're talking about making sure they can withstand the test of time, foster human growth, and make good use of resources all while keeping the environmental footprint to a minimum (Mansour et al., 2022).

Relationship between Water Management and Sustainable Urban Landscape: Integrating ecological, social, and economic aspects of city design, water management is an essential and complex component of creating sustainable urban environments. Increased surface runoff, floods, and water contamination are consequences of the natural water cycle being interrupted by impermeable surfaces such as roads and buildings in expanding metropolitan areas. In order to restore natural water flows, improve water quality, and build resilience against climate change, sustainable urban landscape designs prioritise the integration of water management practices (Amorim et al., 2021). Natural storm water management methods include green roofs, rain gardens, bioswales, and permeable pavements, among others. These features help reduce runoff and increase water penetration into the ground. By decreasing temperatures via evapotranspiration from plants, this strategy helps reduce strain on conventional drainage systems and also contributes to mitigating the urban heat island effect. Furthermore, in areas where water is scarce, xeriscaping using drought-tolerant plants and other water-efficient landscaping practices reduce the amount of water that has to be sprinkle red. Effective water management not only improves the environment, but also makes

cities more aesthetically pleasing and socially valuable by making them more resilient and providing populations with places that they can enjoy. Ponds, streams, and other water features not only provide aesthetic value to metropolitan areas, but they also have a calming effect on people's minds. Thus, water management is an essential part of resilient, healthy, and environmentally responsible urban landscapes that are designed to last for decades to come (Noël et al., 2021).

Since the above discussion, the researcher formulated the following hypothesis, which was analyse the relationship between Water Management and Sustainable Urban Landscape.

H_{01}: **There is no significant relationship between Water Management and Sustainable Urban Landscape.**

H_1: **There is a significant relationship between Water Management and Sustainable Urban Landscape.**

Table 2: H_1 ANOVA Test.

ANOVA					
Sum					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Between Groups	39588.620	628	5945.517	2523.564	.000
Within Groups	492.770	871	2.356		
Total	40081.390	1499			

In this investigation, the results will be substantial. The value of F is 2523.564, achieving significance with a p-value of 0.000, which is below the 0.05 alpha threshold. This signifies the "H_1: **There is a significant relationship between Water Management and Sustainable Urban Landscape**" is accepted and the null hypothesis is rejected.

DISCUSSION

With their many positive effects on air quality, property value (thanks to their aesthetic qualities and amenities), and energy consumption (less cooling required for buildings), urban green spaces may be an all-encompassing instrument for protecting environmental sustainability in the long run. By reducing the negative impacts caused by impervious surfaces—which primarily cause UHI and flooding events—green roofs and community gardens are a good way to develop ecosystem services like air quality and climate regulation, extreme event mitigation, and water flow regulation. This is according to an analysis of the current literature. Community gardens and green roofs provide many other benefits, such as improving people's physical and mental health, increasing the variety of plant and animal life, and bridging gaps in animal and insect habitats. Community gardens seem to make a

significant contribution to the alleviation of racism and social issues in expanding cities with a diverse population. While designing GI, it's important to think about the right plants for the job, the issue at hand, and any potential energy or material flows between the plants and their environment. Ecosystem services are based on these energy and material fluxes, while disservices are characterised by them and may have positive or negative impacts on human well-being. Therefore, plants are more than just decorative pieces; they are living, breathing parts of the environment.

CONCLUSION

In an urban setting, green areas serve several purposes that improve people's standard of living. As a result, most people agree that parks and other urban green spaces are crucial to the development of eco-cities in the twenty-first century. There are environmental, social, and economic implications associated with the ever-increasing levels of traffic and urban heat, particularly in less developed nations. Modern sustainable planning must take into account the many ecological advantages provided by green areas, such as protecting and sustaining biodiversity and assisting in the mitigation of climate change. In order to improve air quality, inner-city green areas are particularly crucial since they absorb polluting gases and particles that cause respiratory diseases. Buildings with more green space around them need less energy to cool themselves. Green areas can boost home values because of the aesthetic and practical benefits they provide. Social and psychological advantages, however, are the most sought-after advantages of urban green areas. Urban parks and gardens, in particular, provide a place to unwind and enjoy nature. In an ideal world, this aids in both the therapeutic mending of the emotions and the relaxation of the body. The city's green areas, both physically and mentally, need to be freely accessible and of sufficient size and quality to fulfil the demands of its residents. The city's green areas should be dispersed evenly throughout the land, and their combined size should be sufficient to meet the demands of the city's inhabitants. In addition to housing the vast majority of the world's population, cities are the primary consumers of natural resources. Urban green spaces not only support vital services, but also encourage and motivate a healthier connection with the environment.

REFERENCES

1. Amorim, J.H.; Engardt, M.; Johansson, C.; Ribeiro, I.; Sannebro, M.; Leandro Maia, R.; Oliveira, G. Regulating and Cultural Ecosystem Services of Urban Green Infrastructure in the Nordic Countries: A Systematic Review. J. Environ. Res. Public Health 2021, 18, 1219.
2. Bao, Y.; Gao, M.; Luo, D.; Zhou, X. Urban Parks—A Catalyst for Activities! The Effect of the Perceived Characteristics of the Urban Park Environment on Children's Physical Activity Levels. Forests 2023, 14, 423.

3. Filimon, C.; Tătar, C.C.; Filimon, L.A.; Herman, L.M. Urban green spaces—A support for physical activities and tourism. Case study Oradea Municipality, Bihor, Romania. Balt. J. Health Phys. Act. 2021, 13, 27–39.

4. Hsu, A.; Sheriff, G.; Chakraborty, T.; Manya, D. Disproportionate Exposure to Urban Heat Island Intensity across Major US Cities. Nat. Commun. 2021, 12, 2721.

5. Kabisch, N.; Kraemer, R.; Masztalerz, O.; Hemmerling, J.; Püffel, C.; Haase, D. Impact of summer heat on urban park visitation, perceived health and ecosystem service appreciation. Urban For. Urban Green. 2021, 60, 127058.

6. Li, Y.; Li, J.; Chu, J. Research on Land-Use Evolution and Ecosystem Services Value Response in Mountainous Counties Based on the SD-PLUS Model. Ecol. Evol. 2022, 12, e9431.

7. Mansour, S.; Alahmadi, M.; Atkinson, P.M.; Dewan, A. Forecasting of Built-Up Land Expansion in a Desert Urban Environment. Remote Sens. 2022, 14.

8. Meo, S.A.; Almutairi, F.J.; Abukhalaf, A.A.; Usmani, A.M. Effect of green space environment on air pollutants PM2.5, PM10, CO, O3, and incidence and mortality of SARS-CoV-2 in highly green and less-green countries. Int. J. Environ. Res. Public Health 2021, 18, 13151.

9. Noël, C.; Landschoot, L.V.; Vanroelen, C.; Gadeyne, S. Social Barriers for the Use of Available and Accessible Public Green Spaces. Front. Sustain. Cities 2021, 3, 102.

10. Ramyar, R. Social–ecological mapping of urban landscapes: Challenges and perspectives on ecosystem services in Mashhad, Iran. Habitat Int. 2019, 92, 102043.

11. Safaie Ghamsary, E.; Karimimoshaver, M.; Akhavan, A.; Goruh, Z.A.; Aram, F.; Mosavi, A. Locating pocket parks: Assessing the effects of land use and accessibility on the public presence. Environ. Sustain. Indic. 2023, 18, 100253.

12. Washbourne, C.L. Environmental Policy Narratives and Urban Green Infrastructure: Reflections from Five Major Cities in South Africa and the UK. Environ. Sci. Policy 2022, 129, 96–106.

13. Zeng, J.; Cui, X.; Chen, W.; Yao, X. Impact of Urban Expansion on the Supply-Demand Balance of Ecosystem Services: An Analysis of Prefecture-Level Cities in China. Environ. Impact Assess. Rev. 2023, 99, 107003.

14. Zhou, H.; Liu, Y.; He, M. The Spatial Interaction Effect of Green Spaces on Urban Economic Growth: Empirical Evidence from China. Int. J. Environ. Res. Public Health 2022, 19, 10360.