

DEVELOPING CRITERIA FOR IDENTIFYING HUMANITARIAN OPEN SPACES FOR DISASTER PREPAREDNESS IN RURAL NEPAL

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Key Words: Humanitarian Open Spaces, Disaster Response, Disaster Preparedness, Climate resilience

Summary:

The identification and utilization of open spaces are crucial for effective disaster response and humanitarian activities. Open spaces, defined as land areas that are free from buildings and other significant obstructions, serve multiple purposes, including playgrounds, distribution hubs, emergency shelters, and recreational activities. Nepal's rapid urbanization has significantly diminished the availability of public open spaces, posing challenges for infrastructure development and weakening disaster preparedness efforts. However, in Rural Nepal, particularly concerning disaster preparedness and response, people often utilize various available lands, such as agricultural fields, near their homes as temporary shelters.

While the International Organization for Migration (IOM) Nepal has established national standards for identifying open spaces in urban areas, there is a significant lack of guidelines specifically designed for rural settings. This study aims to bridge this gap by developing comprehensive criteria to assist governments in determining whether a location qualifies as an open space within a rural Nepal. Leveraging reports and studies conducted by IOM Nepal following the 2015 earthquake, particularly in the Kathmandu Valley and other semi-urban and rural areas, this research will adapt existing urban guidelines to better suit rural environments. Urban guidelines emphasize criteria like minimum area size, slope restrictions, essential facilities (water and electricity), and cultural sensitivity. In contrast, Rural areas, with scattered settlements and agricultural fields, require criteria focused on proximity to open government land, population size, and the vulnerability of traditional homes. Temporary shelters and designated open spaces protect from hazards, ensure access to essential services, and provide recreational or educational uses during non-harvest seasons, with accessible entry-exit points for the disabled, elderly, and children.

This research focused on developing a methodology and set of parameters for identifying open spaces in Rural Nepal, ensuring they are practical and effective for rural communities. By analyzing and adapting IOM's urban open space criteria, this study proposed new criteria focused on land accessibility, proximity to scattered settlements, land usage patterns, and availability of basic facilities, while considering the unique rural landscape and community needs. The resulting guidelines provide a framework for local governments, NGOs, and other disaster response teams to systematically identify, evaluate, and utilize open spaces in rural settings for emergency preparedness and humanitarian response. This research enhances disaster resilience in rural communities by ensuring the availability of designated open spaces for emergency use, ultimately improving the efficiency and effectiveness of disaster response operations.

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1. INTRODUCTION

1.1 Background

Open spaces, defined by scholars as areas free from significant obstructions and intended for public use, include parks, gardens, playgrounds, squares, and natural landscapes like forests and rivers, serving as essential components of urban and rural environments by providing settings for recreation, social interaction, and cultural and community events (Saxena, 2016; Shukla & Chhabra, 2023; Woolley, 2003). Humanitarian open spaces, also known as evacuation centers, emergency shelters, or safe zones, are designated areas intended for use during emergencies, providing essential services such as shelter, water, sanitation, and medical care (Jayakody et al., 2018). These spaces are critical in disaster management, offering a safe haven where affected populations can gather, receive aid, and find temporary refuge. Pre-identification and infrastructure development in such open spaces can help the community, government, and other humanitarian organizations to respond quickly and effectively following any kind of disastrous event (Rimal & Lal, 2021)

In developed countries, cities often prioritize the identification, creation, and maintenance of open spaces, integrating them into urban planning frameworks. For instance, in cities like New York and London, extensive networks of parks and recreational areas are well-maintained and accessible to the public, reflecting a long-standing commitment to urban green space (Byrne & Sipe, 2010). In the context of Nepal, the Nepal Land Use Policy 2015 sheds light on integrating open spaces into urban and rural planning to create hygienic, beautiful, and safe environments through strategic guidelines for human settlements and urbanization. Similarly, the National Urban Development Strategy (NUDS) 2017 highlights that open spaces and parks in urban areas serve as the ‘lungs of the city’, offering breathing spaces, enhancing physical, social, and psychological health, and contributing to the livability of cities. They also play critical roles in disaster risk reduction by serving as evacuation sites during emergencies such as earthquakes (MoUD, 2017).

In urban environments, open spaces are often properly planned and managed to enhance the quality of life, providing areas for relaxation, exercise, and community engagement (Giles-Corti et al., 2005). Conversely, in many developing countries, particularly in disaster-prone regions, the situation is quite different. Open spaces are often inadequately planned, poorly maintained, or even encroached upon due to the pressures of rapid urbanization. Open spaces play a significant role in disaster risk reduction and management (DRRM), facilitating rescue, relief, treatment, recovery, and temporary shelter, especially in densely populated cities (Timalsina et al., 2024). Historical accounts, such as the use of open spaces during earthquakes in India, Japan, and Nepal, as well as during the 2010 Haiti earthquake, demonstrated their critical

function in providing immediate shelter and care for affected populations (French et al., 2019). In the face of the COVID-19 pandemic, open spaces were utilized for setting up immediate health facilities and organizing healthcare delivery, underscoring their importance in disaster response. Similarly, after the 2015 Gorkha Earthquake, many displaced residents sought refuge in open spaces for temporary shelter, ensuring some level of safety (Khazai et al., 2016).

The identification and management of open spaces for disaster preparedness and response have been extensively developed for urban areas, with organizations such as the International Organization for Migration (IOM) in Nepal providing clear guidelines based on international standards like the Sphere Standards (IOM Nepal, 2020). These guidelines emphasize criteria such as total area, road accessibility, and the availability of facilities like water supply, sanitation, and hygiene promotion (WASH) (Sphere Project, 2018). However, these standards are predominantly urban-centric, designed for densely populated areas with well-defined infrastructure, making them less applicable to rural areas where geographic, demographic, and socio-economic conditions differ significantly.

Rural areas, particularly in countries like Nepal, present unique challenges for disaster management. The diverse and rugged geography, sparse and scattered settlements, and the frequent use of personal agricultural lands as temporary open spaces during disasters complicate the application of urban-centric guidelines. For example, the standards designed for urban environments do not adequately address the realities of rural life, where large, flat, and accessible open spaces are scarce, and multifunctional spaces like agricultural fields are often relied upon for shelter during emergencies (IOM Nepal, 2020).

Rural open spaces are typically informal and multifunctional, used for agriculture, livestock grazing, and communal activities. These spaces are only sometimes suitable for emergency use due to a lack of basic infrastructure such as WASH facilities and their frequent location in areas prone to environmental hazards (Saxena, 2016). Moreover, the lack of formal recognition and management of these spaces intensifies their vulnerability during disasters, leading to ad-hoc and inefficient use of available spaces and increasing risks to life and property (Manandhar & Joshi, 2015). Globally, similar challenges have been observed in other rural nepals. In regions like Sub-Saharan Africa and South Asia, the absence of tailored guidelines for identifying and managing humanitarian open spaces has led to inadequate disaster response, higher casualties, and severe disruptions to livelihoods (Collison & Elhawary, 2012; Jayakody et al., 2018).

While much of the focus on resilience strategies has been on urban areas, rural regions have been largely neglected, resulting in a significant gap in understanding and preparedness for disasters in these areas (Su et al., 2022). The disparity exacerbates risks during natural calamities, as rural populations often lack accessible safe zones or evacuation points, increasing the likelihood of property damage and loss of life when disasters strike (Pokharel, 2023). While there are well-established standards and guidelines for urban areas, such as those developed by IOM, these are largely unsuitable for rural nepals due to significant differences in geography, settlement patterns, and infrastructure.

This research seeks to address these critical gaps by developing comprehensive criteria specifically tailored to the identification and utilization of humanitarian open spaces in rural

Nepal. By considering the unique geographic, demographic, and cultural characteristics of rural areas, this study aims to enhance disaster resilience by ensuring that humanitarian open spaces are effectively utilized during emergencies.

1.2 Criteria for Identification of Humanitarian Open Spaces in Urban Context

The International Organization for Migration (IOM) has played a key role in identifying and managing humanitarian open spaces in Nepal, especially after the 2015 earthquake. These efforts have concentrated on urban municipalities such as Kathmandu, Lalitpur, Bhaktapur, and Pokhara, along with semi-urban areas like Gorkha and rural municipalities including Chautara Sangachowkgadhi and Neelakantha. While essential for emergency preparedness, IOM's work has underscored a critical gap: the absence of standard criteria adapted to Rural Nepal, where landscapes and infrastructure differ greatly from urban settings (IOM Nepal, 2020).

The identification of humanitarian open spaces involves multiple considerations guided by international standards like the Sphere Standards. These criteria ensure that selected spaces can meet the needs of displaced populations during emergencies.

1.Size: The Sphere Standards specify a minimum area of 45 square meters per person for all camp functions, including accommodation, cooking, and hygiene. The covered living area should be 3.5 square meters per person, ensuring sufficient space to avoid overcrowding, especially during a flow of displaced individuals.

2.Accessibility: Accessibility is crucial for all population segments, including those with disabilities. The space must be reachable in all seasons, with adequate road access to support the mobility of displaced people, the supply of goods, and access to essential services like health centers and markets.

3.Land Availability and Topography: Adequate land size and stable topography are vital. The space should have a minimum surface area of 3.5 square meters per person, with a slope not exceeding 5 degrees. The terrain should be free from waterlogging or erosion risks to ensure it can safely accommodate the population.

4. Security: Security is a key factor, especially in high-density camps where the risk of conflict or exposure to hazards is heightened. The selected space should avoid areas prone to environmental risks like floods or landslides and away from industrial or high-risk zones.

5.Access to Resources and Water: The Sphere Standards recommend that displaced populations have access to 7.5-15 liters of water per person per day. The space should have reliable access to sufficient water and resources in all seasons, ensuring the camp's long-term sustainability.

6. Environmental Suitability: Environmental sustainability must be considered to prevent the degradation of the area. The space should be free from environmental hazards and minimize the negative impacts of its use as a temporary settlement, with considerations for vegetation cover, soil protection, and dust reduction.

In urban contexts, these criteria are vital for ensuring that humanitarian open spaces are functional, safe, and capable of supporting displaced populations during emergencies. However, these criteria may not be directly applicable to rural areas, where the landscape and infrastructure are significantly different. This highlights the need for developing criteria tailored to rural settings, effectively guiding the identification and management of humanitarian open spaces in these areas.

2. METHODOLOGY

This research employs a qualitative strategy centered on a systematic literature review, aimed at understanding and interpreting the identification of humanitarian open spaces within Rural Nepal. The qualitative approach is particularly suited for this study, as it allows for a deeper analysis of how existing guidelines and criteria can be adapted to meet the unique social and geographical needs of rural communities. By synthesizing diverse sources, this research intends to develop a framework that is both relevant and effective for disaster preparedness in rural areas, addressing the gaps left by urban-focused guidelines typically found in the literature.

The research design follows a structured review framework that involves the identification, selection, and critical appraisal of relevant academic and literature. Sources were thoroughly chosen through systematic searches in databases such as Google Scholar and JSTOR, and from organizational websites like those of the IOM and UNDP. The focus was on studies and reports that discuss the identification and management of open spaces for disaster preparedness, with an emphasis on addressing the challenges specific to Rural Nepal. These relevant academic and peer-reviewed literature were extensively reviewed. The information extracted from these relevant academic and peer-reviewed literature included key criteria for open spaces, methodologies for their identification, and considerations for rural versus urban settings. These criteria for identifying open spaces were thoroughly analyzed to create a revised framework that is specifically focused for identifying humanitarian open spaces in Rural Nepal.

3. FINDINGS (Revised Criteria for the Identification of Humanitarian Open Spaces in Rural Nepal)

The identification of suitable humanitarian open spaces in Rural Nepal requires a multi-faceted approach that considers a range of physical, environmental, and socio-cultural factors. The criteria developed in this research are based on international standards, such as the Sphere Standards, but are adapted to the specific conditions found in Nepal’s rural settings.

The findings provide a revised practical framework for local governments, NGOs, and disaster management agencies in the effective identification and utilization of open spaces for emergency preparedness and response in rural nepal. The structure is intended to be flexible and adaptable to the varied conditions found across Nepal's rural landscapes, thereby enhancing disaster preparedness and resilience at the community level.

Table 1: Revised criteria for identification of humanitarian open spaces in rural nepal

Revised criteria for defining any place as a humanitarian open space
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S.N	Criteria	S.N	Testing List	Status	
				Yes	No
1	Land Ownership	1.1	Government and public owned open land		
2	Size of Land	2.1	Large Open Spaces > 1500 sq. m (Can accommodate more than 428 peoples)		
		2.2	Medium Sized Open Spaces 1000 sq. m to 1500 sq. m. (Can accommodate 285 to 428 people)		
		2.3	Small Open Spaces 500 sq. m. to 100-0 sq. m. (Can accommodate 142 to 285 people)		
3	Topography, Soil and Land Characteristics	3.1	The steepness of the land is up to 30 degrees		
		3.2	Alluvial and very rocky soil		
4	Access to infrastructure and Facilities	4.1	Access to or connected to the road network		
		4.2	Access roads from settlements to close and open areas		
		4.3	Any health facility nearby		
		4.4	Any market area facility nearby		
5	Water and Sanitation Infrastructure	5.1	Water and sanitation infrastructure		
		5.2	Near airport/helipad or connected to airport/		
		5.3	Internet facility or access		
		5.4	Facility or access to electricity		
		5.5	Sewerage facility		
6	Environmental	6.1	Adjacent to or near national parks and wildlife		

	aspect		sanctuaries		
		6.2	Adjacent to or near central areas of National Parks and Wildlife Reserves		
		6.3	Any river or stream or lake or their source estuary		
		6.4	Exposure to air, water, noise, and land pollution		
		6.5	A garbage dump nearby		
7	Disaster risk aspect	7.1	Risk of flooding		
		7.2	Risk of Landslide		
		7.3	Risk of fire and wildfire		
		7.4	Risk of Sinkhole		
		7.5	Risk of Soil Erosion		
		7.6	Risk of collapse or collapse of large buildings and structures		
8	State of security	8.1	Police station or Nepali army security nearby		
		8.2	A large industrial area nearby or exposure to it		
		8.3	Around high tension power transmission lines		
9	Religious and cultural significance	9.1	A socio-culturally acceptable location for the immediate community		
10	Place specific and others	10.1	The land can be adjusted by cutting filling to the current condition and topography		
		10.2	Able to design and construct temporary structures required for emergency assistance		

The explanations for each criterion are provided below:

Land Ownership: One of the primary criteria is land ownership. In rural Nepal, government and publicly owned lands should only be the primary focus of the identification process. These lands are more likely to be available for quick mobilization during emergencies and minimize legal complexities.

Size of Land: The size of the land is crucial for ensuring that the space can accommodate the expected population during an emergency. In this study, three categories of land sizes were defined:

- Large Open Spaces: Greater than 1500 square meters, suitable for accommodating approximately 428 individuals.
- Medium Open Spaces: Between 1000 and 1500 square meters, suitable for 285-428 individuals.
- Small Open Spaces: Between 500 and 1000 square meters, suitable for 142-285 individuals.

These size categories provide flexibility depending on the population density and availability of land in different rural areas.

Topography, Soil, and Land Characteristics: The topography and soil characteristics are critical in determining the usability of the land. Ideally, the slope should not exceed 10 degrees to facilitate the construction of temporary shelters and access by vehicles. The soil should be stable, avoiding areas with loose alluvial soils or rocky terrains that could pose challenges during infrastructure setup.

Access to Infrastructure and Facilities: Proximity to essential infrastructure, such as health facilities, is vital for providing immediate care to affected populations. The selected sites should be within 5-10 kilometers of health services and connected by existing road networks. Additionally, the availability of nearby market areas and communication infrastructure enhances the site's suitability for emergency use.

Water and Sanitation Infrastructure: Access to clean and sufficient water is a fundamental requirement for any humanitarian open space. Sites should be within 500 meters of reliable water sources, and the feasibility of establishing sanitation facilities must be assessed. This includes the availability of sewerage systems or the potential for latrine construction.

Environmental Aspect: Environmental sustainability is a key consideration to prevent further degradation of the selected sites. Sites should be away from protected areas like national parks to avoid conflicts with wildlife. Additionally, the proximity to bodies of water should be evaluated carefully to balance the risk of flooding with the need for water accessibility.

Disaster Risk Aspect: Considering Nepal’s vulnerability to natural disasters, the selected sites must be evaluated for disaster risks such as floods, landslides, wildfires, and soil erosion. Sites with a high risk of these hazards should be avoided to ensure the safety of displaced populations.

State of Security: The safety of the population is paramount. Selected sites should be within close proximity to security forces, such as police stations or army outposts, to ensure rapid response to any security threats. Locations near large industrial zones or under high-tension power lines should be avoided due to the potential risks they pose.

Religious and Cultural Significance: Cultural and religious acceptability is another essential criterion. The selected sites should not conflict with local beliefs or cultural practices, as this could lead to resistance from the community during emergencies.

Place specific and others: Finally, the physical condition of the land should be evaluated to determine whether it can be modified to meet the requirements for emergency use. This includes the potential for cutting, filling, and constructing temporary shelters.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This research developed comprehensive criteria for identifying humanitarian open spaces in rural Nepal, addressing the unique challenges of the country's diverse geography, scattered settlements, and limited infrastructure. Adapted from international standards like the Sphere Standards, the criteria include considerations for land ownership, size, topography, infrastructure access, environmental sustainability, disaster risk, security, and cultural significance.

The study also underscored the significant differences between urban and rural nepals, with rural areas seeking attention for tailored criteria due to their distinct geographic and socio-economic conditions. The lack of formal infrastructure and the multifunctional nature of rural open spaces present challenges that must be addressed to enhance disaster resilience in these communities.

Overall, this research contributes to disaster management by providing a practical framework that can be adapted to other rural areas with similar challenges. By implementing these criteria, local governments and disaster management agencies can better prepare rural communities in Nepal to respond to natural disasters, ultimately reducing vulnerability and enhancing resilience.

5.2 Recommendation

Based on the findings, the following recommendations are made:

- **Prioritize Government-Owned Lands:** Local governments should focus on identifying and utilizing government and publicly owned lands for humanitarian open spaces to avoid legal complexities and ensure rapid deployment during emergencies.

- **Infrastructure Development:** Investments should be made to improve access roads, water supply, sanitation facilities, and communication infrastructure in and around identified open spaces, enhancing their usability and effectiveness during emergencies.
- **Environmental and Disaster Risk Assessments:** Regular assessments should be conducted to ensure that identified open spaces remain safe and suitable for emergency use. Mitigation measures such as erosion control, flood defenses, and firebreaks should be implemented as necessary.
- **Community Engagement:** Involving local communities in the identification and management of humanitarian open spaces is crucial. This ensures that the spaces are culturally acceptable and that the community is aware of their location and intended use during emergencies.
- **Integration into Local Government Policies:** The criteria developed in this research should be integrated into local disaster management policies and guidelines and also in local-level gadget, ensuring a standardized approach across the country.

6. LIMITATIONS

While this research provides valuable insights, several limitations should be acknowledged:

- **Limited Geographic Scope:** The research focused on rural areas in Nepal, and while the criteria may be applicable to similar contexts elsewhere, they may need adaptation to suit different environmental and socio-economic conditions.
- **Dependence on Existing Literature:** The study heavily relied on existing literature and reports, which may not fully capture the current on-ground realities in rural Nepal. Field surveys and empirical studies could provide more accurate and up-to-date information.
- **Dynamic Nature of Rural Areas:** Rural areas in Nepal vary significantly and are subject to changes in land use, population dynamics, and environmental conditions, which could affect the long-term suitability of identified open spaces.
- **Lack of Field-Based Assessments:** Empirical research involving field surveys and stakeholder interviews could provide more detailed insights into the suitability of specific sites and the challenges of implementing the criteria.

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BIOGRAPHICAL NOTES

As undergraduate geomatics engineering students at Paschimanchal Campus and general members of the Geomatics Engineering Students Association of Nepal (GESAN), our interest in the role of open spaces in emergency preparedness, especially in rural Nepal, led us to this research project. We reached out to NAXA, which had already worked with the International Organization for Migration (IOM) in identifying open spaces across various municipalities in Nepal. In response, we were supervised by Uttam Pudasaini, co-founder of NAXA, and Pratik Shrestha, Research and Documentation Officer at NAXA. With their guidance, we tried to give practical criteria for rural communities, helping improve emergency preparedness efforts in these areas. This project is the start of our careers and our first major contribution. While we don't have previous experience or publications, we view this as an important step in our growth. We look forward to exploring new opportunities, gaining further experience, and making meaningful impacts in this sector.

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