National activities and perspectives using global and new, complementary data to produce indicators

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Methodology for calculating SDG indicator 9.1.1

Proportion of rural population who live within 2 km of an all-season road

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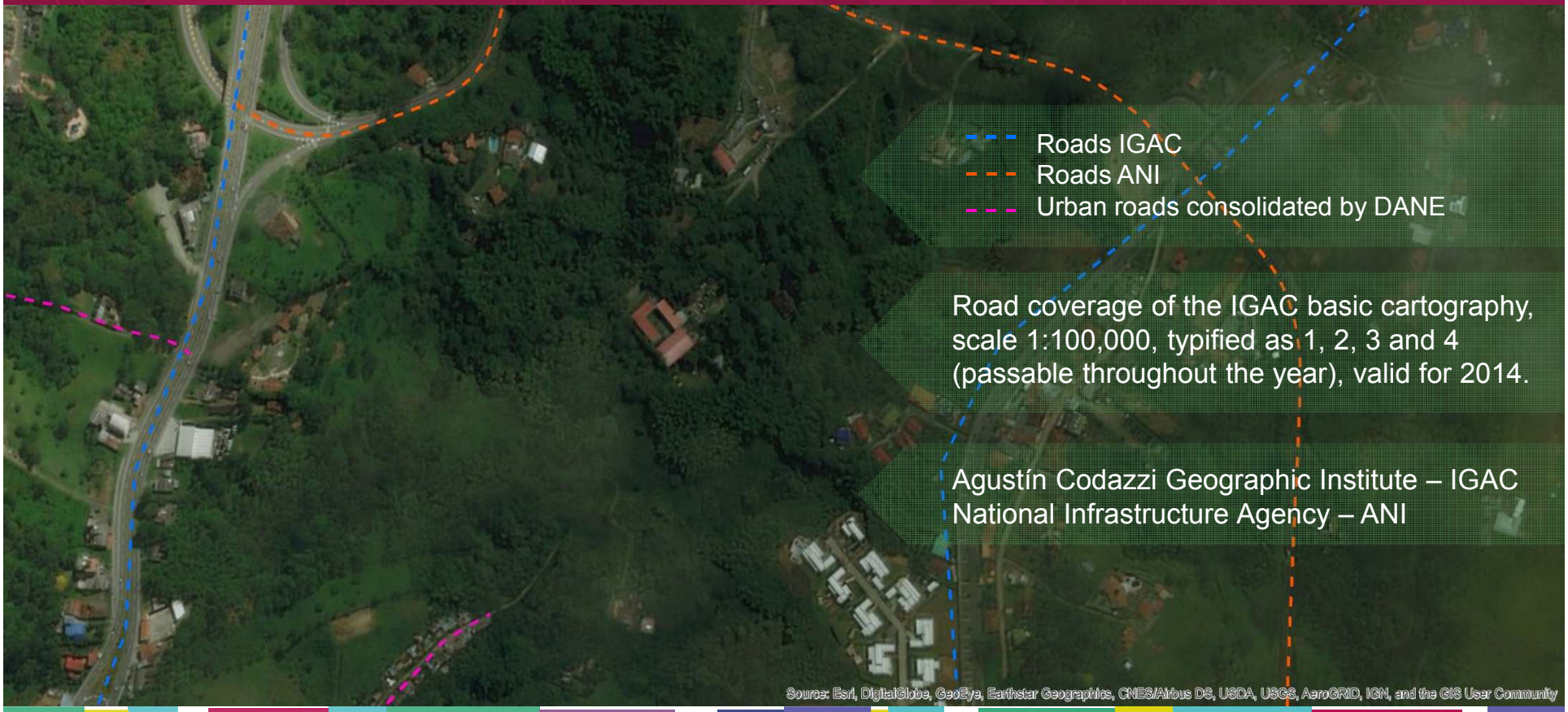
Sustainable Development Goals - SDGs

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

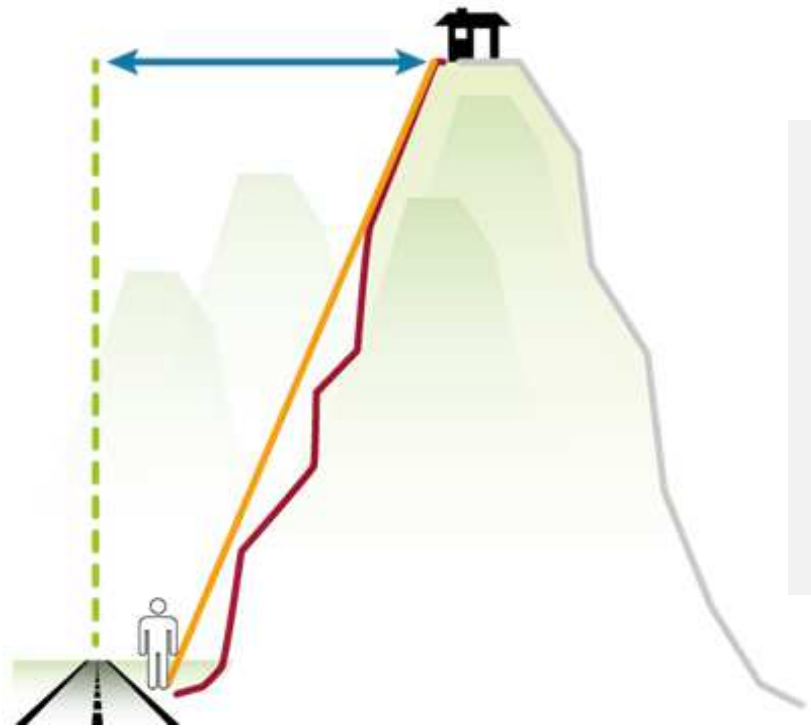
Target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

Indicator 9.1.1 Proportion of the rural population who live within 2 km of an all-season road

Roads data from IGAC, ANI and DANE integrated to build all seasons roads layer

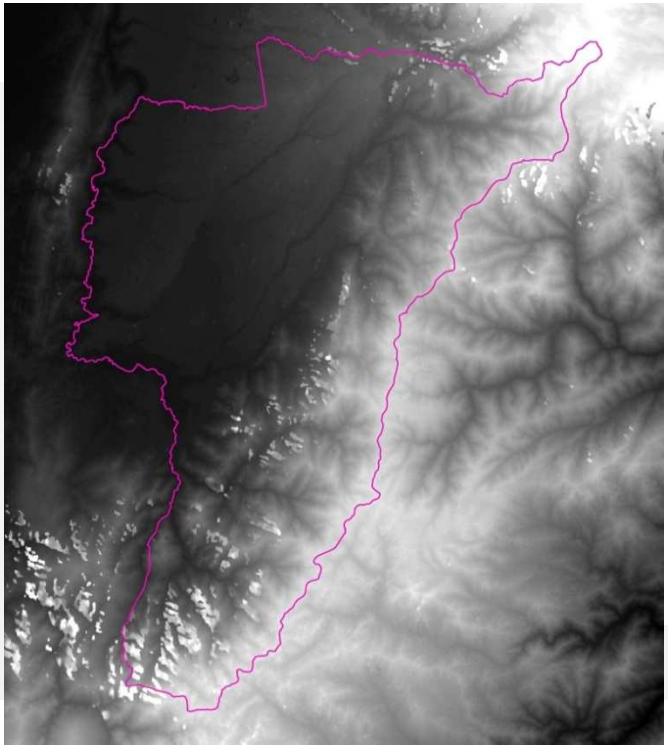


Using slope distance to calculate a more accurate influence area



- Actual distance on the ground (natural)
- Horizontal distance
- Vertical distance (difference in height)
- Slope distance

To determine slope distance, a DEM with no null data was selected



Quindio Region

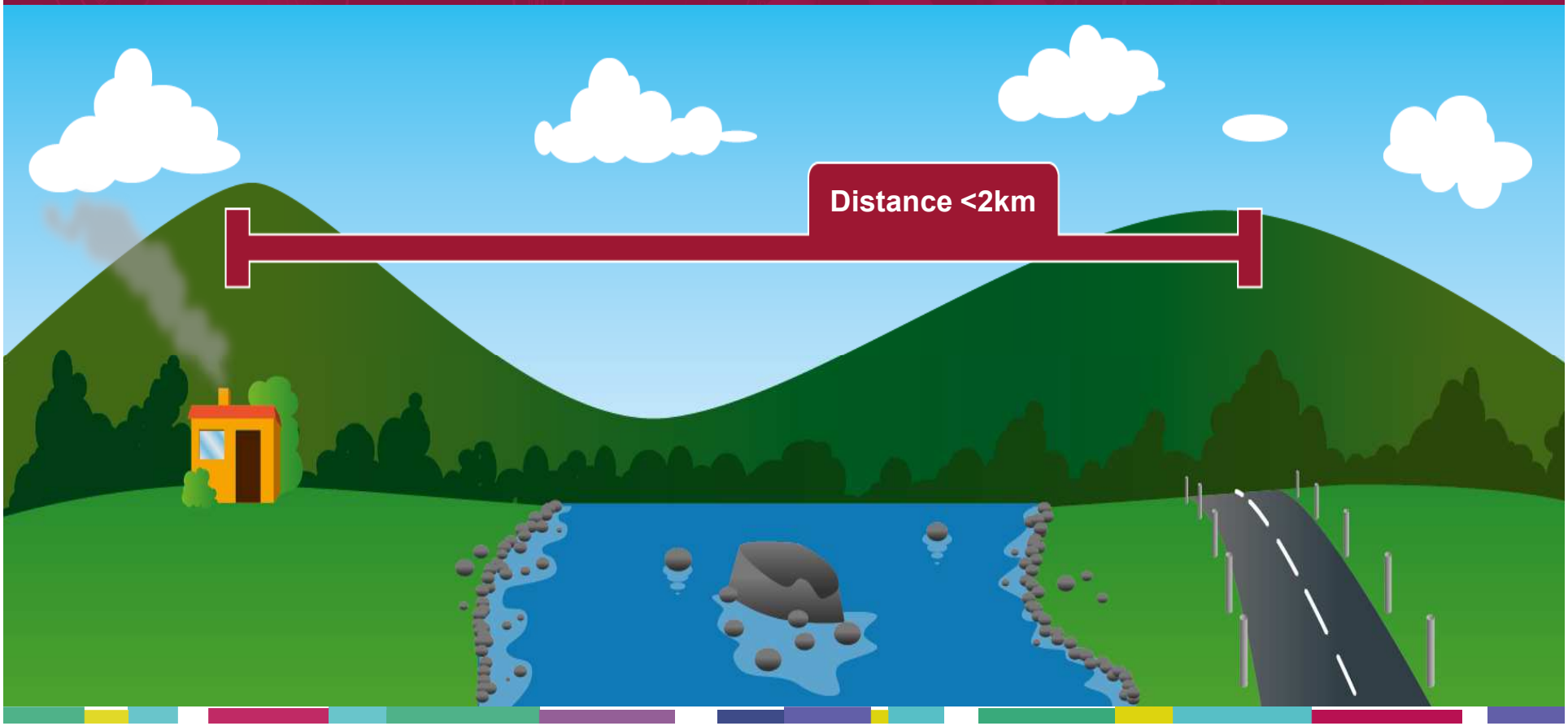
Digital elevation models with coverage in Colombia, available from the United States Geological Survey – USGS portal:

- *Shuttle Radar Topography Mission – STRM* (has null data)
- ***Advanced Spaceborne Thermal Emission and Reflection Radiometer Global Digital Elevation Model - ASTER GDEM*** **(there is no null data)**

Digital Elevation Model - DEM

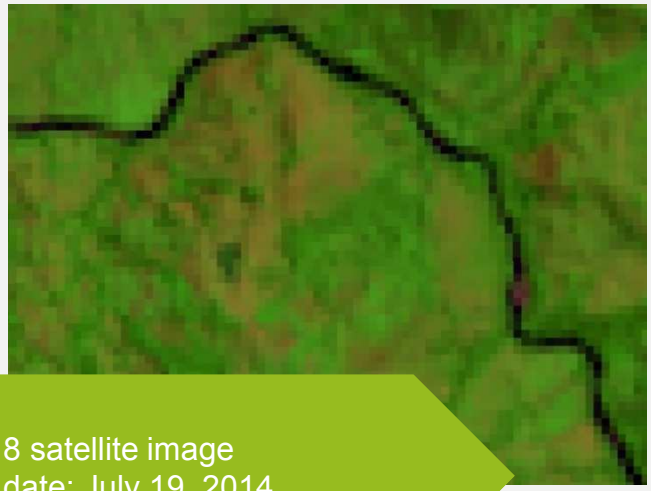
Source: ASTER GDEM
Spatial resolution: 30 meters

Dwellings less than 2 km from roads may not have access to roads due to the presence of surface water and the lack of bridges

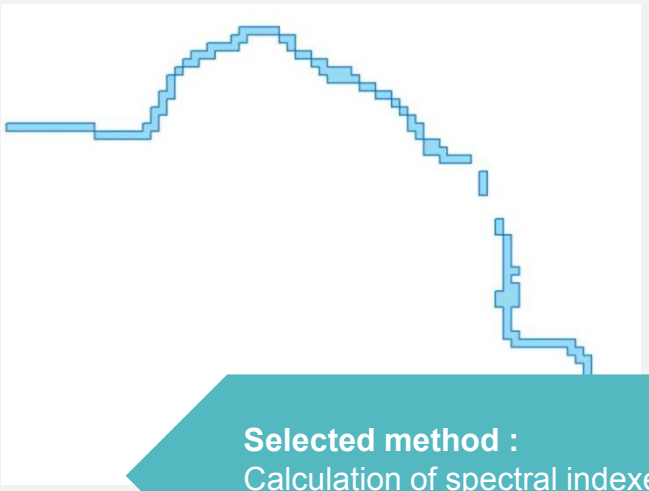


Besides relief, there are other elements to consider when calculating the influence area as surface water, for which satellite images are useful

Surface water coverage



Source:
Landsat 8 satellite image
Capture date: July 19, 2014
Spatial resolution: 30 m

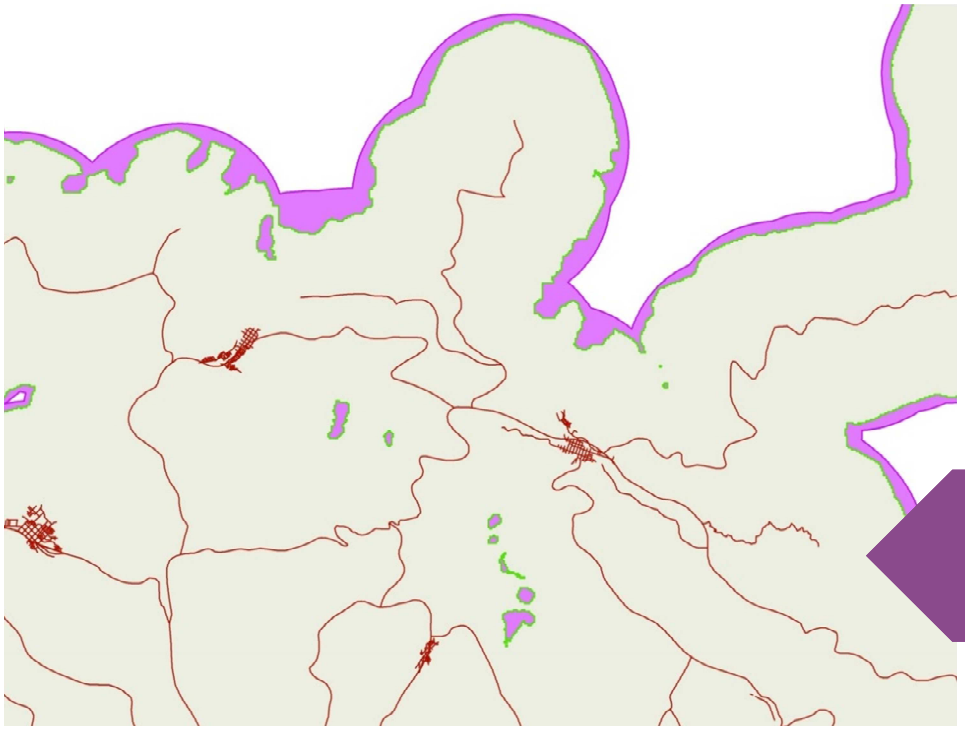


Selected method :
Calculation of spectral indexes, specifically Standardized Water Differential Index

Tested methods :
- Supervised classification
- Unsupervised classification
- Calculation of spectral indexes

Spatial difference between influence areas

Calculate the influence area of 2km on each side of the road



All-season roads

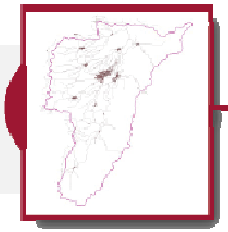
Buffer taking into account the DEM (Digital Elevation Model) and surface water coverage

Buffer without taking into account the DEM and surface water coverage

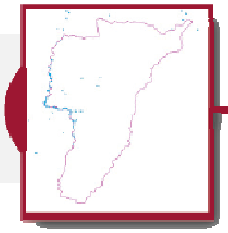
Software:
Path Distance - ArcGis

Overview methodology* Pilot test of the methodology and preliminary results for the Quindío Region

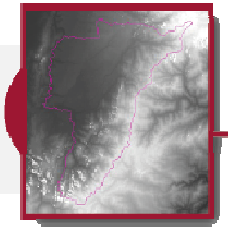
All-season roads



Surface water coverage

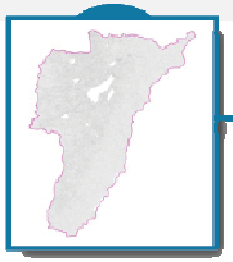


Digital Elevation Model - DEM

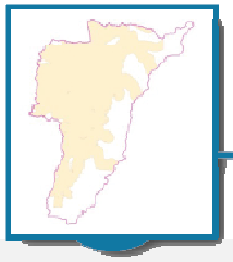


Path Distance

The number of persons residing in the rural area was taken from the National Agriculture and Livestock Census (2014)



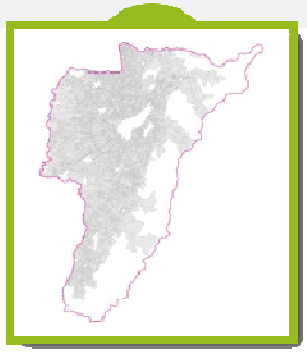
The population is geo-referenced at the property level



Calculate the influence area of 2km on each side of the road

Intersect

The proportion of the rural population who live within 2 km of an all-season road, in the department of Quindío, corresponds to 96.7% of the people



The population of the properties that intersect in an area greater than 50% was counted, with the area of influence

Future work – Pilot learnings

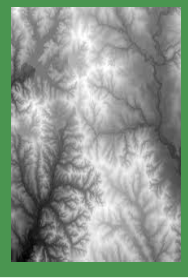
For more detailed scales, the following is required:

Information of the population updated and geo-referenced to dwellings

More detailed water coverage: Satellite images with higher spatial resolution

Updated and complete road coverage (geometry and attributes)

Digital Elevation Model with higher spatial resolution



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