

Sustainable Cities and Urban Landscape – Need of the Hour

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Abstract - Landscape is more than a beautiful sight. Landscape is a term used frequently to describe the holistic view of the natural world, which is to say, the awareness of daily habitat or the outcome of the interaction between natural forces and human activities. The purpose here is to point out how a wise understanding and managing of the landscape phenomena largely contributes to a sustainable city. A separation between urban residents and local natural processes and expressions has resulted from a perspective on nature that reduces it to savor the goodness of immediate material resources and waste disposal services, or to satisfy unpleasant alien aesthetics. In order to replace or make up for the lost natural energy, society has been urged to develop new forms of energy under the pretense of sustainability. Residents of urban settlements may perceive, experience, and breathe the progressive modification of the landscape, and they may also value, control, and plan it, giving sustainability based on a sense of place a concrete and practical significance. A sizable portion of professional work derived from landscape knowledge and thought can make a substantial contribution to sustainability.

Keywords - Urban landscape, Sustainable landscape.

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1. INTRODUCTION

As the global population rapidly urbanises, questions regarding cities' long-term viability arise. In general, economic and environmental justice are considered to be subsets of sustainable development's larger umbrella. Sustainability "seeks to satisfy the demands and ambitions of the present without sacrificing the potential to meet those of the future," as stated in the Brundtland report (United Nations World Commission on Environment and Development 1987). Subjectivity abounds in this situation, since people disagree on the best way to live and how things should be. However, there are several aspects that should be covered in any discussion about sustainability, and one of those aspects is the functioning of ecosystems, which is the topic of this article. An examination of urban ecosystems and their significance, as well as an examination of urban areas as landscapes, are the topics of this article. [1]

The majority of writers choose to define the word "urban" in their own way, or choose not to define it at all. The term "urban" can refer to a variety of diverse circumstances, including population density, land cover, and cultural behaviours. However, urbanisation is a genuine phenomena that does have impacts that can be observed on the natural environment. These effects include temperature increases, shifts in water cycles, and modifications to ecological systems. Urbanization results in a landscape that is mathematically complex, mathematically diverse, and biologically fragmented to a greater extent than any other type of landscape. This is because urbanisation

provides an environment that is more aesthetically diversified. It is possible that it represents the most complicated mosaic of different land uses and vegetative land cover there is. In light of the fact that urbanisation is gradually severing people's links to the natural world that sustains them, cities' healthy ecosystems have an essential educational role due to their widespread influence. This is especially true when considering the fact that urbanisation has an essential educational role. If we want to garner widespread public support for the preservation of ecosystems and more sustainable consumer expectations, one of the most important design priorities that should be implemented in people's homes, schools, and places of employment should be the provision of opportunities for meaningful connections with the natural world. Urban systems not only provide their citizens with a range of environmental services, but they also provide the apparent educational advantages that are associated with them.[2]

All of these amenities contribute to the quality of life in a city. It is not, however, safe to assume that any given city has the potential to deliver these services, as this ability is contingent on the particular arrangement of its ecosystems. In addition, services are not uniformly dispersed throughout geographic areas, therefore urban landscapes need to be developed to guarantee that all residents have easy access to essential services. Findings and methods from many branches of ecology, such as those examining the connection between biodiversity and ecosystem function, the role of humans in

ecosystems, landscape ecology, and resilience, should be incorporated into ecological studies aiming at sustainable management of urban environments.[3]

1.1 Urban Sustainability and Landscape Ecology

All the issues with cities that have been stated thus far are real, and this points to the fact that the vast majority of our metropolitan areas are not sustainable. If urbanisation is allowed to proceed randomly, without thought to ecological and societal outcomes, the situation will only worsen. As a result, if we want to make a difference on a global scale, we need to improve city planning and construction, and recognise that urbanisation is an essential part of the answer. Former UN Secretary-General Kofi Annan said it best: "The future of mankind belongs in cities." [4]

The most diverse environments may be found in urban centres. Essentially, urban sustainability refers to the long-term viability of the urban environment. The urban landscape, which always stretches beyond the city line, is a major factor in this. According to the often-cited "triple bottom line sustainability," a sustainable city needs to strike a balance between environmental conservation, economic growth, and social wellbeing. Minimizing space and resource use, optimising urban design to enable urban flows, safeguarding environmental and human health, guaranteeing equal access to resources and services, and preserving cultural and social variety and integrity are all essential to achieving sustainable urban development. This understanding of urban sustainability aligns with Mustachio's six E's of landscape sustainability, which include environment, economics, equality, aesthetics, experience, and ethics.[5]

Developing sustainable cities may be the greatest issue humanity faces in the future, if city building is one of humanity's greatest achievements. It's not like there's a blueprint for success here, but it's very obvious that science will have to play a major part. This can only be achieved by a complete merging of natural sciences and design sciences. In order to design a long-term solution, we need an understanding of both natural and man-made landscapes, as well as an appreciation for how both types of landscapes function and how they may function more effectively. The field of landscape ecology provides not only a varied cast of characters but also a stage where different disciplines may come together to solve problems.[6]

1.2 Issues in Urban Ecology

i. Biological Diversity and Ecosystem Functions

There is a lack of literature on the species found in urban areas and their significance in terms of their ability to provide ecosystem services and to withstand environmental stresses. Given that the quantity and types of species present impact the efficiency of many ecological activities, altering the diversity, abundance,

and community composition of species may have functional repercussions. An ecologically diverse system is more robust because it has more species that do comparable tasks and more community structures that can maintain those functions. The species composition of urban green spaces is determined by both intrinsic and extrinsic variables, such as the prevailing climate and the nature of the surrounding terrain. Strong relationships between specific species and landscape forest cover and parks provide evidence that certain urban bird groups are saved by their surroundings. In addition to affecting its immediate surrounds, a single patch may have a far-reaching effect on the wider ecosystem as a whole by, for example, delivering ecosystem services to regions far beyond its own. There are many different types of urban land uses, including residential, commercial, industrial, governmental, cultural, and educational, as well as patches of remnant vegetation and secondary green areas like parks and cemeteries, all of which provide suitable habitat for a wide variety of animals.[7]

ii. Ecological Processes and Social Drivers

Humans exert a substantial effect on urban areas, and the management choices made there have serious consequences for the health of the surrounding ecosystem. In urban landscapes, where human activities both cross habitat borders and vary within portions of the same habitat, it may not be so simple to infer processes from spatial patterns, despite this being one of the core assumptions of landscape ecology. Instead, urban landscapes may be seen as the product of several influences superimposed on a single surface. In only very specific contexts and for only certain amounts of time are certain natural processes allowed to proceed unimpeded. Some are supplemented or entirely replaced by anthropogenic processes; for example, all socioecological systems are simultaneously subjected to natural and cultural selection, the latter led by human ideas and desires. In certain cases, these two may complement one other, but in others, they may even have opposing effects. At a certain level of land-use intensity, human preferences will take the reins from biotic and abiotic forces, and the cost of fulfilling those desires will become the limiting factor.[8]

The notion of spatial resilience investigates the resiliency of ecosystems by focusing on the scale at which their linkages take place. The capacity of a patch to recover from perturbations by reorganising itself depending on both external and internal factors is referred to as "ecological memory." Life histories that entail experiences with environmental variances are a component of the ecological memory, which is comprised of the network of species and their interactions in space and time. This memory is passed down via generations of organisms. Persistence is improved in these sorts of dynamic landscapes when the number of connections

between patches increases as a result of long-distance dispersal of individuals.[9]

1.3 Sustainable City

The concept of "sustainable cities" emerged at the same time as widespread support for sustainable development and rising anxiety about the potential negative impacts of growth on society and culture. Cities that put equal emphasis on protecting the environment and improving the living conditions of its residents are more likely to be successful in the long run. Quality of life is often measured by the subject's own estimation of happiness. Sustainable city efforts frequently centre on policies and physical projects including parks, public transportation, buildings, community services, infrastructure, walkways, and public gathering places. To emphasise this point, the phrase "smart city" is frequently used to mean eco-friendly progress.[10]

Energy, materials, and garbage are all much higher in cities with a strong dependence on automobiles. This rule determines who gets to live in the compact city. Determining the extent to which a city is sustainable is difficult since it is not always clear whether quantitative and qualitative criteria are most helpful. However, the indicators are crucial for gauging the sustainability achievements of cities across all dimensions. The use of sustainability indicators to evaluate the efficacy of policies and systems is now widespread.[11]

1.4 Smart Sustainable City

Since the turn of the previous century, the worldwide urban population has increased by two people every second, posing unprecedented problems for city governments and city inhabitants. The World Bank estimates that by some estimates, cities are responsible for as much as 70% of the world's damaging greenhouse gas emissions and consume 67% of the world's total energy. The increasing demands placed on municipal utilities and services such as water, power, transportation, and others, as well as the administration of these, pose difficulties in the face of a growing population. [12]

Cities are seeking to adapt to the difficulties of increasing urbanisation by using urbanisation models offered by digital technology to provide better services for both citizens and tourists. Over the past several years, perspectives on how to achieve this transition have shifted from an exclusive emphasis on the use of technology to increase the efficiency of service delivery to an emphasis on the use of technology to enhance the quality of life for city dwellers. As a result of the latter, the notion of the "Smart City" was born, and now many cities all over the globe are implementing "Smart City" programmes.[13]

The purpose of this paper is to examine the potential of Smart City innovations in various institutional, socioeconomic, political, and cultural contexts to contribute to Sustainable Development goals (hence

referred to as Smart Sustainable City). Among the many goals that have been set is:[14]

- Include insights from interviews with experts and practitioners that promote the Smart City idea in different development contexts, with an emphasis on, but not limited to, developing nations, and a study of relevant research and policy material.
- Case studies demonstrating the application of Smart City technology to specific Sustainable Development issues should be identified and described.
- Create a database of major Smart City deployments in poor nations, together with the individuals responsible for and engaged in these projects.
- Develop and defend a set of policy choices and research questions that may help guide the decision-making process as you decide which measures to take in the near and medium terms to achieve Sustainable Development goals via Smart City implementation.[15]

2. METHODOLOGY

This study analysed all of the articles published between 1900 and 2018 that are included in Thomson ISI Web of Science, which is a database that includes articles from many different high-quality journals and publishing houses. Additionally, the option for all languages was chosen to ensure that all relevant records of scientific publications from throughout the globe would be included. To find credible scientific articles, WoS is your best bet since it is the most reliable, reputable, and well-known database out there.

In addition, information about the articles that were screened, including the year it was published, the authors' names and affiliations, and the keywords from each piece, was retrieved and categorised. English was used for the majority of the articles chosen for the study. Therefore, we used Cite Space, version 5.3, a programme designed for displaying and evaluating bibliographic information. The programme, which was developed specifically for scientometric analysis, included a number of helpful visualisation features for revealing the hidden pattern underlying the aggregated articles on the desired subject. Subsequently, the WoS data was imported into Cite Space. Additionally, the affiliation identification for chosen publication data was completed by using the physical address of the organisation or institution where each author is employed.

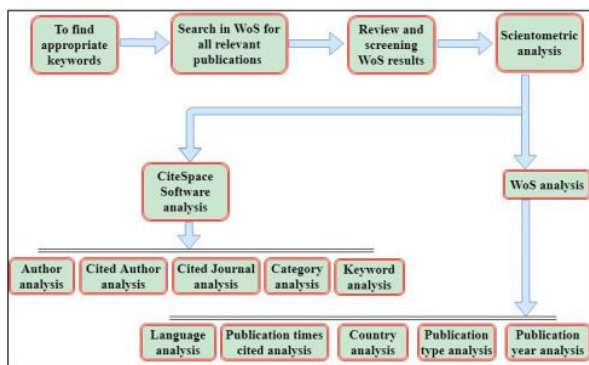


Figure 1: Procedures implemented as a flowchart

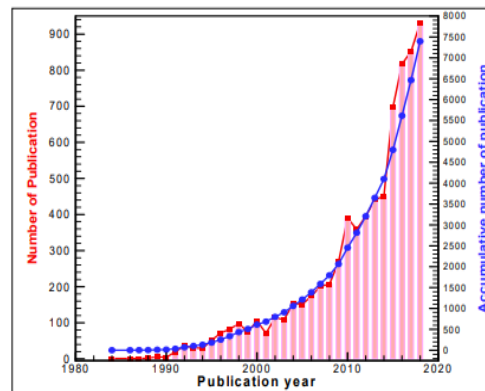


Figure 2: Distribution of publication count

3. RESULTS

To get a bird's-eye perspective of the situation based on the filtered records of publishing, we have compiled all of the relevant data and presented it in Table 1. The article with the most citations has 811, out of a total of 39,007, with an average of 7.57 citations per publication. Even though the period from 1900 to 2018 was examined, the earliest found item was from 1984. This snapshot of data shows that the most-cited article receives many more citations than the typical article, which speaks volumes about the breadth and quality of the most-cited piece's influence.

Table 1: Data from a comprehensive survey of screened publications on sustainable rural and urban development (SURA)

Total Publication	Interval Time	Citing Articles	Most Cited Article	Average Citation per Article
7393	1900-2018	39,007	811	7.57

3.1 Publication History

The basic method of scientometrics is to examine how many works were published at various times. The distribution of these citations might offer light on the significance of a subject and the spark that initially drew attention to it. The first publication on the topic sought was published in 1984, making it just 35 years old over the time period studied (1900-2018). The fact that 2018 accounts for a surprising 1/8 of all recordings may be indicative of the global focus on this study's issue in the present day. There are also five increases where the number of articles is more than 1.5 times the equivalent figure from the prior year.

Table 2: Distribution of publication count

No	Year	Count	Accumulative
1	2018	931	7397
2	2017	852	6466
3	2016	817	5614
4	2015	697	4797
5	2014	451	4100
6	2013	441	3649
7	2012	395	3208
8	2011	359	2813
9	2010	390	2454
10	2009	269	2064
11	2008	207	1795
12	2007	201	1588
13	2006	174	1387
14	2005	151	1213
15	2004	154	1062
16	2003	109	908
17	2002	114	799
18	2001	71	685
19	2000	105	614
20	1999	75	509
21	1998	97	434
22	1997	83	337
23	1996	71	254
24	1995	52	183
25	1994	29	131
26	1993	31	102
27	1992	36	71
28	1991	20	35
29	1990	4	15
30	1989	6	11
31	1988	2	5
32	1987	1	3
33	1986	1	2
34	1984	1	1

When comparing previous and current records, the first significant increase was in 1991 (a factor of five), the second in 1992 (a factor of 1.8), the third in 1995 (a factor of 1.8), the fourth in 2002 (a factor of 1.6), and the fifth in 2015. (1.55-fold). Bear in mind that in 1992, Rio de Janeiro hosted the inaugural United Nations (UN) Conference on Environment and Development (UNCED), often known as the Earth Summit or Agenda 21. This plan was the very first of its kind, and it was approved by the international community to improve environmental conditions and promote economic growth. Also in 2015, the UN General Assembly established a set of long-term objectives for sustainable development known as the 2030 agenda. The research suggests that the Earth Summit held by the United Nations in 1992 may have been motivated by the rise in scientific worry over SURA, which occurred around

the same time as the public announcement of Agenda 21. This approach only demonstrates the interconnected nature of scientific endeavours and policymaking in the service of bettering the society in which we live.

3.2. Analysis on Document Type

In this study, we examine the different kinds of filtered records. Journal articles account for more than half of all publications, while conference proceedings account for around a third. While published books are typically considered as publicly approved science, the large number of 646 review books on SURA implies the well-established, well-performed academic investigations in this area. This is especially true when compared to other scientific areas, where book reviews made up only 9% of publications. Review articles, of which there are a total of 220, share the same general assessment.

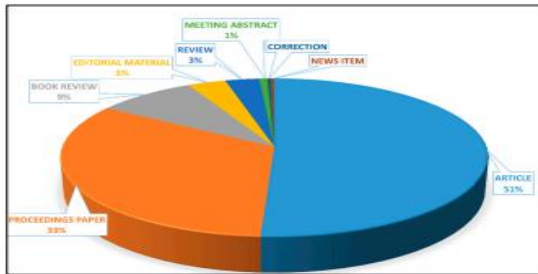


Figure 3: Distribution of publication types.

Table 3: Distribution of publication types.

Type	Count
Article	3857
Proceeding paper	2508
Book review	646
Editorial material	247
Review paper	220
Meeting abstract	53
Correction	17
News item	15
Others	13

3.3 Country/Region Analysis

This table shows the top-50 nations' distribution of screened records around the globe. China and the United States come in first and second, respectively, with 1126 (15.22%) (determined by dividing the number of publications from China by the total number of publications, 7397) and 1056 (14.28%) (determined by dividing the number of publications from the United States by the total number of publications, 7397). Because this methodology takes into account contributions from all authors, a single manuscript may be included toward the tally for more than one nation. This causes the total number of publications to be more than the sum of the publications evaluated in this study (7397). As can be seen, some of the top-20 countries contributing to SURA scientifically are emerging nations. This includes the likes of India,

Brazil, South Africa, Turkey, and Iran. While the world's second most populous nation and a major source of SURA issues, India is just tenth in terms of contribution to the field, behind such heavy hitters as the Netherlands and Germany.

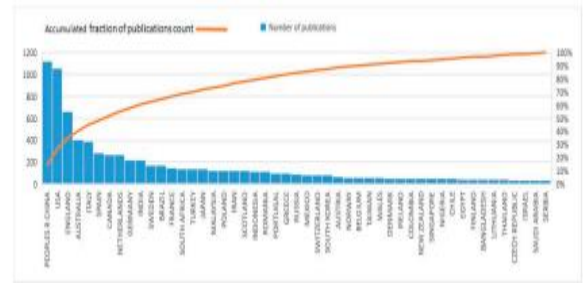


Figure 4: Pareto map showing the publishing distribution among the top 50 nations

Some nations have executed few or no concrete plans because they lack a defined strategy that is in line with sustainable aims. Certain this, it's clear that a country's scientific output in a given topic is not always indicative of its actual practise; in many instances, the gap between theory and actual application is actually determined by academic writing.

3.4 Language Analysis

Screened records are examined linguistically. Given its status as a worldwide language and the only language accepted by the vast majority of journals, English naturally came out on top, accounting for almost 95% of all articles (Figure 5). Furthermore, Chinese ranks lower than European languages like Spanish, Portuguese, and German when it comes to non-English publications. In light of China's status as the world's leading scientific contributor, it's tempting to assume that Chinese scientists would rather have their research published in English than in Chinese. This might be because they want to get more readers and citations for their works in this manner. As a matter of fact, the English language has topped the charts and is unchallenged because of a combination of variables, including widespread use, the availability of large audiences, and the acceptance of submissions to a large number of journals.

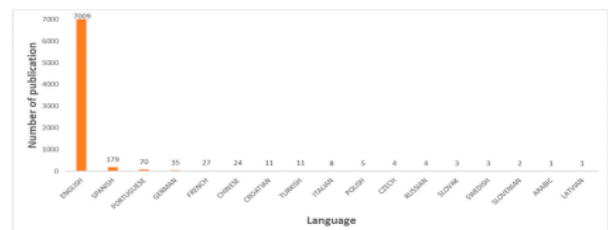


Figure 5: Distribution of language of publications.

4. CONCLUSIONS

The Anthropocene is a period of fast population growth, urbanisation, and industrialization, making it more important to ensure the long-term viability of both urban and rural places. To achieve sustainable development objectives, it is crucial to use eco-friendly and resource-conserving methods, particularly in the wake of recent natural disasters caused by human influences on ecosystem degradation, such as Amazon and Australia bushfires. From this vantage point, the focus of this research was on illuminating the state of the art in academic studies. Understanding the trajectory and development of a research topic requires first drawing a detailed map of the scientific environment in that discipline. The authors of this paper want to offer a wide range of scientometric findings on the topic of sustainable urban, suburban, and rural settings. The bibliographic maps were based on research from a whopping 1280 different publications.

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