

Stewardship of Urban Greenery in an Era of Global Urbanisation

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Abstract—Urban greenery remains the bastion of urban landscape and a key to sustainable development due to its integral connections to the general health and wellbeing of urban residents. However, in an era of rapid urbanisation, recent studies indicate that urban greenery, especially ecologically sensitive areas, in many African cities is becoming increasingly depleted. Given the scale and rate of natural and anthropogenic change, effective management of urban greenery as the ultimate goal of restoring depleting urban landscapes is urgent. This review advocates for an urban resilience model to managing urban greenery.

Keywords—Green spaces, resilience, urbanisation, urban greenery.

I. OVERVIEW OF THE STATE OF URBAN GREENERY IN AFRICA

WORLDWIDE, the importance of urban greenery or green spaces – open spaces, public parks, play grounds, ecologically sensitive areas, golf courses – has been widely researched [1]-[3]. Urban areas endowed with green spaces provide recreational opportunities and scenic views for city residents, as well as providing biodiversity values [1], [2]. Today, effective management of urban greenery has become imperative in urban planning, as it is linked to the general health and wellbeing of urban residents across a city-wide region [2], [3].

The father of American landscape architecture, Frederick Law Olmsted, described green spaces in the urban landscape as the ‘lungs of a city’ [4], due to their role in reducing the impact of rising urban temperatures, urban air pollution and associated respiratory, cardiovascular and immunological diseases [3]. Increasing recognition of these benefits among urban residents and city authorities is reflected in the contemporary policies and practices of urban planning in developed countries, including increase investment in the provision and management of green spaces [1], [5]-[8].

In African cities such as Dakar (Senegal), Lagos (Nigeria), Nairobi (Kenya) and Kumasi (Ghana), policies and practices guiding provision and management of urban greenery are largely a relic of colonialism. For instance, Kumasi – the second largest city in Ghana – was planned and founded on the Ebenezer Howard Garden City Concept introduced during the period of British colonisation [3]. This concept advocates the creation of green belts and spaces as integral parts of cities to combat overcrowding, reverse uncontrolled physical spread

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of cities, and to provide a liveable urban environment. However, many urban areas in Africa have difficulty adopting ‘foreign concepts’ of urban management, which is reflected in poor management of green spaces in many cities across the continent [3], [9], [10].

Effective management of urban greenery relies predominantly on policies of development control by city authorities and informed urban residents [5]. However, recent studies indicate that urban greenery is depleting at an alarming rate in African cities. For example, [3] reports that the lack of policy direction, nonchalant urban residents, and lack of commitment on the part of city authorities towards protecting green spaces have led to rapid depletion of the urban landscape in Kumasi (Ghana). In Nigeria, [10] observed that due to lack of regulatory policy; land earmarked for green spaces in Benin City was subdivided and allocated for other uses (e.g., commercial purposes). Akamani [9] further argues that urban policy interventions in Africa often exclude issues on the environment, particularly urban greenery, and its management processes. Thus, as urban planning is not reacting with appropriate development and management strategies, urban greenery in Africa may continue to rapidly deteriorate.

However, in an era of rapid urbanisation, innovations on restoring urban greenery in Africa are urgently required. The level of urbanisation in Africa is alarmingly high: official statistics estimate it to reach about 58% in 2050, with urban areas on the continent hosting nearly a quarter (1.3 billion) of the world's urban population [11]. Recent studies have reported damaging impacts of rapid urbanisation on ecological and environmental resources in Africa [12]-[14]. Without careful production of a management model to restore and manage green spaces, urban areas in Africa will be overwhelmed with environmental challenges, and may be quite unliveable.

Many policy instruments and scientific evidence have highlighted the critical necessity of urban greenery to ensure effective functioning of the socio-ecological systems of cities [15]. The international minimum standard of urban greenery proposed by the World Health Organisation is 9 m² of green open space per city resident [16], yet the developed countries have raised their standard to 20 m² green space per capita, because of increasingly awareness and demand for such areas by their urban residents [17].

Similarly, in the developed countries, the significance of urban greenery has transcended environmental benefits to include socio-economic value [1], [6], [18]. For example, [1] found that green spaces are positively impacting on property

values in the United States, while [18] established positive correlation between green spaces (golf courses) and home sale price. Chiesura [6] also proposes socio-psychological functions of urban greenery which are essential to improving the wellbeing of city residents. In contrast, cities in Africa are yet to recognize the value of green spaces [9], as many struggles to meet the World Health Organisation's minimum standard. This raises concerns about the effectiveness of urban management policies and practices as well as the future of green spaces in African cities.

So what is the cause of such widespread poor management of urban greenery in African cities?

II. RESTORING URBAN GREENERY IN AFRICA

Urban researchers are increasingly concerned about the depleting urban landscape and loss of green spaces as urbanisation impacts intensify in the coming decades [3], [11], [14]. The decline in number and availability of urban greenery particularly parks, natural areas and play grounds in many African cities including Nairobi (Kenya) and Kumasi (Ghana) since the turn of the 21st century have been shown to be contemporaneous, characterised by rapid urbanisation, poor management and lack of policy direction [3], [19]. The increasing search for dwelling places by urban residents, unregulated by city authorities, has led to encroachment on and conversion of green spaces into residential and commercial uses [19].

Empirical evidence shows that city authorities' response to depleting urban greenery is hampered by the activities and influence of urban residents [3], [19], [20]. Ahmed and Dinye [20] observe that natural areas (e.g., riparian zones of rivers) in Kumasi (Ghana) have experienced extreme encroachment by residential developers due to nonchalant residents and lack of policy direction, thereby exposing the river bodies to the vagaries of the weather. A similar study by [19] in Nairobi (Kenya) also revealed that green spaces have become a dumping site for solid waste and thriving grounds for hawking activities in residential neighbourhoods within the urban landscape. The rate of depletion of urban greenery in African cities since 2000 suggests that increasing urbanisation has been a significant contributory factor in city authorities' inability to effectively manage green spaces [12], [14]. However, urbanisation should not be an excuse for the deteriorating state of urban greenery in African cities. Over the past 50 years cities in developed countries have experienced higher levels of urbanisation compared to those in Africa [21]-[23], yet there is a growing commitment towards the provision and management of green spaces [1], [7], [24]. Recent studies indicate that urban greenery depletion in Africa resulting from urbanisation is predominantly induced by changing human behaviors (e.g., land use change, encroachment on ecologically sensitive areas) rather than a natural increase in population [3], [12], [19].

Regardless of research emphasising probable benefits of urban greenery in Africa and other developing countries, in terms of minimising the negative effects of urbanisation and creating a more attractive and comfortable urban environment

[25], the failure of city authorities as reliable sources and systems for managing both anthropogenic and natural factors hindering sustainable urban management is increasingly becoming clear. Given the magnitude of human influence on urban greenery, an exclusive focus on city authorities as systems for planning and managing urban areas particularly green spaces would lead to a failure in restoring the depleted urban landscapes [19]. Similarly, [3] has observed that urban greenery cannot be managed without the acknowledgement of the role and the involvement of urban residents that may inevitably lead to loss of urban resilience.

Urban resilience is defined here as largely a function of resilient and resourceful citizens necessary to achieving sustainable development – fostering adaptive capabilities and creating opportunities to maintain or achieve desirable social, economic and ecological systems [26], [27] – through precautionary urban policy and planning regarding resource use and emerging risks, the reduction of vulnerability and the promotion of both present and future ecological integrity [28]-[31]. Resilience encompasses the way society responds to change and remains a necessary approach to meeting the challenges of sustainable urban management [30]. Promoting resilience usually stimulates dialogue between different disciplines and stakeholders – science and policies, city authorities and urban residents – and aids in restructuring decision-making processes to recognise the value of self-sufficiency and new forms of governance with a focus on social equity, learning and fostering the capacity to adapt [30], [32], [33].

The urban resilience model acknowledges the role of urban residents in planning and managing urban landscapes, emphasises the importance of informed and resourceful urban residents, and underlies the fact that urban areas have the natural societal capacities to rebuild themselves [29]. There is growing understanding, supported by empirical research, that the urban resilience model is at the core of appreciating urban socio-ecological interactions and remains a vital tool for restoring the integrity of urban landscapes [29], [30], [34]. A number of studies have emphasised the inherent capacity of urban areas to recover after disasters [29], [34], [35] and to respond to climate change vulnerabilities [36], [37]. However, [30] observe that these are just few of “many situations in which resilience addresses and is applied to urban environments” (p. 11).

Given the scale and rate of natural and anthropogenic change, effective management of urban greenery as the ultimate goal of restoring depleting urban landscapes in Africa is critical. An urban resilience model to restoring depleted urban greenery is therefore pertinent and urgent. Management of urban greenery should not be the sole responsibility of city authorities. Considering the environmental and socio-cultural benefits to urban residents and the significant role urban residents play in green spaces degradation, management of such areas should be a dynamic process, involving and engaging with both city authorities and urban residents to respond and adapt to changes occurring within the urban landscape. The involvement of informed urban residents

coupled with the role of city authorities, in terms of governance and policy, is necessary to provide a renewed optimism in building a resilient urban environment [29], [30]. In the urban resilience model, city authorities and urban residents are not isolated entities, but interdependent and collaborative in building a dynamic and resilient urban landscape.

An urban resilience model to restoring urban greenery promulgates two important factors [38]:

- i. Learning, knowledge generation and adaptive management. An urban resilience model should foster sustainable opportunities for urban areas and facilitate learning, enhance urban management, and support sustainable futures [30]; and
- ii. The ability to foster flexibility of city authorities and promote experimentation. The urban resilience model advocates the creation of opportunities and platforms by city authorities for urban residents to engage with, and participate in urban management processes.

The bigger challenge lies in the application of the urban resilience model. Carpenter et al. [39] argue that applying the 'resilience concept' can generate both desirable and undesirable outcomes. Also, [30] have warned that urban resilience should be carefully promoted and applied in order not to generate vulnerabilities within the urban landscape. But there is a great opportunity here to restore depleting urban greenery in Africa and avert potential future vulnerabilities resulting from the destruction of green spaces (e.g., flooding) by using the urban resilience model. This opportunity is made clear with recent academic interest in the urban resilience model to establish the relationship between resilience and urban landscape transformation using innovation and technology [40], [41]. This is an indication that the urban resilience model is gaining global recognition and application in addressing emerging challenges in the urban environment.

Nevertheless, provision of scientific and research evidence to support the relevance and application of the urban resilience model in itself does not guarantee effective management of urban greenery. It is important to communicate the scientific evidence supporting the application and usefulness of the urban resilience model through public education and outreach programmes to engage with both city authorities and urban residents. With informed urban residents and equipped city authorities, the socio-cultural and environmental benefits of urban greenery, and the value of the urban resilience model in creating an all-inclusive urban future would be realised in African cities.

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