

THE SIGNIFICANCE OF URBAN OPEN SPACE FROM SAFETY PERSPECTIVES

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Abstract. Urban open spaces (UOSs) are publicly accessible areas within urban settings designed for human interaction and recreation, encompassing parks, playgrounds, and gardens. UOSs are reserved for green spaces and other open spaces whereas areas related to the urban or built environment, including natural spaces such as valleys running through an urban area. UOSs are increasingly recognized for their multifaceted role in enhancing safety, community well-being, and disaster resilience. The aim of this paper is to determine the significance of UOSs from the safety perspectives. A literature review was conducted to gather relevant information. In terms of planning of UOSs, collaboration between local authorities and community including broader urban planning process and wider green infrastructure network is crucial. To ensure safety in public spaces, the important factors are: UOSs planning and managing urban settlements; core principles for achieving safety in public spaces; good maintenance, higher illumination and lighting sources, and take into account about the crime-related perceived safety; careful planning of UOSs as assembly areas for emergency evacuation; risk assessment; and fulfils legal and other requirements. Meanwhile, for safe evacuation and rescue, rescue facilities, rescue routes, evacuation routes and shelters are provided in UOSs. In conclusion, the significance of UOSs from safety perspectives is vital.

Keywords: *urban open spaces, disaster, safety, assembly area, emergency evacuation*

Introduction

Nowsheen et al. (2021) stated that Urban Open Spaces (UOSs) are publicly accessible areas within urban setting designed for human interaction and recreation, encompassing parks, playgrounds, and gardens. Urban Safety Reference Group (2020) and World Health Organization (WHO, 2017) emphasized the importance of collaborative planning, legal protection, and integration of these spaces into broader urban frameworks to support informal economies and community safety. Research by Zhao and Huang (2021) highlights the impact of well-maintained greenery and lighting on perceived safety, particularly among women. Jayakody et al. (2018) underscore the need for proactive hazard identification and emergency preparedness, with green spaces serving as critical infrastructure during disasters. Malaysian directives like National Disaster Management Agency (2024) and studies by Gong et al. (2017) further reinforce the importance of coordinated evacuation and rescue processes, involving multiple stakeholders and facilities, to ensure effective disaster response and recovery. As reported by WHO (2017), green space interventions are implemented to enhance environmental conditions, protect and improve biodiversity, promote outdoor activities and active lifestyles, increase social interaction and exchange, and provide healthy urban settings that support physical and mental well-being. WHO stated that when designed effectively, urban green spaces can be universally accessible, offering benefits to all urban community members. WHO further stated that even small-scale greening

initiatives can deliver health, social, and environmental benefits cost-efficiently, achieving much more than most public health interventions. Akbari Neisiani et al. (2016) mentioned that cities are dynamic systems, where parks and urban green spaces hold significant strategic importance in improving living conditions. WHO (2017) mentioned that the benefits of urban green spaces can be maximized through proper planning, design, and evaluation. WHO emphasized that the most effective urban green space interventions use a dual approach, combining physical improvements to the urban environment with social engagement and participation, promoting the use of green spaces and reaching out to diverse local users. WHO highlighted that these spaces are most sustainable when supported and implemented by various sectors and stakeholders.

In addition to their recreational, environmental, and social functions, urban open spaces can play an important role in emergency preparedness by providing accessible areas that may support evacuation, temporary assembly, and coordinated response activities during emergencies. Nowsheen et al. (2021) examined the availability and requirements of open spaces for potential emergency assembly points, demonstrating the relevance of considering open-space provision as part of urban emergency planning. Similarly, Gong et al. (2017) evaluated the evacuation and rescue capabilities of urban open spaces from a land-use perspective, indicating the importance of spatial characteristics when assessing their potential contribution to emergency response. Jayakody et al. (2018) further integrated disaster management strategies with the planning and design of public open spaces, strengthening the connection between everyday urban spaces and disaster preparedness. Within the Malaysian context, National Disaster Management Agency (2024) establishes the national policy and mechanism for disaster management, while MS 2735 (2021) provides guidelines for emergency preparedness and response in managing emergencies in facilities. These requirements indicate that emergency preparedness involves more than simply identifying an available outdoor area; consideration must also be given to how people can safely access, use, and manage such spaces when an emergency occurs. The Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations (1996) additionally provide a regulatory context for controlling major industrial accident hazards in Malaysia. Collectively, these sources support the consideration of urban open spaces not only as amenities for normal daily activities but also as potentially important components of broader emergency preparedness and disaster management systems. Consequently, evaluating their suitability for emergency purposes requires attention to accessibility, evacuation and rescue functions, coordination mechanisms, and the relationship between the physical characteristics of the space and the surrounding urban environment.

The suitability of an urban open space for emergency use should also be considered alongside environmental management, occupational safety, and the quality and physical characteristics of the space itself. MS ISO 14001 (2015) provides requirements and guidance for environmental management systems, whereas MS ISO 45001 (2018) establishes requirements and guidance for occupational health and safety management systems. When considered together with MS 2735 (2021), these standards provide relevant management perspectives for examining environmental conditions, safety considerations, and emergency preparedness within facilities and their associated spaces. The physical condition of urban green spaces is equally significant because spaces intended to support communities must remain usable and perceived as safe during normal conditions as well as potentially during emergencies. Zhao and Huang

(2021) examined the physical characteristics of urban green spaces in relation to perceived safety, while Akbari Neisiani et al. (2016) assessed urban green spaces from health, safety, and environmental perspectives. Urban Safety Reference Group (2020) also addresses the relationship between public space and urban safety, while WHO (2017) emphasizes the contribution of urban green spaces to healthier urban environments. These perspectives suggest that the assessment of urban open spaces should not focus on a single physical or functional criterion. Instead, their role should be considered through an integrated perspective incorporating environmental quality, accessibility, perceived safety, emergency preparedness, and management requirements. Such an approach is particularly relevant when urban open spaces are being considered as potential emergency assembly points, because their effectiveness depends not only on the presence of sufficient open land but also on whether the spaces can support safe access, organised use, and appropriate emergency functions. Therefore, integrating urban planning, environmental management, safety management, and disaster preparedness considerations provides a more comprehensive basis for evaluating the suitability of UOSs as potential emergency assembly points.

Materials and Methods

This paper is based on the findings of a literature analysis which was carried out as part of an ongoing PhD research study. A comprehensive review of the literature was carried out covering journal papers and other references within the subject area (National Disaster Management Agency, 2024; Nowsheen et al., 2021; Urban Safety Reference Group, 2020; Jayakody et al., 2018; Gong et al., 2017; WHO, 2017; Akbari Neisiani et al., 2016). A content analysis of the literature review was conducted to gather relevant information on the significant of UOSs from safety perspectives (Zhao and Huang, 2021; Urban Safety Reference Group, 2020; WHO, 2017; Akbari Neisiani et al., 2016). There have been many studies in terms of the UOSs from the safety perspectives in relation to assembly areas for emergency evacuation (Nowsheen et al., 2021; Jayakody et al., 2018; Gong et al., 2017). Content analysis is utilized to scrutinize the literature review presented in the articles. A systematic literature review was carried out to identify the criteria of UOSs as assembly areas for emergency evacuation (Nowsheen et al., 2021; Jayakody et al., 2018; Gong et al., 2017). A review of the significant of UOSs in terms of safety perspectives was studied to ensure safety in public spaces (Zhao and Huang, 2021; Urban Safety Reference Group, 2020; WHO, 2017; Akbari Neisiani et al., 2016).

The literature analysis was structured to examine UOSs from the interconnected perspectives of urban safety, emergency preparedness, evacuation and rescue capability, environmental management, and disaster management. The sources considered in the review comprised peer-reviewed journal articles, published conference research, national standards, government directives, regulations, and institutional publications. This combination of academic and institutional literature was considered relevant because the identification of UOSs as potential assembly areas for emergency evacuation involves both physical characteristics of urban spaces and the broader requirements associated with emergency management and public safety. Studies addressing the availability of open spaces for potential emergency assembly points and the evacuation and rescue capabilities of urban open spaces were considered in examining the emergency functions of UOSs (Nowsheen et al., 2021; Gong et al.,

2017). The integration of disaster management strategies with the planning and design of public open spaces was also considered in understanding the relationship between urban planning and disaster preparedness (Jayakody et al., 2018). In the Malaysian context, the review incorporated National Disaster Management Agency (2024) to provide the national disaster-management perspective and MS 2735 (2021) to consider guidelines related to emergency preparedness and response in facilities. The analysis additionally considered the broader safety and environmental dimensions of UOSs through literature addressing public-space safety, urban green spaces, and their physical characteristics (Zhao and Huang, 2021; Urban Safety Reference Group, 2020; WHO, 2017; Akbari Neisiani et al., 2016). Through this approach, information obtained from the selected literature was examined according to its relevance to the safety functions of UOSs and their potential application as assembly areas during emergency evacuation rather than considering urban open spaces exclusively in terms of their conventional recreational and environmental functions.

The content analysis subsequently focused on identifying recurring considerations associated with the suitability of UOSs for emergency evacuation and assembly purposes. Particular attention was given to literature addressing emergency assembly points, evacuation and rescue capability, public-space safety, emergency preparedness, disaster management, occupational safety, and environmental management. Nowsheen et al. (2021) provided literature directly concerning the gap between available and required open spaces for potential emergency assembly points, while Gong et al. (2017) addressed the evacuation and rescue capabilities of urban open spaces from a land-use perspective. These sources were considered together with Jayakody et al. (2018), who examined the integration of disaster management strategies with the planning and design of public open spaces. The analysis also incorporated relevant Malaysian requirements and guidance to establish the institutional and safety context for emergency preparedness. These included National Disaster Management Agency (2024), MS 2735 (2021), MS ISO 45001 (2018), MS ISO 14001 (2015), and the Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations (1996). The Malaysian standards respectively address emergency preparedness and response, occupational health and safety management systems, and environmental management systems. The regulatory source additionally provides the Malaysian context for the control of industrial major accident hazards. Literature concerning the broader quality and safety of urban spaces was also examined through Zhao and Huang (2021), Urban Safety Reference Group (2020), WHO (2017), and Akbari Neisiani et al. (2016). The information obtained from these different source categories was then considered collectively to identify relevant safety-related considerations for UOSs as potential assembly areas. This literature-based procedure enabled academic findings to be considered alongside standards, regulatory requirements, and disaster-management guidance, thereby providing the methodological basis for examining UOSs from the perspective of emergency evacuation and public safety.

Results and Discussion

Planning of urban open spaces

According to WHO (2017), cross-sectoral collaboration within local authorities and community groups actors can help deliver multiple outcomes. WHO mentioned that the

planning and design of urban green space interventions actively involve the local community and the intended end users, ensuring community engagement and the delivery of interventions that meet the community's needs. WHO further mentioned that urban green space is considered as part of the broader urban planning process and the wider green infrastructure network. WHO highlighted that urban greening interventions are embedded in local planning frameworks and masterplans, and are reflected in other sector policies such as housing, transport, health, sustainability, and biodiversity. WHO (2017) explained that, while there are short-term effects, green space interventions should be seen as a long-term urban investment, providing the most substantial benefits over time. WHO further explained that the use and benefits of urban green spaces are evaluated to guide future planning and ensure that current green spaces are reviewed and adapted to meet the community's needs (*Figure 1*). WHO (2017) emphasized that urban green space interventions are collaboratively planned with communities, integrated into broader urban and policy frameworks, and treated as long-term investments that are regularly evaluated to meet evolving local needs.

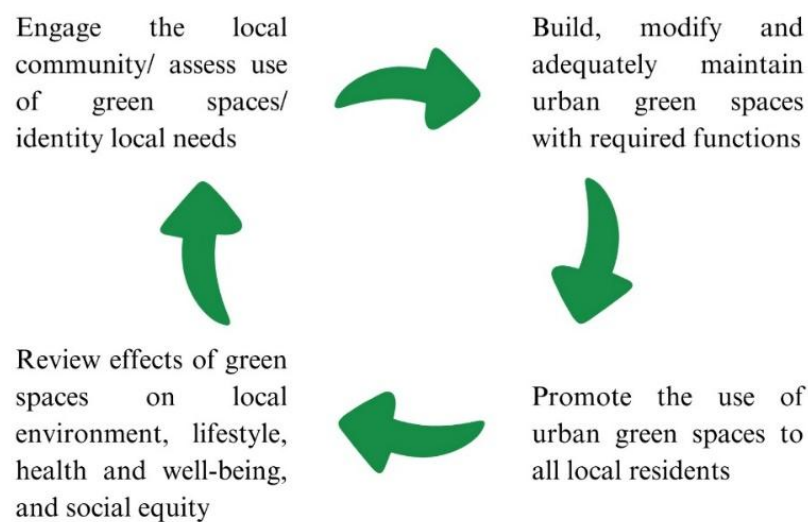


Figure 1. Green space action cycle.
Source: WHO (2017).

Safety in public spaces

Urban Safety Reference Group (2020) stated that the underappreciated importance of public spaces in planning and managing urban settlements. Urban Safety Reference Group further stated that the lack of legislative protection for public spaces, which often leads to their sale for development. Urban Safety Reference Group emphasized that public spaces significantly support livelihoods through the informal economy, such as street vendors, and this role needs better support and nurturing. Urban Safety Reference Group added that the core principles for achieving safety in public spaces (*Figure 2*). In accordance with Zhao and Huang (2021), safety is essential for livable cities. Zhao and Huang reported: (i) good maintenance of vegetation, open view, low locomotive accessibility of water, and more aquatic plants can predict a higher overall perceived safety during the daytime; (ii) higher illumination and lighting sources in the distance of vision indicate a higher overall perceived safety during the evening; (iii) females are more worried about the crime-related perceived safety than males during the daytime or evening. Zhao and Huang (2021) found that well-maintained greenery and lighting

improve perceived safety in cities, especially during day and night, with women generally feeling more concerned about crime than men. Jayakody et al. (2018) explained that disasters, whether seasonal (e.g., floods) or unpredictable (e.g., earthquakes), require careful planning of open green spaces for assembly points and temporary shelters. Jayakody et al. (2018) further explained that planning these spaces away from the daily routine of the city can lead to isolated areas and additional costs for municipalities, open green spaces integrated into the daily life of the city. As per to MS ISO 45001 Occupational health and safety management systems-Requirements with guidance for use (2018), sub-clause 6.1.2.1 Hazard identification stated that the organization shall establish, implement and maintain a process(es) for hazard identification that is ongoing and proactive; and the process(es) shall take into account, but not be limited to d) potential emergency situations. Meanwhile, Clause 8.2 Emergency preparedness and response stated that the organization shall establish, implement and maintain a process(es) needed to prepare for and respond to potential emergency situations. Meanwhile, MS ISO 14001 Environmental management systems-Requirements with guidance for use (2015), Clause 8.2 Emergency preparedness and response stated that the organization shall establish, implement and maintain the process(es) needed to prepare for and respond to potential emergency situations.



Figure 2. Core principles for achieving safety in public spaces.
Source: Urban Safety Brief (2020).

Based on MS 2735 Emergency preparedness and response (EPR)-Guidelines in managing emergencies in facilities (2021), assembly area(s) mean the designated place or places where people assemble during an evacuation. The assembly area shall be at an open, safe area. It should not impede the entry of emergency service vehicles or operations. For a facility that falls under Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations (1996), determination of an assembly area should be based on risk assessment result. Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations (1996) clearly stated that requirements for manufacturers under major hazard installation to establish on-site and

off-site emergency plans. The manufacturer shall provide the local authority or port authority with information relating to the industrial activity under his control. It shall be the duty of a manufacturer who has control of an industrial activity to ensure that people outside the site who are likely to be in an area which is likely to be affected by a major accident occurring at the site, are supplied in an appropriate manner with at least the information specified in Schedule 3. According to National Disaster Management Agency (2024) as the guiding document for disaster management. National Disaster Management Agency (2024) outlines Malaysia's disaster management policies and mechanism for before, during and after (post-disaster) encompassing prevention, mitigation, preparation, responses and recovery efforts. It defines roles and responsibility of government agencies, statutory bodies, NGOs and private entities involved in disaster management. Among the challenges are road access, communication, utilities and coordination. Urban Safety Reference Group (2020) highlighted that public spaces are vital yet undervalued in urban planning, often lacking legal protection, and play a key role in supporting informal livelihoods and community safety.

Evacuation and rescue

Gong et al. (2017) explained that disaster emergency response, involving evacuees, rescuers, government institutions, and social organizations, is divided into two processes: evacuation and rescue (*Figure 3*). Based on *Figure 3*, Gong et al. (2017) explained that the evacuation process involves residential areas, shelters, and evacuation routes, while the rescue process includes shelters, rescue routes, and rescue facilities for medical, security, or goods supply purposes. *Table 1* summarizes the significant of UOSs from safety perspectives.

Table 1. Appropriate distances for pedestrian access.

No	Item	Description
1	Planning of Urban Open Spaces	The importance of collaboration of local authorities and community. The importance of broader urban planning process and wider green infrastructure network.
2	Safety in Public Spaces	The importance of UOSs planning and managing urban settlements. The importance of core principles for achieving safety in public spaces. The importance of good maintenance, higher illumination and lighting sources, and consideration about crime-related perceived safety. The importance of careful planning of UOSs as assembly areas for emergency evacuation. The importance of risk assessment. The importance of fulfilling legal and other requirements.
3	Evacuation and Rescue	The importance of rescue facilities, rescue routes, evacuation routes and shelters in UOSs.

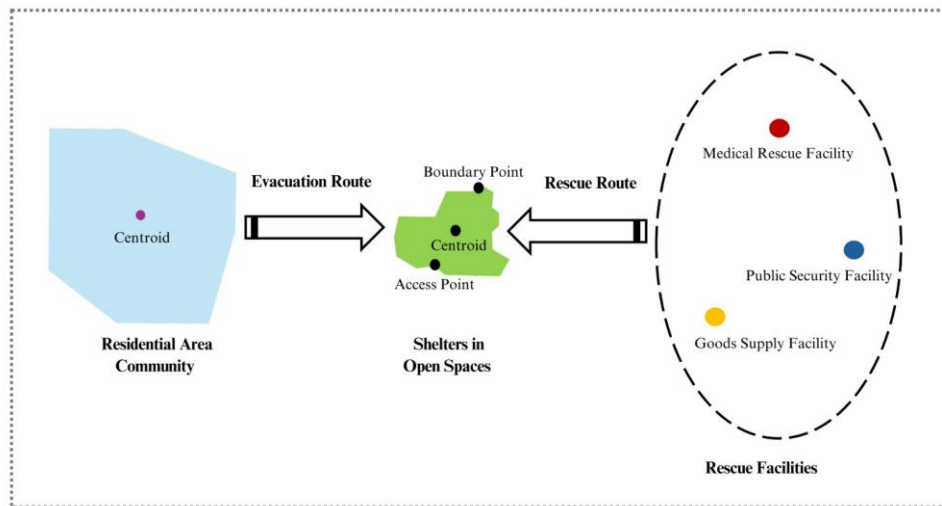


Figure 3. Schematic of evacuation and rescue factors.
Source: Gong et al. (2017).

UOSs play a critical role in ensuring public safety, particularly in times of disaster (Nowsheen et al., 2021; Urban Safety Reference Group, 2020; Jayakody et al., 2018; Gong et al., 2017; Akbari Neisiani et al., 2016). UOSs shall be carefully planned and integrated into daily urban life to serve as effective assembly points and shelters during disasters (Nowsheen et al., 2021; Jayakody et al., 2018). Their importance lies not only in their everyday function as recreational and communal areas but also in their capacity to serve as assembly points, temporary shelters, and emergency evacuation during emergencies (MS 2735, 2021; Nowsheen et al., 2021; Jayakody et al., 2018; Gong et al., 2017). To maximize this dual purpose, UOSs must be carefully planned, designed, and integrated into the fabric of urban life (Nowsheen et al., 2021; Jayakody et al., 2018; WHO, 2017). Safety considerations for UOSs include hazard identification and risk assessment (MS ISO 45001, 2018; Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations, 1996). Ongoing identification of hazards and assessment of risks is essential to ensure UOSs remain safe and reliable (MS ISO 45001, 2018). Community and local authority engagement and cooperation is vital to enhance preparedness, fosters trust, and ensures that UOSs are managed effectively (WHO, 2017). UOSs should be built or adapted to accommodate both daily activities and emergency functions whereas regular maintenance ensures they remain safe, accessible, and resilient (Zhao and Huang, 2021; Jayakody et al., 2018). Promotion to public in order to encourage communities to recognize UOSs as safe assembly areas and emergency evacuation, ensuring widespread awareness of their role in disaster response (MS 2735, 2021; Nowsheen et al., 2021). The effects of UOSs on local environment, lifestyles, public health, and social equity must be continuously assessed to balance safety with sustainability (WHO, 2017; Akbari Neisiani et al., 2016). The core principles for achieving safety of UOSs include the emphasis on the local context, integrated approach, holistic intervention, activated public space, crime prevention through environmental design, homegrown public spaces and participation (Urban Safety Reference Group, 2020). The importance of being ready for potential emergencies through ongoing planning and management (MS 2735, 2021; MS ISO 45001, 2018; MS ISO 14001, 2015).

In Malaysia, National Disaster Management Agency (2024) serves as Malaysia's main guide for disaster management, covering all phases from prevention to recovery. It assigns roles to various stakeholders and highlights key challenges like road access, communication, utilities, and coordination (National Disaster Management Agency, 2024). Disaster management involves evacuees, rescuers, authorities, and social groups, and is carried out through evacuation and rescue (Gong et al., 2017). UOSs are not just recreational spaces, they are strategic assets for urban resilience (Nowsheen et al., 2021; Urban Safety Reference Group, 2020; Jayakody et al., 2018; Gong et al., 2017). Their safety, accessibility, and integration into disaster management frameworks ensure that communities are better prepared, protected, and empowered in the face of emergencies (National Disaster Management Agency, 2024; MS 2735, 2021; Nowsheen et al., 2021; Jayakody et al., 2018; Gong et al., 2017).

Conclusion

This paper highlights the significance of Urban Open Spaces (UOSs) from a safety perspective by examining their roles in urban planning, public safety, emergency preparedness, evacuation, and rescue. The findings demonstrate that UOSs should not be regarded solely as recreational and environmental spaces but also as important components of urban safety and disaster management systems. Effective planning of UOSs requires collaboration between local authorities, communities, and other relevant stakeholders, together with their integration into broader urban planning processes and green infrastructure networks. From the perspective of public safety, UOSs should provide environments that are accessible, appropriately maintained, adequately illuminated, and responsive to the safety needs of different groups within the community. Their planning and management should also incorporate proactive hazard identification, risk assessment, emergency preparedness, and compliance with relevant legal and other requirements. These considerations become particularly important when UOSs are intended to function as assembly areas during emergencies. Such spaces should be located in safe and accessible areas, remain suitable for the movement and assembly of evacuees, and avoid interfering with emergency service vehicles and rescue operations. The findings further demonstrate that the integration of UOSs into the everyday urban environment can strengthen their usefulness during emergencies because spaces that are regularly used and maintained are more likely to remain accessible and familiar to communities. Therefore, the safety function of UOSs depends on an integrated approach that combines appropriate physical planning with continuous management, maintenance, community participation, and emergency preparedness. This reinforces the importance of considering UOSs as multifunctional urban assets capable of supporting both everyday community activities and emergency functions, thereby contributing to safer and more resilient urban environments.

The findings also emphasize that evacuation and rescue should be incorporated into the planning and management of UOSs because effective disaster response depends on the relationship between residential areas, evacuation routes, shelters, rescue routes, and supporting rescue facilities. UOSs can provide strategically important locations for emergency assembly and temporary shelter when these elements are appropriately connected and coordinated. In the Malaysian context, this role is particularly relevant to the broader disaster management framework, which encompasses prevention, mitigation, preparedness, response, and recovery and requires coordination among

government agencies, statutory bodies, non-governmental organizations, private entities, emergency services, and communities. Consequently, UOS planning should consider not only the physical availability of open spaces but also their accessibility, surrounding hazards, evacuation connectivity, emergency service access, capacity to accommodate users, and suitability under different emergency conditions. Regular assessment and maintenance are equally important to ensure that spaces designated for emergency functions remain usable when required. Public awareness and community participation should also form part of this process so that communities understand the location and function of appropriate assembly areas and can respond more effectively during emergencies. Overall, the content analysis demonstrates that planning of UOSs, safety in public spaces, and evacuation and rescue are closely interconnected rather than independent considerations. The effectiveness of UOSs as part of urban disaster preparedness therefore depends on integrating these dimensions throughout planning, implementation, management, and evaluation. By incorporating safety and emergency functions into the planning of UOSs while maintaining their environmental, recreational, and social functions, cities can strengthen preparedness and improve community resilience. This paper therefore provides a basis for recognising UOSs as strategic components of safer urban environments and highlights the importance of incorporating their emergency functions into future urban planning and disaster management practices.

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Conflict of interest

The authors declare no conflict of interest.

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