

Overview of Humanitarian Operations and GIS Technology

TECH4R TRAINING ON QGIS FOR HUMANITARIAN

Humanitarian Operations

Disaster Stages

Hazard Types

Development in
Humanitarian Operations

Humanitarian Operations



Source: UN-SPIDER and UNDRR

Disaster Stage	Definition
Response	Actions taken directly before, during or immediately after a disaster to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.
Rehabilitation and Recovery	<p>Rehabilitation: The restoration of basic services and facilities for the functioning of a community or a society affected by a disaster.</p> <p>Recovery: The restoring or improving of livelihoods and health, economic, physical, social, cultural and environmental assets, systems and activities to avoid or reduce future disaster risk.</p>
Prevention and Mitigation	<p>Prevention: Activities and measures to avoid existing and new disaster risks.</p> <p>Mitigation: The lessening or minimizing of the adverse impacts of a hazardous event.</p>
Preparedness	The knowledge and capacities to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters.

Humanitarian Operations

Hazard:

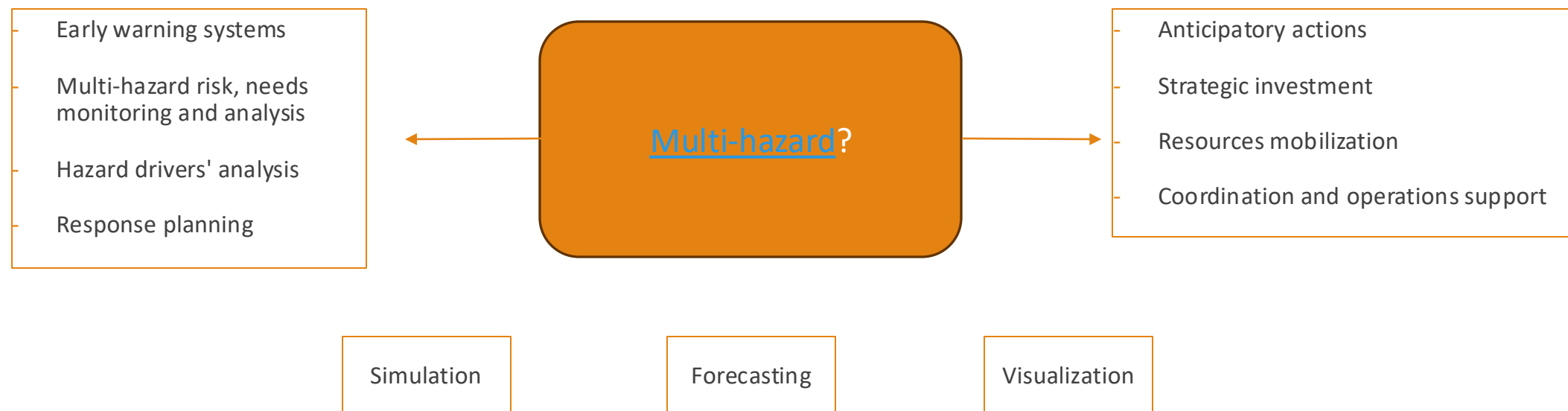
A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation.

Hazards may be **natural**, **anthropogenic**, or **socio-natural**.

Hazard Types	Definition	Examples
Biological Hazards	Hazards that are originated or conveyed by biological vectors, including microorganisms, toxins, and bioactive substances.	Bacteria, viruses or parasites, venomous wildlife and insects, poisonous plants, mosquitos carrying disease-causing agents.
Environmental Hazards	These hazards may include chemical, natural, and biological hazards. They can be created by environmental degradation or physical or chemical pollution in the air, water, and soil.	Soil degradation, deforestation, loss of biodiversity, salinization, and sea-level-rise.
Geological or Geophysical Hazards	These hazards originate from internal earth processes. Hydrometeorological factors are important contributors to some of these processes.	Earthquakes, volcanic activity and emissions, mass movements, landslides, rockslides, surface collapses and debris or mud flows.
Hydrometeorological Hazards	Hazards that are originated from atmospheric, hydrological, or oceanographic origin. These may also be a factor in other hazards.	Tropical cyclones (typhoons or hurricanes), floods, drought, heatwaves and cold spells, coastal storm surges.
Technological Hazards	Originate from technological or industrial conditions, dangerous procedures, infrastructure failures or specific human activities.	Industrial pollution, nuclear radiation, toxic wastes, dam failures, transport accidents, factory explosions, fires, and chemical spills.

Humanitarian Operations

- a. The selection of multiple major hazards that the country faces.
- b. The specific contexts where hazardous events may occur simultaneously, cascading, or cumulatively over time, considering the potential interrelated effects.



GIS Technology

What is GIS?

Spatial Data

Key Functionalities

GIS Technology

GIS (Geographic Information System):

Framework for **capturing, storing, analysing**, and **managing** spatial data.

- Functions: mapping, analysis, data management, decision support.
- Fields of application: urban planning, environmental management, disaster response, business, and more.
- Key components: **data, software**, hardware, people.

GIS Technology

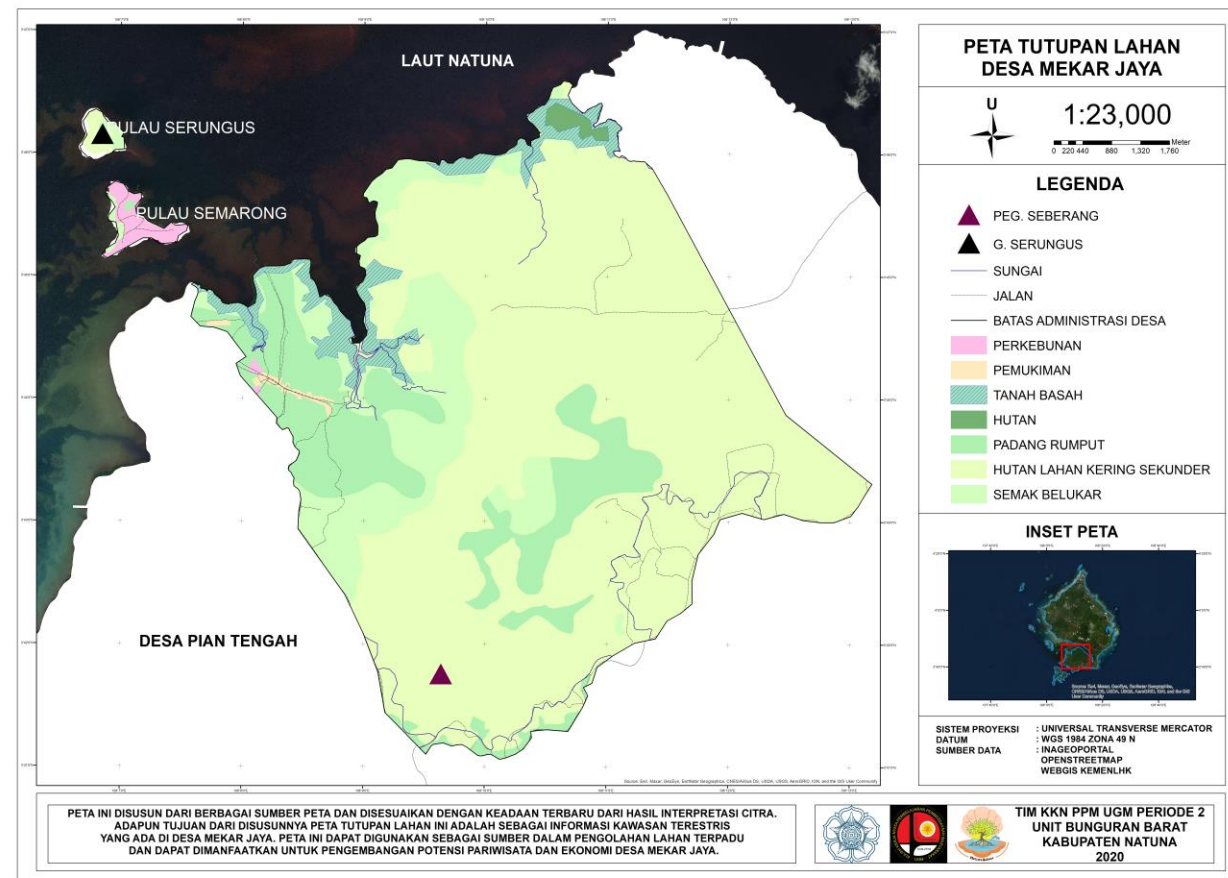
Spatial data refer to any data that has a spatial (or locational) component which can be associated with a specific position in space.

Vector

- Represented using points, lines, and polygons.

Raster

- Represented as a grid of cells (e.g., satellite images, elevation data).

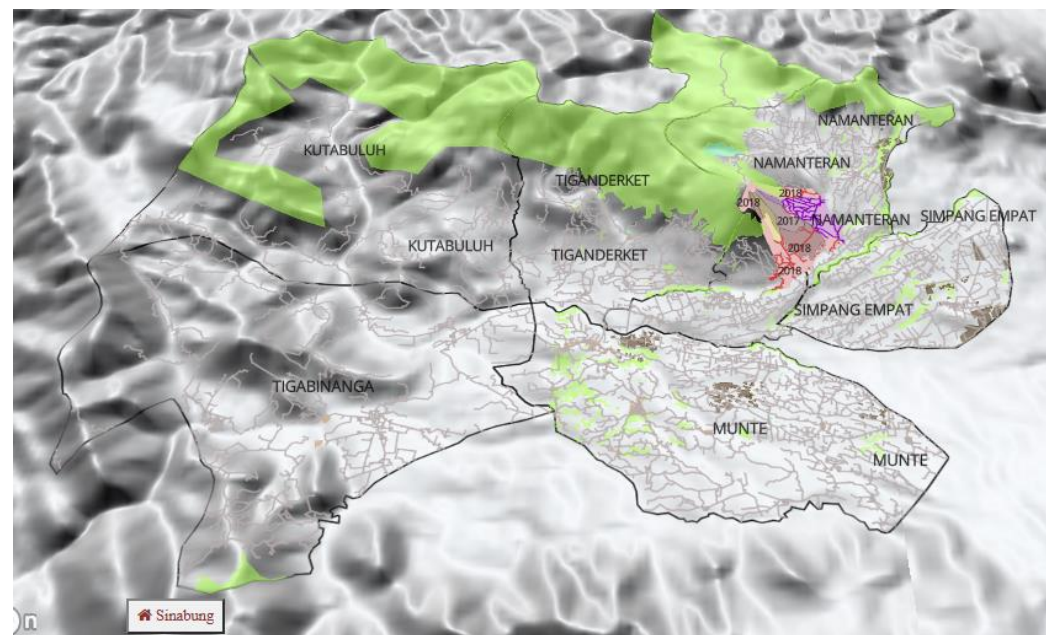


GIS Technology

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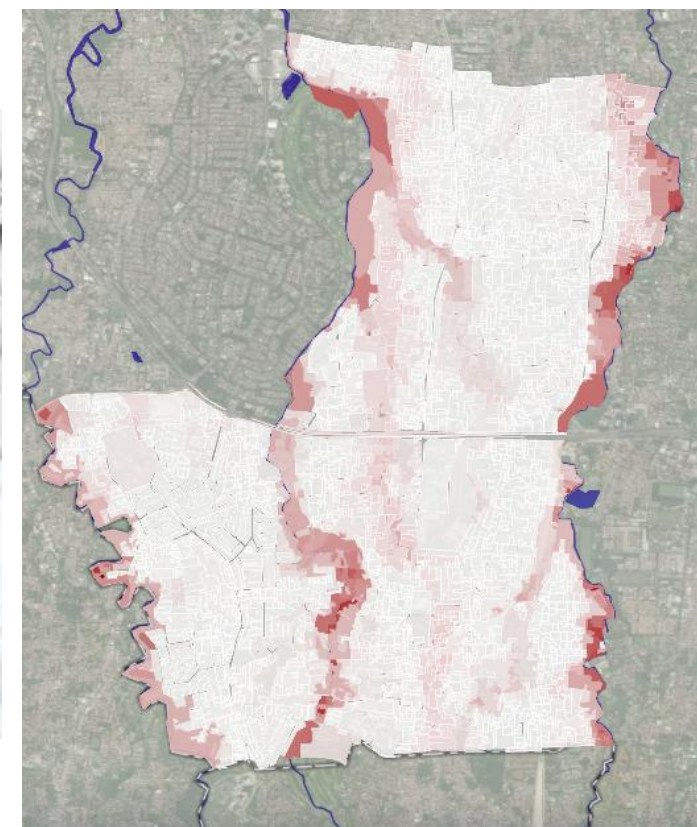
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GIS Technology

Data Collection <ul style="list-style-type: none"> -GPS, satellites imagery, drones and UAVs. -Surveys, public datasets. 	Data Processing and Analysis <ul style="list-style-type: none"> -Spatial analysis (e.g., buffer, interpolation). -Attribute analysis (e.g., query, statistics).
Data Storage <ul style="list-style-type: none"> -Database services; PostGIS, GeoServer, or cloud storage systems. 	Visualization <ul style="list-style-type: none"> -Map creation, thematic mapping, web map. -3D visualization.

Leveraging GIS in Humanitarian Contexts



Disaster Stage	GIS Application Example
Response	Mapping-affected areas. Identifying safe zones, evacuation routes, and affected populations.
Rehabilitation and Recovery	Mapping areas for reconstruction priorities. Analyzing infrastructure damage.
Prevention and Mitigation	Risk assessment; using GIS data and processing to map risk zones. Design mitigation measures such as drainage systems (for landslide-prone or storm-prone regions).
Preparedness	Creating hazard scenarios. Developing evacuation plans.

Leveraging GIS in Humanitarian Contexts

Disaster Response:

- Rapid damage assessment.
- Route optimization for relief supply delivery.
- Mapping disaster-affected areas.

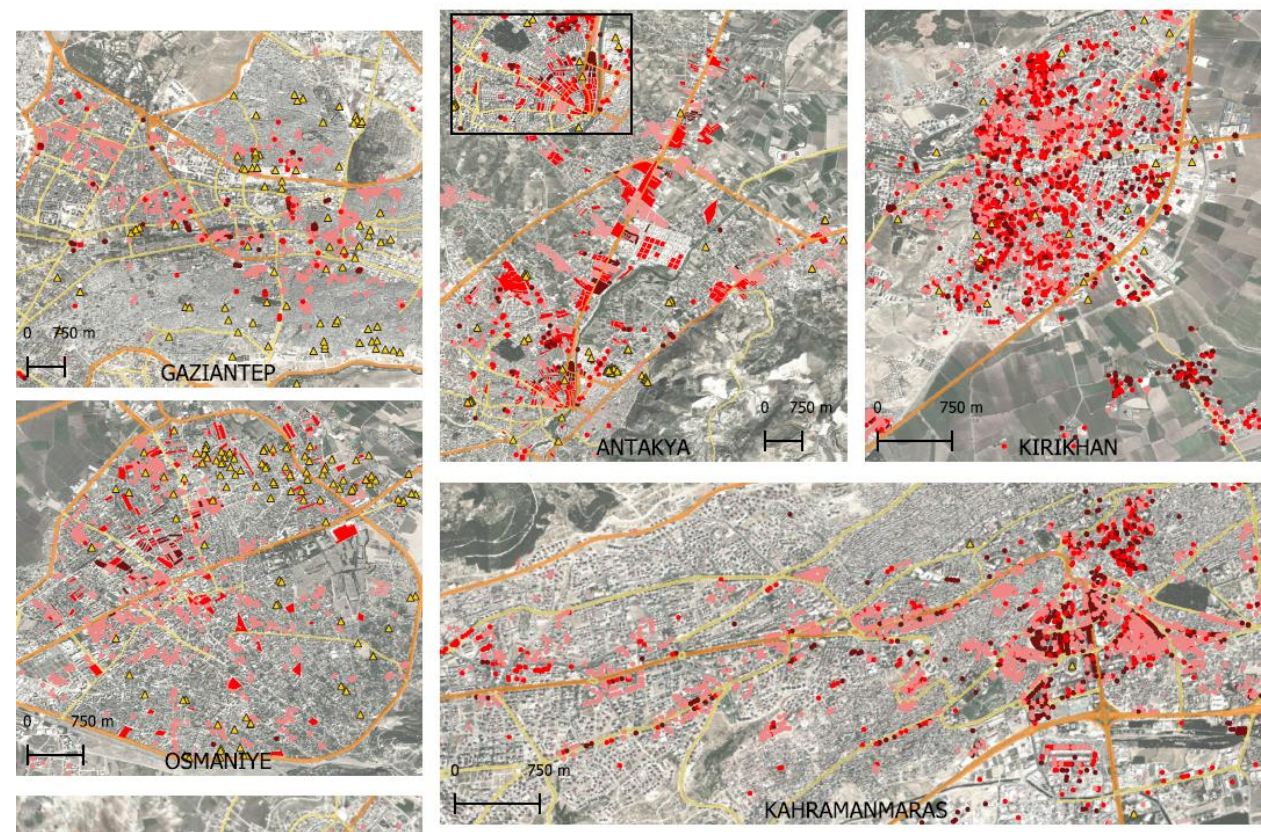
Refugee Camp Management:

- Site planning and layout.
- Resource distribution.
- Monitoring population movements.

Long-term Resilience Planning:

- Identifying vulnerable areas.
- Climate change adaptation strategies.
- Biodiversity conservation.

NOTE: COMBINATION OF MULTIPLE DATA SOURCES IN VARYING STATES OF COMPLETION



Leveraging GIS in Humanitarian Contexts

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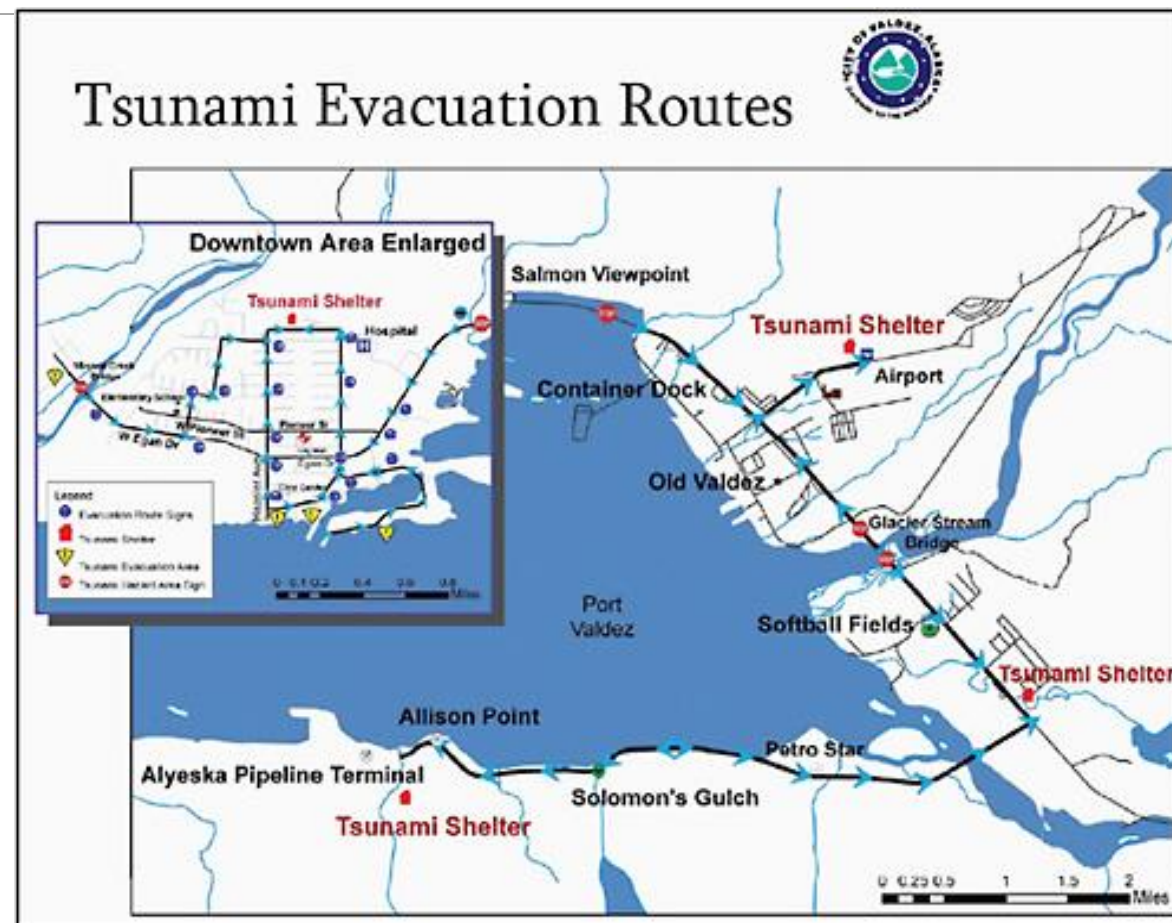
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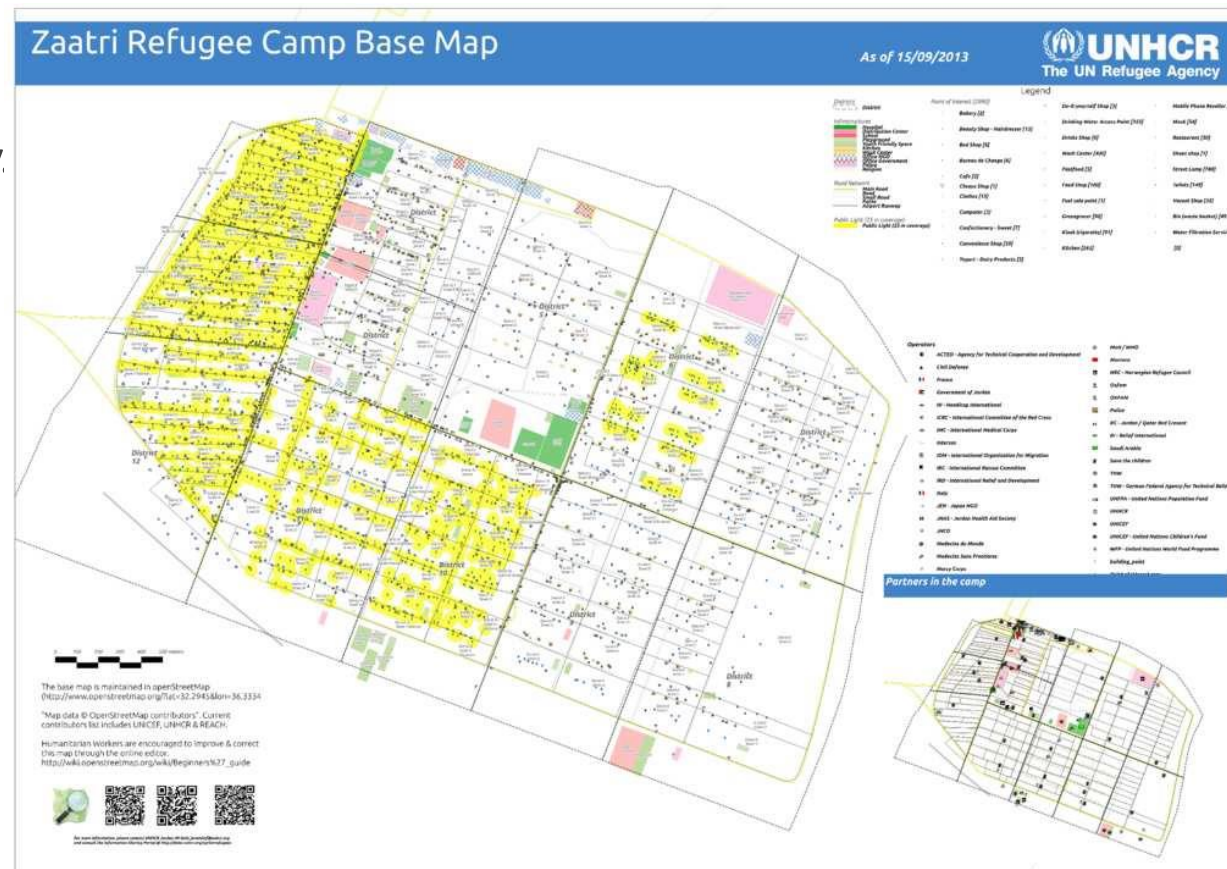
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Thank You!

Any questions?