Indicator: **11.1.1** Proportion of urban population living in slums, informal settlements or inadequate housing

Earth Observations Toolkit for
SUSTAINABLE CITIES
AND HUMAN SETTLEMENTS

Target	**11.1** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.		
Custodian	United Nations Human Settlements Programme (UN-Habitat) - Link to Metadata	**Tier**	I
Short summary of the role of EO for this SDG	Presently, the indicator is measured at the household level (i.e., tenure, sanitation, water, overcrowding, housing conditions/location, and affordability) using surveys; with issues on data availability. At city levels, local SDG monitoring is hindered by access to high spatial resolution data. EO allows mapping of areas that have physical characteristics of slums (building density, roof size, material and conditions, and location proximate to hazards or non-healthy areas). Link to the data described: https://eo-toolkit-guo-un-habitat.opendata.arcgis.com/pages/eo-data		

Earth Observation Data in the Toolkit

Data within the Toolkit (what they can offer)	Presently, the Toolkit does not contain data on slum locations or boundaries. However, several data sets provide context information (slum characterization) for the SDG 11.1.1 indicator:
	Building Footprints Uganda and Tanzania: Building footprints that allow the calculation of built-up densities and patterns, which are key proxies to delineate slum areas. However, the dataset shows often omission in slums.
	Global Human Settlement Layer -Built-Up area and Population (GHS-BUILT and GHS-POP): The multi-temporal GHSL layers visualize built-up and population dynamics since 1975 and provide temporal information when overlaid with local slum boundaries. However, the spatial detail of such delineations may not match the scale of global population datasets (250x250m grid cells). Therefore, the analysis of local dynamics that fall in single or few aggregated grid cells should be limited to areas where the spatial detail of the census/survey allows. GHSL population estimates derived from large census units should be interpreted with caution as the population is assigned proportionally to the density of built-up areas.
	VIIRS Plus DMSP Change in Lights: The presence or absence of light (when combined with a built-up layer) is a socio-economic proxy and allows visualization of built-up areas with missing streetlights that often highly correlate with slum locations. Note, however, that the VIIRS Plus DMSP dataset was last updated in 2013 and is highly aggregated to ~1x1km grid cells at the equator, which means it can only detect the absence of light in very large settlements.
Methods and required resources	Building (built-up density) and VIIRS (night light) layers can support the generation of spatial proxy maps of slums, when combined with population data they provide spatial patterns of the population living in slums.
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Recommendations for implementation

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Recommendations	Please be aware of the conceptual difference between a slum household and an informal (deprived) area. EO can provide data on the location and characterization of deprived areas, not household data. The listed data can model dimensions of deprivation and can indicate deprived areas, but cannot be used to accurately and routinely map such areas.
Links to training material	Slum (deprivation area) mapping for local governments
References	GHSL; Building Footprints; Thomson et al., 2021