

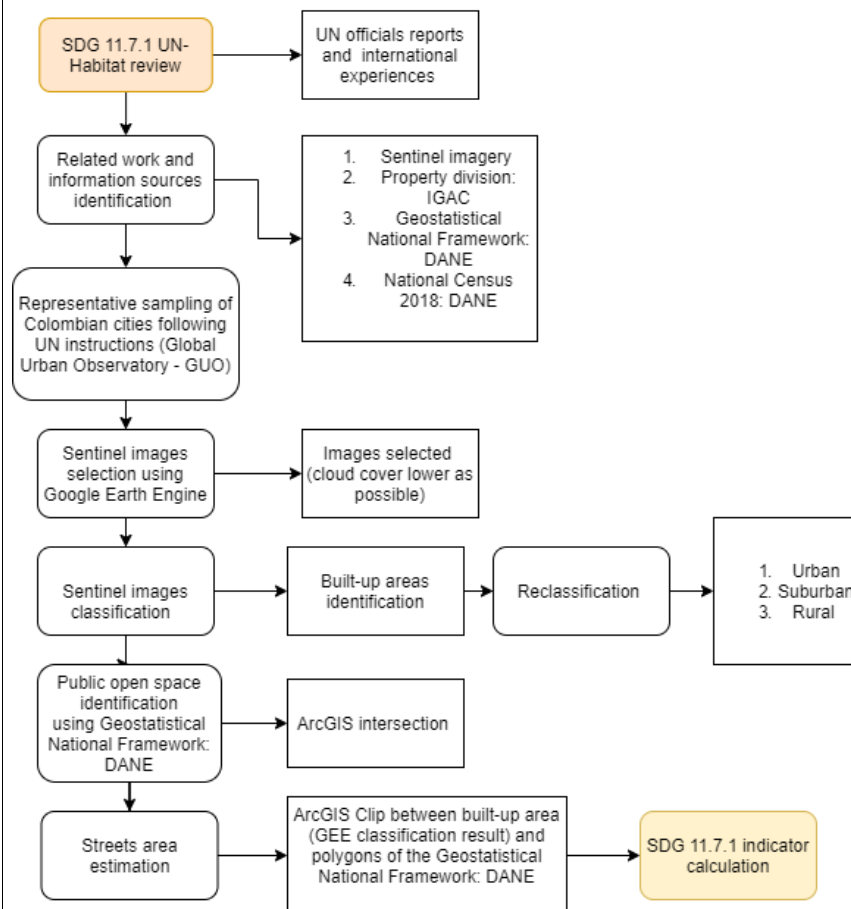


Country Use Case of EO for SDG Indicator	
SDG Indicator/Sub-indicator	Indicator 11.7.1: Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
Country or region	Colombia
Status (please check)	<p>being used in official SDG Indicator reporting</p> <p>✓ being verified or tested by country</p> <p>studying feasibility</p>
Earth Observation Data Used and its links	<p>Sentinel 2A imagery</p> <p>https://scihub.copernicus.eu/dhus/#/home9</p> <p>https://developers.google.com/earth-engine/datasets/catalog/COPERNICUS_S2_SR</p>
Additional/ Other Data Used and its links	<p>Parcel/property division of Colombia, source: Instituto Geográfico Agustín Codazzi (cartographical agency of Colombia)</p> <p>https://geoportal.igac.gov.co/contenido/datos-abiertos-catastro</p> <p>National Geostatistical Framework of Colombia, source Departamento Administrativo Nacional- DANE</p> <p>https://geoportal.dane.gov.co/servicios/descarga-y-metadatos/descarga-mgn-marco-geoestadistico-nacional/</p> <p>National Colombia census 2018</p> <p>http://microdatos.dane.gov.co/index.php/catalog/643/get_microdata</p> <p>https://www.dane.gov.co/index.php/en/estadisticas-por-tema/demografia-y-poblacion/censo-nacional-de-poblacion-y-vivenda-2018</p>
Description of data access, processing, and analysis, including methodology that was developed, associated tools or applications, and how these are applied to compute SDG Indicator	<p>DANE is currently developing a methodology for the calculation of SDG Indicator 11.7.1., preliminary tests have been performed in Google Earth Engine (GEE) that included the selection and digital processing of Sentinel-2A satellite imagery (cloud cover lower as possible) for the classification of impermeable surfaces; pixels classified as impermeable surfaces are classified again as: urban, suburban and rural areas, also using a script developed in GEE. As a result of the previous procedure, the classification of the images in urban and suburban areas was obtained. Finally, ArcGIS was used to perform other processes that determine the area of interest.</p>



Work flow

SGD 11.7.1 DANE Colombia methodological proposal



Partially, DANE proposes the following workflow for the calculation of the indicator, based on a pilot test applied in three (3) Colombian cities.

1. Identification of study area based on a representative sample of the country's cities (according to recommendations of the Global Urban Observatory)
2. Sentinel 2A image selection based on low cloud cover criteria in Google Earth Engine
3. Processing of images in built-up and non-constructed area classes
4. Based on the above classification, the thematic class built-up area is taken and classified into urbanized, suburban and rural areas, following the criteria specified in metadata of the indicator issued by UN Habitat:

- Define a circle of 1 km² around each pixel classified as built and calculate the proportion of pixels in the circle that are also classified as built
- If 50% or more of the pixels in the kernel are constructed, the pixel is classified as Urban.
- If between 25% and less than 50% of the pixels in the kernel are constructed, the pixel is classified as Suburban.
- If less than 25% of the pixels in the kernel are constructed, the pixel is classified as Rural.



	<p>To identify possible public open spaces in urban built areas, the DANE proposes the following process</p> <ol style="list-style-type: none">5. Selection by location to determine the lots that have an effective cross with the toponymy of public open spaces6. Selection by location to determine the apples that have an effective cross with the toponymy of public open spaces, given that there are some areas that do not have a defined lottery but if the apple layer7. Quality review of the results of the previous items (logical consistency, compliance with topological rules etc)8. Estimation of the area destined to streets, for this from the Urban Extension (result of the processing in GEE), a CLIP is made or cut until the limit that allows the layer IM_Center_Populated (layer of the MGN that represents urban agglomerations) the result will be a mesh, type polygon of the cities roads <p>The final calculation of the indicator is made using the formula:</p> <p>Part of the urbanised area of the city that is an open space for public use (%)</p> $= (\text{Total area of the public open space} + \text{Total area of the land allocated to the streets}) / (\text{Total area of the built-up area of the conurbation})$ <p>The proposed methodology allowed the calculation of indicator 11.7.1 for cities: Pasto, Soledad and Villavicencio, Colombia.</p>
Lessons learned, any gaps, key issues and recommendations	<p>Lessons learned:</p> <ul style="list-style-type: none">-Earth observation data are a valuable source of information for determining the area of cities and their urban expansion.- Google Earth Engine is a platform that has an updated catalogue of satellite images and processing algorithms, in the cloud, with free access, through which users generate their routines. The use of this platform has allowed DANE to optimize the time in the digital processing of satellite images.- Alternative sources of information such as Open Street Map can be useful in the identification of public spaces accessible to the entire population, given the constant updating by the community. <p>Gaps:</p> <ul style="list-style-type: none">- Despite the efforts of national and local governments, there are gaps in the updating of cadastral information depending on the level of the city under study (in addition to the dynamics of the urban territory), particularly in reference to geographical information on open spaces for public use, which has a direct impact on the accuracy of the results of the indicator calculation.- For the year 2019, date of development of the methodology mentioned above, it was not possible to validate the results obtained with the value of the indicator calculated for other Colombian cities or at the international level, consequently contrasting with methodologies proposed by other organizations. <p>Key issues</p>



	<ul style="list-style-type: none">- Given the accuracy of the results of the CNPV 2018 (with georeferencing at the housing level), DANE is researching the generation of clusters that allow measuring access to public spaces by the population.- The CNPV 2018 had a differential approach (gender, disability, ethnicity, among others), however, the scope of the methodology for the calculation of indicator 11.7.1 was established (preliminarily) until the access of the population to public spaces was measured, taking into account the gaps between the information generated by the different entities. <p>Recommendations:</p> <ul style="list-style-type: none">- It is essential that there be a synchronization of versions (updates) between the metadata published on the UNSD web portal https://unstats.un.org/sdgs/metadata/ and those published by the custodian agencies.- Links to tools and learning materials that have been developed and that facilitate the calculation of indicators should be included in the metadata- The use of alternative sources of information such as Open Street Map is widely recommended for the identification of public spaces, as well as cloud processing platforms (of free access) that reduce local computing demands and allow the processing of large volumes of information such as Google Earth Engine
Supporting material about this use case. Include links, publications, etc.	
Collaboration with other agencies - agency names and activities	
Name(s) and email address of individual(s) involved in this effort. Please note the principal point(s) of contact (POCs).	National Administrative Department of Statistics – DANE Sandra Moreno slmorenom@dane.gov.co , DANE Technical Director of Geostatistics Carlos Durán cadurang@dane.gov.co , Coordinator of the Research and Development Group of the Geostatistics Department.