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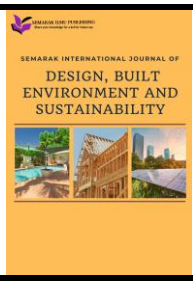

Urban Open Spaces (UOSs) for Urban Life and Disaster Management – A Review

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ABSTRACT

Urban open spaces (UOSs) play a vital role in enhancing urban life and offer numerous benefits to urban communities. These spaces include green, blue, brown, and grey spaces, which are publicly accessible areas within populated settlements. UOSs often function as parks, public squares, sports arenas and religious, and educational facilities. In addition to these roles, UOSs can also contribute to disaster management. However, challenges such as rapid urbanization, high population density, limited land availability, rising land values, inadequate planning, financial constraints, and policy noncompliance have hindered the effective provision of UOSs in terms of size, accessibility, and multi-functionality. This research aims to define the dual roles of UOSs in both urban life and disaster management. A literature review was conducted to gather relevant information. This study revealed that UOSs contribute to urban life through four key functions: recreation, ecological benefits, aesthetic value, and positive health impacts. Meanwhile, for disaster management, UOSs play critical roles across the four phases: mitigation, preparedness, response, and recovery. The findings suggest that UOSs serve two crucial purposes: improving the quality of urban life and supporting disaster management efforts, making them an essential component of sustainable urban planning.

1. Introduction

IGI Global, [1], Jansson and Randrup,[2] stated that urban open spaces (UOSs) are unbuilt spaces. Jansson and Randrup [2] Jonodesign, [3] mentioned that UOSs include green space, blue space, brown space and grey space. In accordance to Suomalainen *et al.,* [4] Jansson *et al*., [5] UOSs as urban nature comprises vegetated green areas, known as urban green, and additionally hard surfaces, water elements, and brown areas for spontaneous vegetation and use.

According to Jonodesign [3], the periodic table of elements that improved understanding by sorting information in a structured way, whereas the infographic uses the table as a template for illustrating the different types of open space found in urban, sub-urban and peri-urban (urban fringe)

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areas, represented with 118 different types, illustrating the diverse character of urban open space as shown in Figure 1.

Fig. 1. Periodic table of open space, source Jonodesign [3]

This study addresses gaps related to the size, accessibility, and multi-functionality of UOSs. It explores how UOSs can simultaneously provide recreational, ecological, aesthetic, and health benefits while contributing to disaster mitigation, preparedness, response, and recovery. The findings aim to offer valuable insights for academics, policymakers, urban planners, communities, and stakeholders. These research aims to define the dual roles of UOSs in enhancing urban life and supporting disaster management.

2. Methodology

A content analysis of the literature review was conducted to gather relevant information on UOSs for urban life and disaster management. Content analysis is to utilized and scrutinize the literature review presented in the articles. UOSs play a vital role in enhancing urban life and offer numerous benefits to urban communities. UOS also contribute to disaster management.

3. Results

3.1 Urban Open Spaces for Urban Life

Suomalainen *et al*., [4], Jansson *et al.,* [5], mentioned that urban open space is often publicly accessible sites. Scholarly Community Encyclopaedia, [6] stated the urban open space provide to citizens into four basic forms: recreation, ecology, aesthetic value, and positive health impacts. Scholarly Community Encyclopaedia, [6] further stated that these spaces reserved for parks, green spaces, and other open areas, whereas the landscape of UOSs can range from playing fields to highly maintained environments to relatively natural landscapes, and sometimes privately owned, such as higher education campuses, neighbourhood/ community parks/ gardens, and institutional or corporate grounds. According to IGI Global, [1] urban open space includes public spaces, private spaces, green spaces, playgrounds gardens and urban plazas. Sahin *et al*., [7] mentioned that open green spaces are one of the most crucial urban components in creating healthy, functional, and

aesthetically pleasing environments. As stated by Suomalainen *et al*., [4], UOSs are sources of recreation due to the nature experiences they provide, the different services they offer, and the social environment they constitute; including their impact on psychological and physical health.

Public open spaces are often used as a mode to make cities sustainable from all its three counts which is economic, environmental and social [8,9]. In addition, Jayakody *et al*., [8] stated that most of the contemporary urban planners, use the public open spaces to make sustainable cities in multiple-dimensions, and explained that public open spaces are mostly used to improve the scenic amenity and to promote active and passive engagement with the place, benefiting the physical and psychological wellbeing of urban dwellers. Jayakody *et al*., [8] further elaborated that these open spaces are also used to promote social interaction and cohesion for economic, environmental and social., and also as a mode to increase the urban quality of life, improve aesthetic attractiveness, improve the environmental health, growth of economy, and to increase the walkability, live ability and vitality of a city which direct towards the sustainability. Timalsina and Subedi, [10] explained the development of open areas has not been given much attention in the earlier urban planning practice, but recent urban development planning has emphasized with a special focus which is very important for sustainable and safer city development and is expected to address the current bulging urban issues of spatiality and sociability. Timalsina and Subedi, [10], emphasized the importance of open spaces for (re)shaping the urban form and enhancing urban social life. Figure 2 illustrates role of urban open spaces for enhancing urban social life.

Fig. 2. Urban open spaces for enhancing urban life located at Bangi Sentral, Bandar Baru Bangi

In Malaysia, as reported by Suratman *et al.,* [11] the importance of providing open space was initiated by the government since the idea to transform Malaysia into Garden City has emerged as a response to the Langkawi Declaration in 1989 and national commitment in rationalizing Agenda 21 in 1992. Suratman *et al.,* [11] added that the need to increase the quantity of open space continues to be emphasized in the NUP 2 (2016-2025) as one of the efforts to create a safe, clean and comfortable neighbourhood. In line with Bektas and Sakarya [12], KENTGES [13], open spaces are function as parks, public squares, sports arenas, religious and educational facilities. As per Bektas and

Dogan [14], open spaces are public parks and gardens. As stated by Carrasco and O'Brian [15], open spaces to accommodate community needs and cultural preferences. As reported by Jayakody *et al.,* [16] open spaces to improve the quality of life, aesthetic beauty, environmental health, economic growth and increase walkability, live ability, and vitality of the cities. Furthermore, in accordance with Senik and Uzun [17], open spaces functions for ecological, recreational, spatial and economic.

3.2 Urban Open Spaces for Disaster Management

According to Sahin *et al*., [7] the industrialization, rapidly increasing population, and the rise in disaster events have heightened the significance of green spaces, whereas each urban open and green area component performs multiple functions including serve as gathering and living spaces in disaster management. As per Bektas and Sakarya [12], KENTGES, [13] open spaces can function as emergency assembly areas and for disaster prevention. Emergency means an adverse situation that impacts people, environment, asset and reputation (PEAR) and requires immediate action, meanwhile assembly area means the designated place or places where people assemble during the course of an evacuation [18]. Bektas and Sakarya, [12] stated that emergency assembly areas, serve various functions in disaster management, as muster points, evacuation areas, emergency aid centres and temporary accommodation areas, and concluded basic criteria of emergency assembly areas: adequate size, away from disaster risks, and accessible. In line with Bektas and Dogan [14] discussed about gathering, evacuation, and shelter areas. Furthermore, Bektas and Dogan [14] Cinar [19], listed five basic criteria for assembly area: accessibility, easy connection, usability and multi-functionality, ownership, and size. Bektas and Sakarya [12], emphasized that it is of vital importance to establish emergency assembly areas, which is the first stage area prior to moving on to the evacuation area and to establish temporary shelters in the wake of a disaster.

Open spaces play dual roles in providing locations for temporary accommodation and rescue activities during disaster situations [20]. The establishment of resilient cities often involves the identification of emergency gathering and shelter sites to mitigate the potential aftermath of disasters and emergencies [21]. Transform open spaces for the recovery and revitalization of the disaster-affected communities [15]. Sahin *et al.,* [7] mentioned that urban open and green area components offer significant opportunities for disaster management. Meanwhile, Fei *et al.,* [22] emphasized that urban green spaces, play a key role in sheltering and housing, including improves disaster prevention, enhancing evacuation efficiency during disasters, improving overall urban disaster prevention, and emergency management capabilities.

The needs in identifying and developing open areas that are: easily accessible, centrally located, and suitable designed safe for the use of the community [23]. Large urban open green spaces such as parks, squares, sports fields are used as assembly points and temporary shelters [17]. It is important to utilize open spaces as emergency assembly points [24]. Emergency gathering and temporary shelter areas are safe areas that people urgently need to reach during and after a disaster and are not exposed to disaster risks [7]. Open green spaces used as emergency assembly points, and the selection of emergency assembly points within the urban area holds significant importance for ensuring swift and effective intervention in the aftermath of a potential disaster until temporary shelter areas are prepared [25]. Size, spatial distribution, usability, accessibility, and connections to emergency transportation routes of emergency assembly areas earmarked for use in the event of a disaster are of vital importance [12]. There is a need of planning of sufficient and safely (suitable site selection) open green spaces, which will provide emergency assembling and temporary and/or long-term shelter public, which can be accessed at certain distances, as emergency assembly points and temporary shelter areas (multiple use) [17]. The emergency assembly areas are evaluated

qualitatively based on the criterion of appropriateness, with the sub-variables of usability, accessibility, and safety [14]. The criteria of emergency assembly areas: adequate size, away from disaster risks, and accessible to all residents [12].

As stated by Senik and Uzun [17], it is important to place the assembly points and temporary shelters close to certain urban occupancy areas (health institutions, main roads) and far away from certain others (areas with flood risk, fuel stations, existing buildings). Sahin *et al*., [7], emphasized that emergency gathering and temporary shelter areas are places where information is provided to those affected by the disaster, where support teams work together, and where people are directed to temporary shelter areas set up after the disaster. Sahin *et al*., [7], mentioned that emergency gathering and temporary shelter areas are of critical spatial importance in preventing or reducing casualties during disasters, meeting urgent needs, systematically managing the disaster situation, and restoring normal life as quickly as possible. Sahin *et al*., [7] added that accessible open and green areas (OGAs) to serve as a gathering spaces and temporary shelters during emergency response to disasters such as flood, earthquake, storm, terrorism, and battle. As mentioned by Jayakody *et al*., [9] open space as an agent of recovery, to provide essential life support, primary place to rescue and for shelters and potential adaptive response.

Open spaces play a crucial role in the first emergency phases, like in the evacuation process, since they host emergency paths and gathering areas [26]. Gathering areas can also is used as pre-evacuation areas, whereas there are five basic criteria are taken into account when identifying emergency assembly areas: accessibility, connectivity to the road network, usability and versatility, ownership, and spatial size/dimensions [7,21].

Wang *et al*., [27] mentioned that emergency evacuation is the process of removing people from an area of imminent or actual threat to individual safety and life to an area of safety, and the evacuation process is frequently divided into: pre-travel, and travel phases (the actual physical evacuation of the occupants from an area). As per MS 2735 [18], evacuation means organized, phased and supervised dispersal of people from dangerous or potentially dangerous areas to places of safety. Wang *et al*., [27], stated that several factors may affect the evacuation process and final outcome, including the nature and scope of the event, the features of the hazard, the features of the affected area, the notifications and information to the public, the behavior of the evacuees, as well as the planning and execution of the evacuation.

Public open spaces have the potential to act as a facilitator for emergency evacuation [9,8]. Open spaces for evacuation [28-30]. According to Setiawan *et al.,* [28] open space for gathering point. Gong *et al.,* [30] explained that the pattern and factors of public open space as an evacuation space are influenced by:

i. The physical aspect of the availability of the nearest public space in the form of environmental roads and open spaces in residential areas.
ii. Non-physical aspects include survivors' and refugees' social interactions.

Khalili *et al.,* [31] reported that transit-based evacuation planning exhibits unique characteristics within disaster management, whereas open spaces located at within the community with easy access to transportation and near the river system can better meet evacuation requirements, whereas the closer the open spaces to commercial facilities, the more difficult to meet the requirements. Cavus and Percin [32], highlighted that another point as important as the disaster parks is the evacuation roads leading to the area and explained that in addition to determining evacuation routes, preparations is made for other natural events that may occur after the disaster especially Urban

Earthquake Recovery Parks which can solve the majority of the problems caused by post-earthquake chaos.

Jayakody *et al.,* [9] explained that there are six strategies. First, planning public open spaces as a strategy for emergency response and recovery aligned with everyday life of the city. Second, design the spaces as a loose space. Third, to harness the potential use of different types of open spaces for different functions in emergency response and recovery. The strategy of mixing diversity of public open spaces to the city layout. Fourth, design a network of public open spaces contributing to both disaster resilience and urban resilience, to facilitate the city's open spaces system to act as a second city after a major disaster. The potential conversion of hazard-prone areas which allocated for mitigation purpose into public open spaces. Fifth, plan and design public open spaces addressing multiple objectives (incorporating sustainability, disaster mitigation, liveable community and enhancing economic vitality). Sixth, get the highest and best use of available spaces in cities.

In accordance with Ibrahim *et al.,* [33] that there are many problems face by the local authorities in the development planning, lack of funding, policy non-compliance, rapid development, and financial constraints. According to Hossain *et al.,* [34] open spaces functions to handle any emergency situation as a temporary shelters and assembly places, and Barzallo *et al.,* [29] highlighted the importance factor of public open spaces for evacuation for persons with disabilities during disasters. Jayakody *et al.,* [8] discusses the potential uses of public open spaces as a facilitator for emergency evacuation, as an agent of recovery and as a strategy for mitigation; and suggest the potential planning and design interventions that can be incorporated when using public open spaces for disaster resilience cities. Meanwhile, Jayakody *et al.,* [16] stated that past disaster events evidence that public open spaces have a significant potential to contribute to disaster management as a primary place to rescue and for shelters, as an agent of recovery, to provide essential life support and potential for adaptive response. Russo *et al.,* [35] emphasized that open spaces such as streets, squares, and green areas, in existing built environment (BEs) are key places in disaster risk management. Meanwhile, Timalsina and Subedi [10], stated the importance of open spaces for (re)shaping the urban form and are also important for enhancing urban social life and disaster risk management, particularly for dense cities which is use for risk relief, treatment, recovery, and rehabilitation.

As stated by Saxena [23], roles of open spaces include prevention and recovery during floods, recovery during earthquake, mitigate cyclones, prevent, and mitigate fire and mitigate landslide. Saxena [23] further explained that the disaster mitigation and recovery planning can effectively be done if have many more open spaces, treated as per the need of the hazard, including identifying and developing open areas that are easily accessible, centrally located, suitable designed safe for the use of community.

Table 1, summarizes the main findings of articles related to vital role of UOSs in enhancing urban life and offer numerous benefits to urban communities, and the contribution to disaster management.

Table 1
The previous research that highlighted the role of urban open spaces for enhancing urban life and disaster management

Author	Role of Urban Open Spaces	
	Enhancing Urban Life (Recreation, Ecological Benefits, Aesthetic Value, and Positive Health Impacts)	Disaster Management (Mitigation, Preparedness, Response, and Recovery)
Suomalainen *et al*., (2022) [4]	Recreation, social environment, psychological and physical health.	Not available.

Scholarly Community Encyclopaedia, (2022) [6]	Recreation, ecology, aesthetic value, and positive health impacts.	Not available.
Sahin *et al*., (2024) [7]	Creating healthy, functional, and aesthetically pleasing environments.	Gathering, living spaces and temporary shelter areas.
Jayakody *et al*., (2016) [8]	Economic, environmental, and social. To improve the scenic amenity and to promote active and passive engagement, physical and psychological wellbeing. To improve aesthetic attractiveness, environmental health, growth of economy, and to increase the walkability, live ability and vitality.	Emergency evacuation, as an agent of recovery and as a strategy for mitigation.
Jayakody *et al*., (2018a) [9]	Economic, environmental, and social.	As an agent of recovery, to provide essential life support, primary place to rescue and for shelters and potential adaptive response, and as a facilitator for emergency evacuation. Act as a second city after a major disaster.
Timalsina and Subedi, (2022) [10]	Sustainable and safer city development, and for (re)shaping the urban form and enhancing urban social life.	Disaster risk management, particularly for dense cities which is use for risk relief, treatment, recovery, and rehabilitation.
Suratman *et al*., (2020) [11]	Transform Malaysia into Garden City. To create a safe, clean, and comfortable neighbourhood.	Not available.
Bektas and Sakarya, (2020) [12]	Function as parks, public squares, sports arenas, religious and educational facilities.	Disaster prevention and emergency assembly areas.
Kentges, (2010) [13]	Function as parks, public squares, sports arenas, religious and educational facilities.	Emergency assembly areas and disaster prevention.
Bektas and Dogan, (2024) [14]	Public parks and gardens.	Gathering, evacuation, and shelter areas.
Wei *et al*., (2020) [20]	Not available.	Temporary accommodation and rescue activities during disaster situations.
Carrasco and O'Brian, (2018) [15]	Accommodate their needs and cultural preferences.	Recovery and revitalization of the disaster-affected communities.
Fei *et al*., (2023) [22]	Not available.	Sheltering and housing, including improves disaster prevention, enhancing evacuation efficiency, improving prevention, and emergency management capabilities.
Senik and Uzun, (2020) [17]	Ecological, recreational, spatial, and economic.	Large parks, squares, sports fields are used as assembly points and temporary shelters.
Nowsheen *et al*., (2021) [24]	Not available.	Emergency assembly points.
Akar, *et al*., (2024) [25]	Not available.	Emergency assembly points.
Bernabei *et al*., (2021) [26]	Not available.	First emergency phases, like in the evacuation process, since they host emergency paths and gathering areas.
Barzallo *et al*., (2022) [29]	Not available.	Evacuation, including for persons with disabilities during disasters.
Gong, *et al*., (2017) [30]	Not available.	Evacuation.
Cavus and Percin, (2021) [32]	Not available.	Urban Earthquake Recovery Parks.

Hossain, *et al*., (2019) [34]	Not available.	Temporary shelters and assembly places.
Jayakody *et al*., (2022) [16]	Improve the quality of life, aesthetic beauty, environmental health, economic growth and increase walkability, live ability, and vitality of the cities.	Primary place to rescue and for shelters, as an agent of recovery, to provide essential life support and potential for adaptive response.
Russo *et al*., (2022) [35]	Not available.	Key places in disaster risk management.
Saxena, (2016) [23]	Easily accessible, centrally located, and suitable designed safe for the use of the community.	Prevention and recovery during floods, recovery during earthquake, mitigate cyclones, prevent, and mitigate fire and mitigate landslide. Disaster mitigation and recovery planning.

3.3 Challenges

As stated by Madsen [36], open spaces are threatened to disappear to development (growing populations numbers). According to Saxena [23], the vulnerability of all these developments is much more than those in the village areas. Based on study by Cetin [21], deficient in terms of both size and quantity of UOSs. Senik and Uzun [17], stated that there are deficiencies in the site selection and size of the emergency assembly points and temporary shelter areas in the city. However, study by Randrup *et al.,* [37] found that more urban open space is created as a direct result of increased urbanisation, leading to new, but smaller spaces. Sahin *et al.,* [7] mentioned that the population lacking gathering and temporary shelter facilities during and after a disaster is a factor that reduces urban resilience. Sahin *et al.,* [7] added that the resilience of cities can be strengthened if there are enough open and green areas, and if these areas are integrated into the daily life of the community (in other words, if the connection between the place and the community is established). According to Saxena [23], no refuge space substantially big for the people to escape the disaster and the setbacks are the only spaces that could be considered safe, yet they are equally small linear stretches barely able to accommodate people. As per Ibrahim [33], rapid development in urban areas make it difficult to impose open spaces provision to developers and, among others, contribute to the difficulty for local authorities to meet the population's demand to provide an area for recreation.

As mentioned by Saxena [23], most developments are designed with provisions of parking in the basement covering 90% of the site and it is really important to visualise that 90 % of the site is built up and not on natural earth. According to Carrasco and O'Brian [15], the limited land available restricts opportunities for high-quality spatial design within the settlements to optimize the land and provide the maximum number of houses possible. Sinxadi and Campbell [38], mentioned that rapid changes in land use and occupancy patterns of UOSs have led to value conflicts in terms of the quest for sustainable neighbourhoods and becoming extinct due to rapid urbanization, hence affecting the spatial patterns of urban land use. Madsen [36], lack of proper city plans and provision of cheap housing has contributed to uncontrolled encroachment of UOSs. Jayakody *et al.,* [8], Jayakody *et al.,* [9], The integration of disaster management strategies with planning public open spaces remains unrehearsed within the urban planning context.

The development of open areas has not been given much attention in the earlier urban planning practice [10]. Increasing population and densification of the cities lead to increasing land value by the high demand of land for housing and other infrastructure developments are the reasons that tend to decreasing open spaces [39]. Lack of attempts to harness the potential through the integration of disaster management strategies into planning and designing public open spaces in cities [16]. Sinxadi and Campbell [38], stated that in planning, the implementation of land use regimes is lacking, especially in land earmarked for UOSs.

According to Ibrahim *et al.,* [33] financial constraints to provide, manage and maintain open spaces are an important problem that local authorities face on issues related to the management of open spaces. Ibrahim *et al.,* [33] added that the study found that the availability of land, lack of funding and policy compliance are the main obstacles hindering local authorities to provide better service to the public.

As stated by Wan Mohd Rani [40], lack of social interactions in urban neighbourhood would eventually lead to greater urban problems such as threat to the safety aspects and sense of security among the residents. Meanwhile, in accordance with Kusumadewi *et al.,* [41] urban infrastructure is increasingly growing vertically and horizontally to meet population growth, especially residents, and the development of their activities.

4. Discussions

This study revealed that UOSs contribute to urban life through four key functions: recreation, ecological benefits, aesthetic value, and positive health impacts.

UOSs contribute to urban life through function as a place for recreation and its role is to provide facilities such as parks, public squares, sports arenas, religious and educational facilities. UOSs also promote social environment and active engagement to accommodate their needs, based on cultural preferences. These spaces are able to increase and enhance urban social life, including providing safe place for the use of community. UOSs also contribute to urban life through function in terms of ecological benefits to help in maintaining ecological balance.

Besides that, UOSs contribute to urban life through function as an aesthetic value which improves the aesthetic attractiveness, beauty, and scenic amenity. These spaces improve the quality of life, growth of economy, increase walkability, live ability, and vitality of the cities. Furthermore, these spaces create a safe, clean, spatial, and comfortable neighbourhood. These spaces vital for sustainability, safe city development, and for shaping and reshaping the urban form.

Lastly, UOSs contribute to urban life through promoting positive health impacts especially physical, psychological wellbeing and environmental health. Meanwhile, for disaster management, UOSs play critical roles across the four phases: mitigation, preparedness, response and recovery.

UOSs play critical roles as a strategy for mitigation for disaster management in order to reduce the impacts of disasters. These places function as key places in disaster risk management, particularly for dense cities which is used for risk relief. These spaces functions as an emergency assembly areas and disaster prevention area. These spaces also function to mitigate disaster such as fire and landslide.

UOSs play critical roles for preparedness phase, which is focuses on the readiness for potential disasters such as floods, earthquake, and fire. The preparedness phase includes providing emergency assembly, temporary accommodation, sheltering and housing. Large parks, squares, sports fields are used as assembly points and temporary shelters. UOSs play critical roles for response phase in providing assembly area for safe evacuation, shelter areas, temporary accommodation, and rescue activities during disaster situations.

Finally, UOSs play critical roles as an agent of recovery as primary place to rescue, providing essential support, for shelters and potential adaptive response, and act as a second city after a major disaster. This includes providing treatment, rehabilitation, accommodate urban earthquake recovery parks, and revitalization of the disaster-affected communities. These spaces are very important for recovery during floods, earthquake, and recovery planning.

UOSs, therefore, not only enhance the urban life during normal times but also play crucial roles in safeguarding and supporting communities during and after disasters. UOSs serve two crucial

purposes: improving the quality of urban life and supporting disaster management efforts, making them an essential component of sustainable urban planning.

5. Conclusion

This paper gathers relevant information on UOSs for urban life and disaster management. Content analysis is to utilized and scrutinize the literature review presented in the articles. UOSs play a vital role in enhancing urban life and offer numerous benefits to urban communities. UOS also contribute to disaster management. To this aim, 41 references have been reviewed and analysed. Through reviewing the articles, these findings are discussed based on both role of UOSs, which is to enhance the urban life and disaster management. UOSs play a vital role in enhancing urban life and offer numerous benefits to urban communities.

These spaces include green, blue, brown, and grey spaces, which are publicly accessible areas. UOSs contribute to urban life through function as a place for recreation such as parks, public squares, sports arenas, religious and educational facilities. UOSs contribute to urban life through function in terms of ecological benefits. UOSs also contribute to urban life through function as an aesthetic value which improves the aesthetic attractiveness, beauty, scenic amenity, and increase walkability, live ability and vitality of the cities. Furthermore, UOSs contribute to urban life through promoting positive health impacts.

In addition to these roles, UOSs also contribute to disaster management. UOSs play critical roles as a strategy for mitigation such as fire and landslide. Preparedness phase focuses on the readiness for potential disasters such as floods, earthquake and fire which includes providing emergency assembly areas. Meanwhile, response phase provides assembly area for safe evacuation, shelter areas, temporary accommodation, and rescue activities during disaster situations. UOSs also play critical roles as an agent of recovery and primary place to rescue, providing essential support, for shelters and potential adaptive response.

However, challenges such as rapid urbanization, high population density, limited land availability, rising land values, inadequate planning, financial constraints, and policy noncompliance have hindered the effective provision of UOSs in terms of size, accessibility, and multi-functionality. Addressing these challenges requires innovative planning, community involvement, strong policies, and sustainable funding mechanisms.

UOSs indeed serve dual purposes that are critical to both enhancing everyday urban life and providing crucial support in disaster management. By examining these dual roles, this research can highlight the necessity of thoughtful, integrated planning that prioritizes these spaces for their multiple benefits. Exploring how UOSs can simultaneously support recreation, ecological benefits, aesthetic value, and positive health impacts while also contributing to disaster mitigation, preparedness, response, and recovery could provide valuable insights for academics, policymakers, urban planners, communities, and stakeholders. This holistic understanding can drive more sustainable and resilient urban development.

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