


# Humanitarian OPEN SPACE

## Identification and mapping



Open space has no densely-built structures or buildings. They are identified and mapped primarily to strengthen the emergency preparedness and response initiatives of government authorities and emergency responders.

### Urban Resilience ➤

Nepal is prone to multiple disasters due to its increasing population, rapid urbanization, sloppy terrains, and fragile geology. The vulnerability is further compounded by the impacts of climate change, and weak disaster preparedness and management practices. As the urban areas are multiplying, it has brought new challenges in managing disasters. Cities are places where stresses accumulate or sudden shocks occur, resulting in social breakdown, physical collapse, or economic deprivation. About 54% of the world's population lives in cities, and the number is expected to increase to 66% by 2050 (National Urban Development Strategy 2017, MoUD, GON). Kathmandu Valley, which is rapidly urbanizing, is at high risk of multiple hazards. Low and middle-income population are highly vulnerable to such disasters. The increasing frequency and intensity of climatological hazard risk people's lives in the cities, leading to loss of natural resources, food insecurity, health impacts, and even displacements. With the scenario provided by IPCC in AR6

in Climate Change Science, more recurring disaster events will continue to happen, and are likely to bring more challenges to humanitarian agencies.

Incorporating urban disaster risk management in urban planning is one of the key responsibilities of the local government. Risk assessments and measures to reduce disaster risks are vital as it enables the resilience of cities to absorb and manage risks. Resilient cities create, enable, and sustain the services and institutions required for basic ongoing survival and characterized by their ability to generate new opportunities for their residents by adopting a broader, integrated approach.





*Orthophoto map, Changuarayan Municipality-3*

A resilient city has minimal human vulnerability; diverse livelihoods, employment opportunities and social welfare; adequate safeguards to human life and health; collective identity and mutual support; social stability and security; availability of financial resources and contingency funds; reduced physical exposure and vulnerability; continuity of critical services; reliable communications and mobility; effective

## Humanitarian open space ➤

One of the major indicators of a resilient city is well-managed humanitarian open spaces. During a humanitarian crisis, such spaces provide refuge to the vulnerable and displaced population, facilitate disaster response and relief distribution, and establish WASH, medical, and health care facilities during emergencies. Other times, it could function as a ground for sports, entertainment, and environmental aesthetics. The concept of open space was first officially discussed during the Koshi flood of 2009. Then, Nepal Government prioritized open space setup in its National Disaster Response Framework (2013). During that period, Nepal Government identified 83 open spaces in the Kathmandu Valley for humanitarian purposes and published in its Gazette mentioning that these areas were under the protection of the Nepal Government who would control encroachment to these areas. However, it was not until the Gorkha Earthquake of 2015 that the need for open space was widely felt. On Saturday, April 25, 2015, an earthquake of 7.8 in Richter-Scale shook the western, central, and eastern mid-hills for 56 seconds. With the epicenter in Bardiya District, the major and subsequent aftershocks killed 8,970 people and destroyed 604,930 houses. People took refuge in available open spaces for weeks and even months. The earthquake was an eye-opener for many cities to have plenty of open spaces for people to take shelter during disasters. Open spaces were also required for isolation centers and quarantines during the COVID-19 pandemic.

In support of the Dan Church Aid (DCA) Nepal and digital partner NAXA, Institute for Social and Environmental Transition (ISET) – Nepal and Nepal National Social Welfare Association (NNSWA) implemented the Nexus project in Changuarayan Municipality, Bhaktapur, and Bheemdatta Municipality Kanchanpur to enhance urban resilience, early warning and

## Elements of urban resilience



Source : ACCCRN, 2009

leadership and management; empowered stakeholders; and integrated development planning. Ensuring the following elements during planning helps cities to be resilient:

**Redundancy:** Several urban systems can serve similar functions and provide services when another system is disrupted. If redundancy is eliminated, urban vulnerability increases.

**Flexibility:** Ability to absorb shocks and challenges to avoid catastrophic failure if thresholds are exceeded. Flexibility includes a diversified economic base.

**Reorganize:** Ability to change in response to changing external conditions such as disasters.

**Learning capacity:** Ability to learn from experience and avoid repeating mistakes and make better decisions going forward.

landslide resilience, and urban risk communication. One of the significant activities of the project was to identify and map open spaces for humanitarian rescue and relief purposes. The declining open spaces in cities offer extreme difficulties during disaster and post-disaster management. The project used drones to conduct aerial mapping of open spaces for humanitarian purposes in both municipalities. The open space is expected to facilitate government and emergency responders' preparedness and response initiatives during disasters.

The project successfully mapped open spaces in the two wards of the Changuarayan Municipality and two wards of the Bheemdatta Municipality following the criteria provided by the International Sphere Standards (ISS). The Changuarayan Municipality leveraged funds to carryout mapping in all nine wards of the municipality. The ISS has defined the following sets of criteria to be considered for identifying suitable locations that can be used for disaster management:

- Easy accessibility to open spaces in all seasons for the mobility of the displaced population and supply of goods and critical services
- Availability of security features and avoid areas that are exposed to natural or man-made hazards.
- Access to sufficient water and resources for the basic needs of affected people.
- Availability of sufficient land area (35-45 sq. m. minimum flat surface area) and consider the slope of the land (< 5 degrees).
- Environmental concerns such as the negative impacts of changing the existing open space into temporary settlements or health camps should be studied.
- Sufficient size should be considered for accommodation, cooking, and hygiene (the covered living area is 3.5 sq. m. per person).

## Open space identification and mapping process ➤

<b>Orientation</b>	First and foremost activity during this process is orienting the local government representatives and officials, community members, local disaster management committees, and other relevant stakeholders on the importance of identification and preservation of open spaces.
<b>Identification of possible locations</b>	Collect a preliminary listing of possible locations as open spaces in consultation with the local government officials, community members, and concerned stakeholders.
<b>Finalization of locations</b>	Based on International Sphere Standards (open space selection criteria), assign different scores to the locations and proceed for detailed field inspection.
<b>Field survey</b>	Carry out a topographical survey of finalized locations and collect data on attributes associated with these locations, such as current land use, ownership, nearby critical facilities, and basic environmental assessment.
<b>Processing survey outputs</b>	Preparation of GIS-based maps such as topographic and ortho photo maps and documentation of all field data sets in the form of data tables and reports.
<b>Endorsement of the open spaces</b>	Once the maps have been prepared and submitted to the municipality, it requires endorsement from the local government. Before submission, it should be re-checked to see whether it meets the criteria set by the International Sphere Standards.
<b>Visualization and dissemination</b>	After the endorsement, visualize the open space datasets and maps in the form of open space map atlas, design and install community map boards, and integrate open space datasets into municipality websites, map books, and map boards for wider dissemination.

## Diffusion of innovation : Use of drone in mapping open spaces ➤

Over the years, technology has been used to save lives in all aspects of disaster management: prevention, preparation, and management. High-capacity super computers, satellites, and servers generate, store, and process climatological data to forecast and provide early warning systems. Similarly, robots and drones are used for fire management, rescue and relief, and humanitarian aid. In the recent years, the use of cellular phones to communicate disaster information has increased. The Nexus project used drone for mapping of topography and ground features of open spaces in both the municipalities. It aimed to provide an initial response planning framework to support the affected people and those in immediate need during and in the aftermath of disasters.

Drone technology has only recently emerged as an innovative approach in the humanitarian sector in Nepal. The aerial survey of ground features using drones offers better visualization of an area compared to the photographs captured at ground level. Drone flights can reach difficult to access disaster-hit area in relatively shorter time.

The high-resolution images, 7cm/pixel GSD, were captured using the latest survey grade drone (Wingtra One). This helped generate recent and accurate data sets of urbanizing areas in Changunarayan and Bheemdatta. Municipalities could utilize the datasets in urban planning and infrastructure development projects such as the expansion of roads and construction of parks.

The process also requires status assessments of the identified open spaces, using drones, in different time intervals to detect changes in land use. Drones can detect and monitor



*Participants of community consultation workshops to identify suitable open spaces*







*Drone mapping in Action*

the changes in the open space and provide information on the encroachment status and usable spaces at different times. This will help the decision-makers identify the problems or enhancements made on that particular open space. Drones can also be used for various other initiatives as follows:

**Building inventory:** The drone images are sharp and can help identify each building's footprint, which can then be accurately digitized.

**Base map of the municipality:** The high-resolution map from drone images can be used as base data to digitize different layers like roads, footpaths, green zones, potholes, blue zones, and other geographical objects.

**Public utility mapping:** Mapping electric poles, transmission lines, sewage and house numbering using drone images allows for better stock taking and management of public utilities at the community level.

**Disaster/emergency response and preparedness:** High-

resolution images can capture more precise identification and assessment of structural damages that may pose risks to the local community and first responders during a disaster. This can aid in the rapid delivery of emergency infrastructures and supplies to the most needed population as well as foster effective communication between the emergency responders and decision-makers to plan and execute disaster response and management operations.

**Urban planning:** Planners and policymakers require high-quality, accurate, and timely data and information to analyze the environmental and socioeconomic status to make decisions. Hence, real-time geospatial datasets and base maps have emerged as critical factors for planning infrastructure development, improvement of utilities, and other urban development initiatives.

## Recommendation ➤

Disaster preparedness at the local level is crucial for urban resiliency, and open spaces can serve as critical resources to local governments to accommodate affected populations during humanitarian crises. They also provide several economic benefits by attracting businesses, tourists and adding the land value. Simply identifying and mapping of open spaces are not enough. The local government should provide physical infrastructure and support systems such as access to toilets, electricity, and drinking water, as basic needs during the humanitarian crisis and preserve and prohibit encroachments. At the same time, institutionalizing open space datasets at the municipality and the involvement of local stakeholders and communities to maintain open spaces is critical. Finally, identifying, declaring, endorsing, and engaging a wide range of stakeholders and communities in managing open spaces is challenging, but not difficult. With careful planning and coordination, it can be carried out.

## References ➤

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