STATISTICS INDONESIA

Geospatial Approach

To Identifying
The Proportion of population covered by a mobile network (SDG 9.c.1)

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Background

- The lack of official household surveys that collect information on ICT access is a challenge in implementing and monitoring the SDGs.
- Data are available at a national level, without a sub-national disaggregation that would allow to map underserved areas.

ITU Project on Big Data for Measuring ICT Development

- Indonesia (BPS) join ITU Project (second phase).
- For this project we chose 3 indicator targets in 3 different goals that could be measured using mobile phone:

5.b.1 Proportion of individuals who own a mobile telephone

9.c.1 Proportion of population covered by a mobile network

17.8.1 Proportion of individuals using the Internet

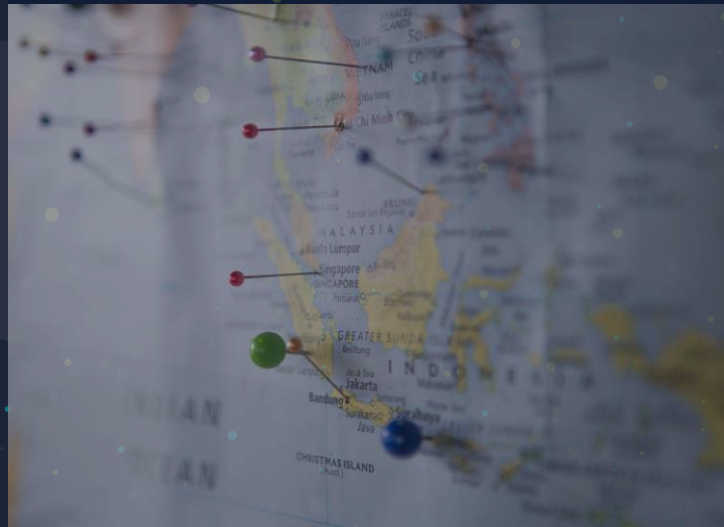
Objectives

9.c.1 Proportion of population covered by a mobile network

How this indicator could be calculated without having access to mobile network operator data and using available data sources.

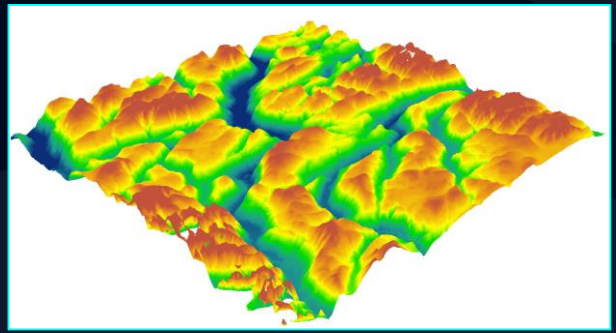
ITU Pilot Scope in Indonesia

- Coverage: Indonesia area (514 municipalities/cities).
- Data: 2019 and 2020
  - Local Adminsitrative Map,
  - Mobile network operator (MNOs cell sites),
  - Digital Elevation Model (DEM),
  - Population distribution (WorldPop data),



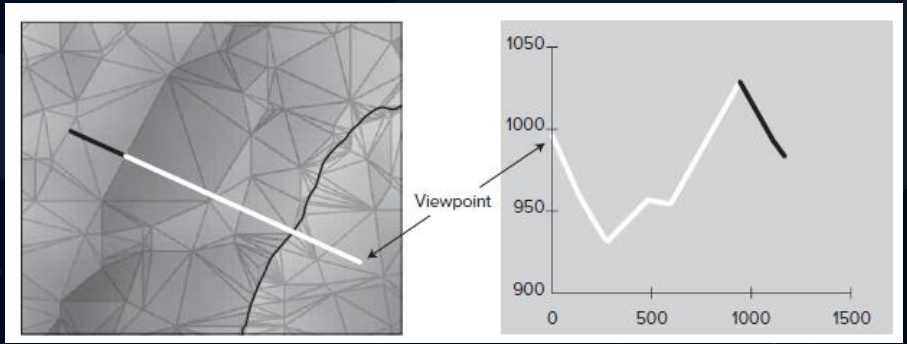
The Influence of Topography on Cellular Network

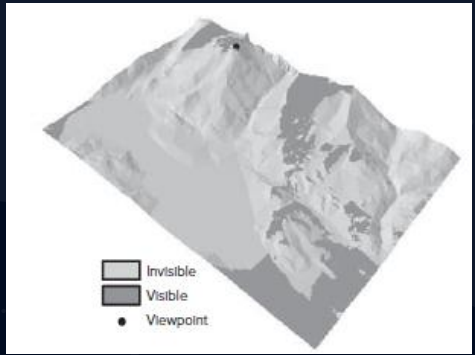
- Geographic features such as topography buildings, mountains and peak with undulating terrain between transmitters and receivers are some of the main barriers to signal Propagation.



Viewsheds: Determining Cellular Network's Reach

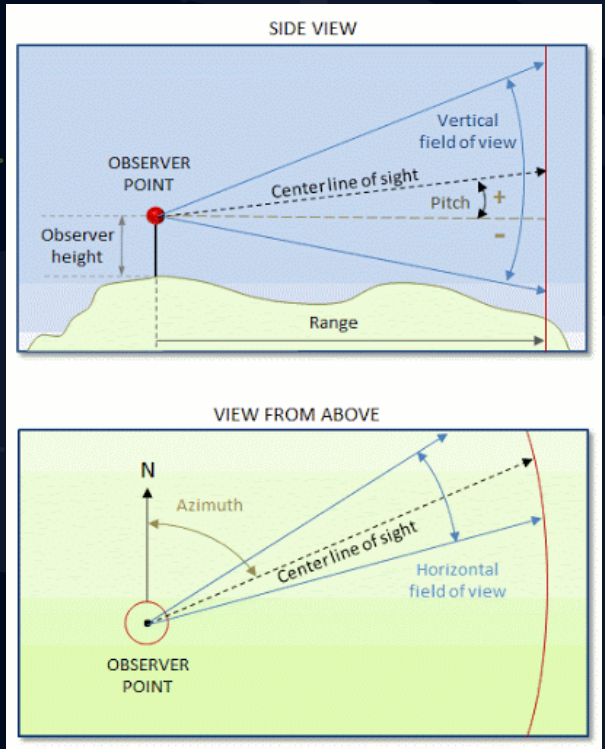
- Viewshed refers to the portion of land surface that is visible from one or more viewpoints using Digital Elevation Model to identify potential obstacles blocking line-of-sight .
- Every raster cell within the DEM was considered as a target. All cells that were visible from the observer point were coded as "1", while the non visible ones as "0" in order to produce a binary (viewshed) map.





Viewsheds: The Viewpoints/Observer Points

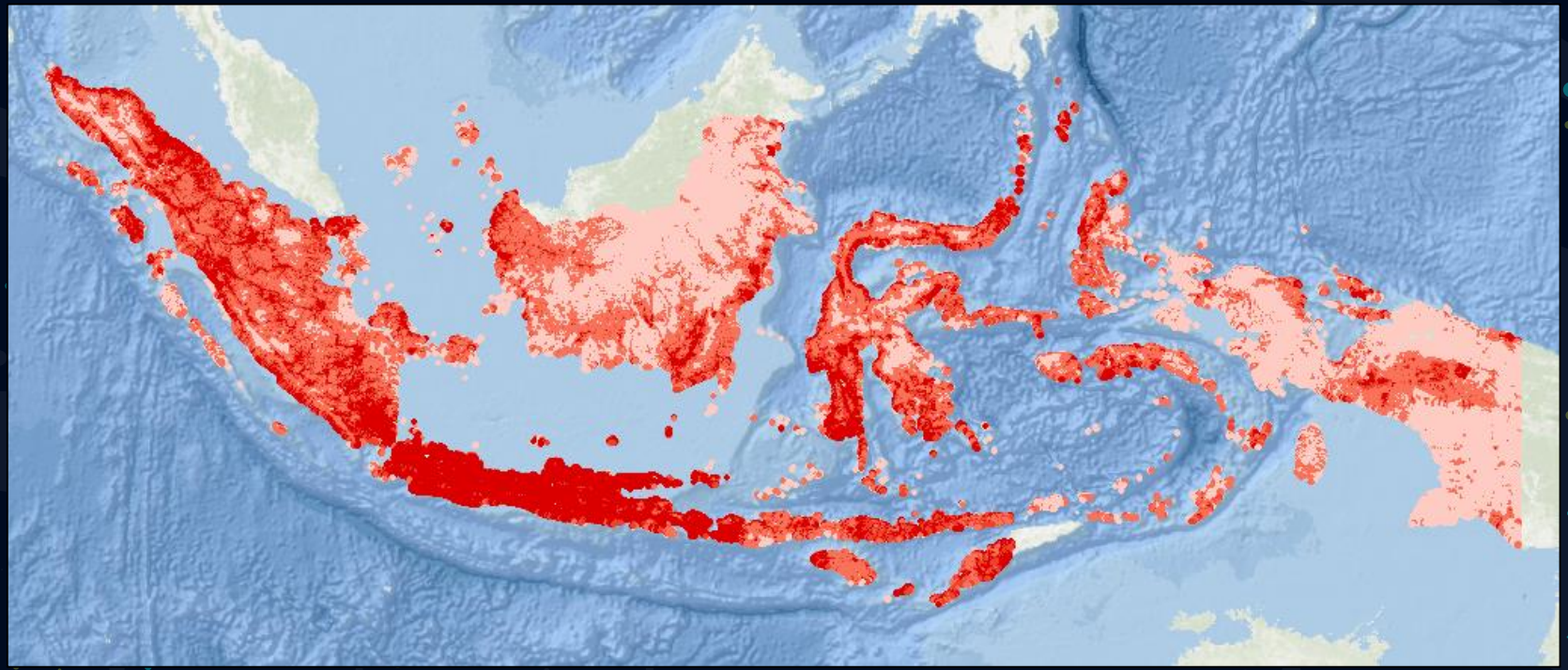
- A viewshed analysis requires a viewpoint layer dataset.
- The viewpoints refer to the cellular tower location.
- A variable of Radius Value is used as a parameter to determine the range of the wireless signal.



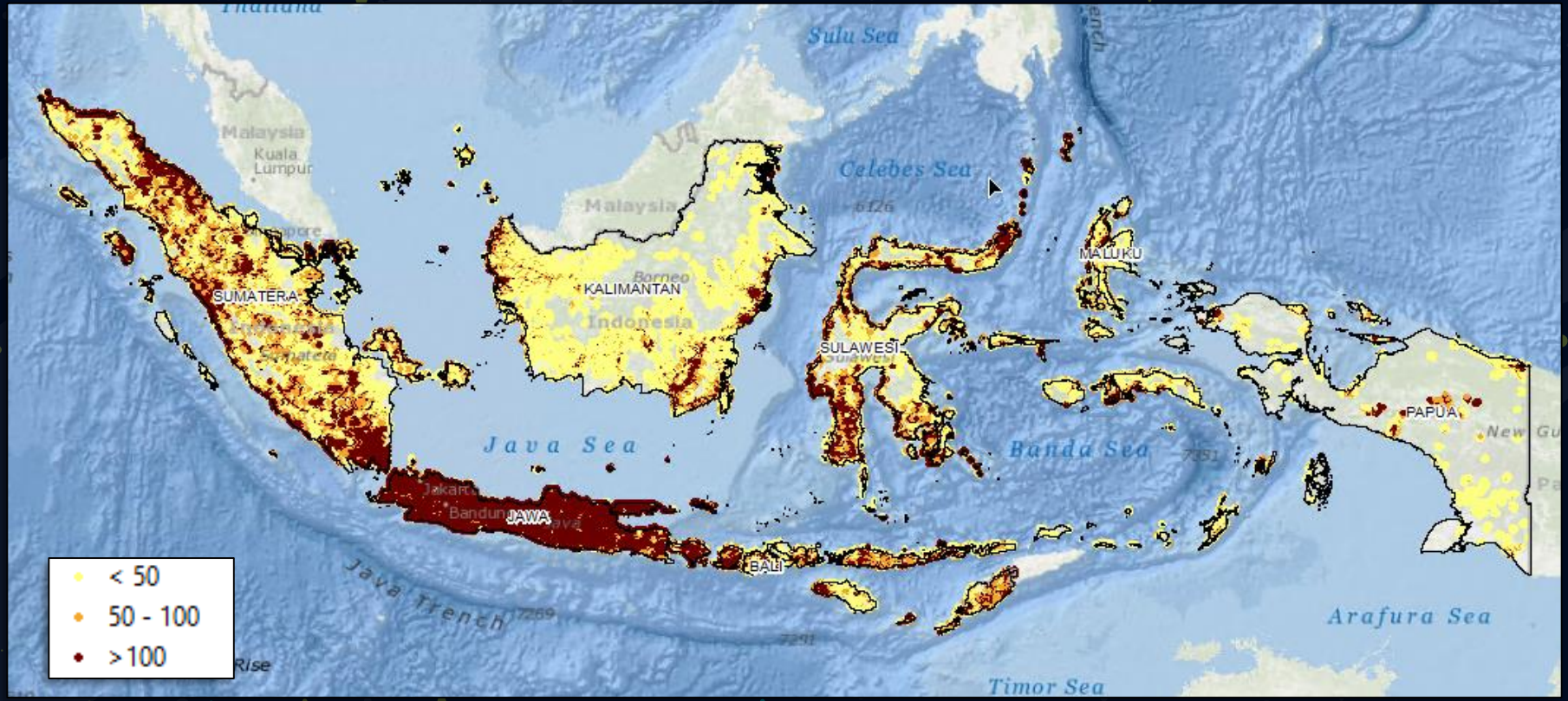
Mobile network operator (MNOs cell sites),

Spatial distribution of population

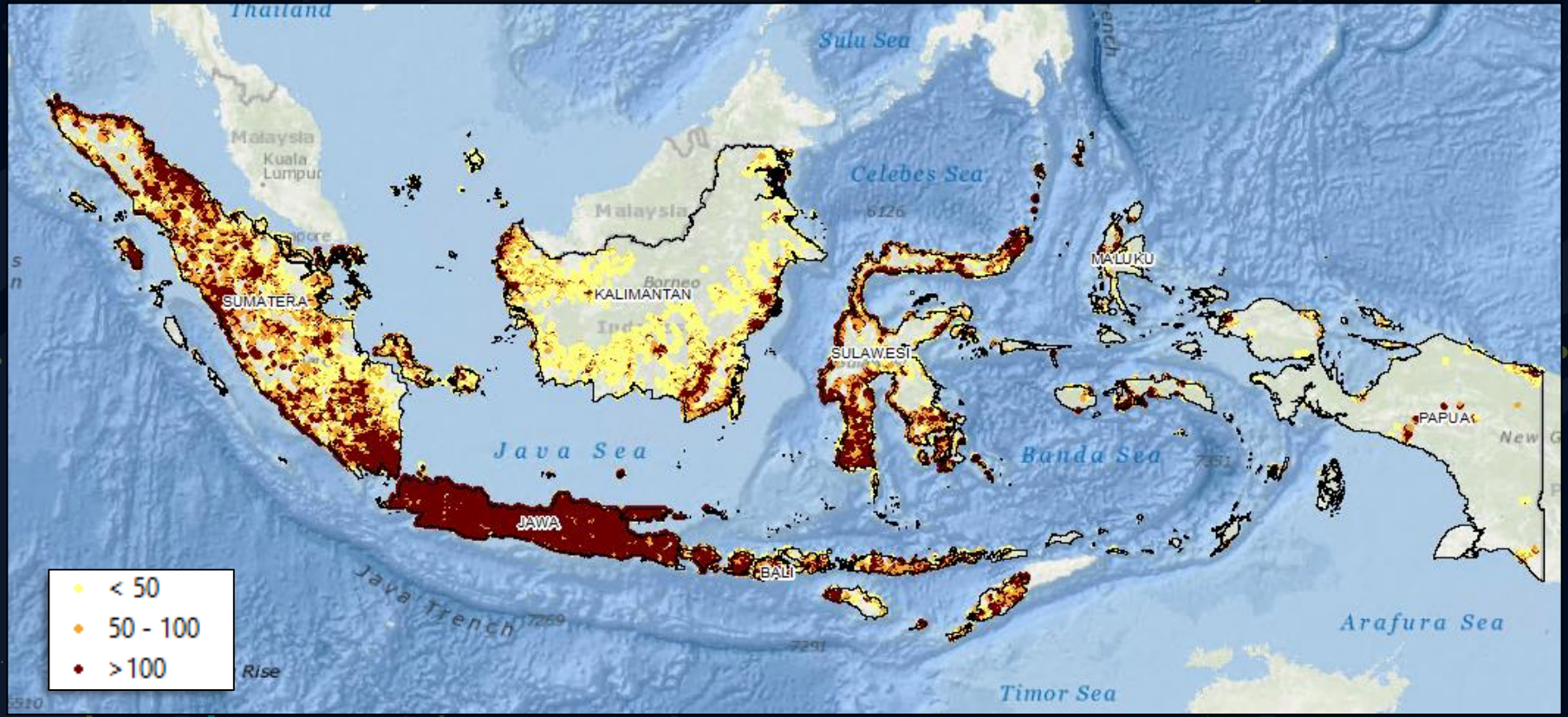
Source: worldpop.org



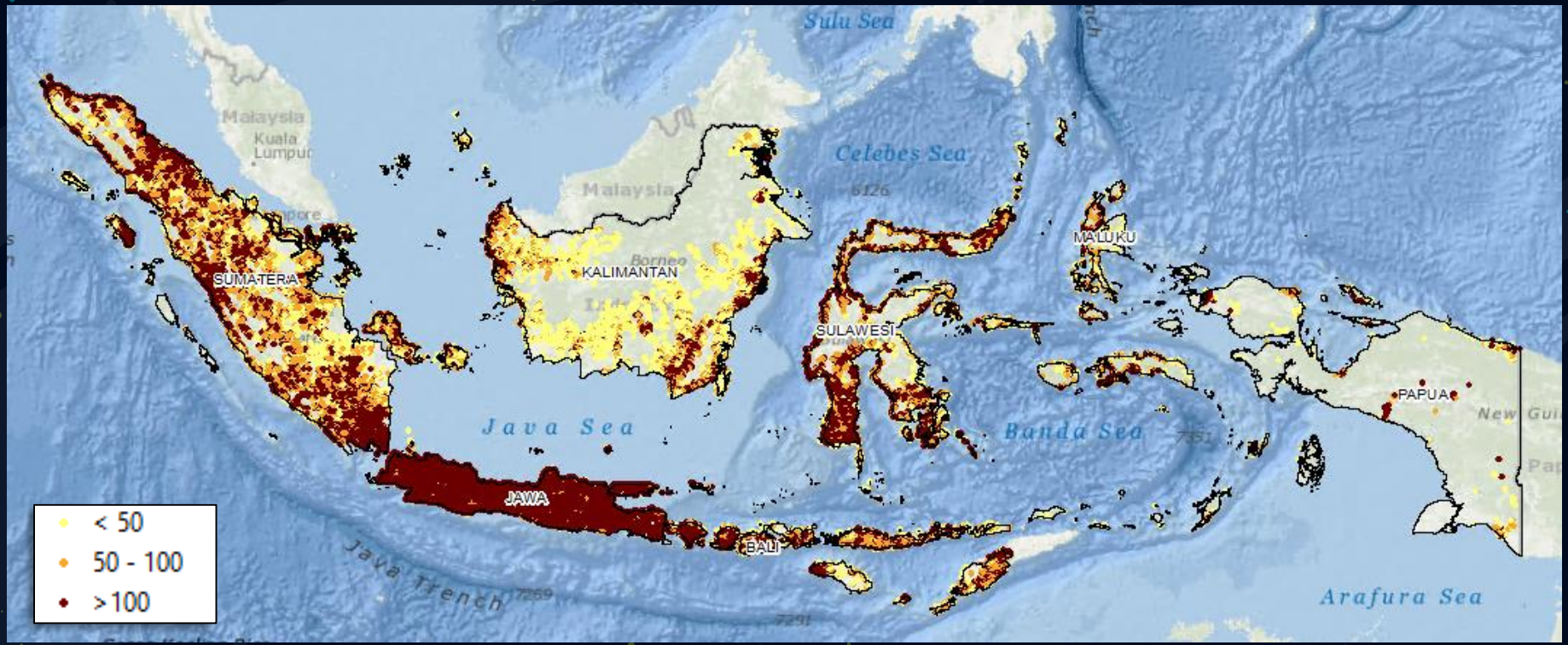
The Population Covered By 2G

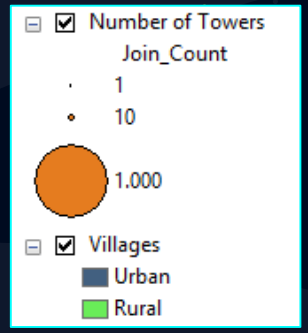


The Population Covered By 3G



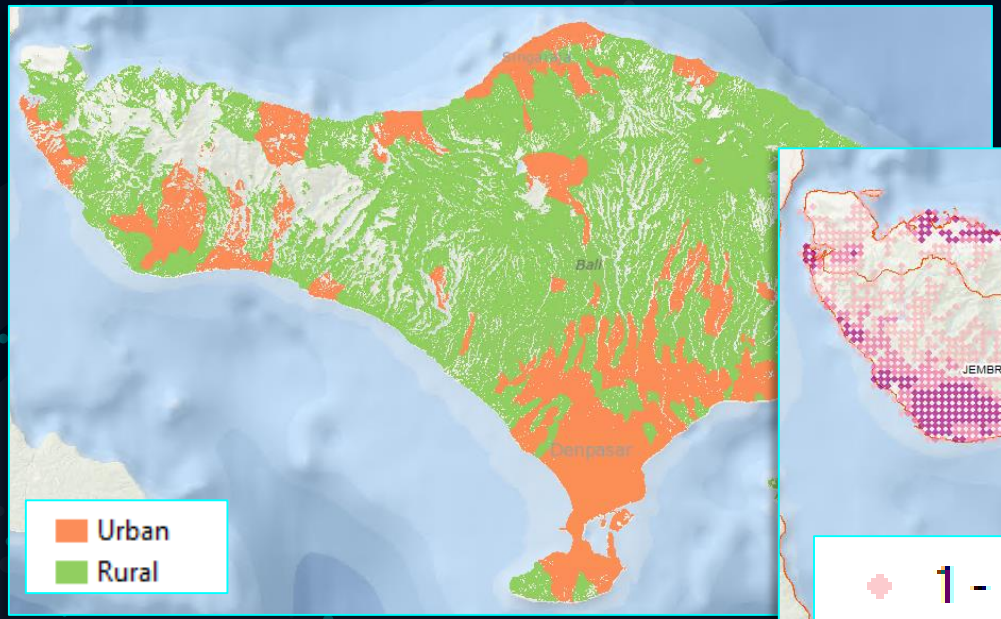
The Population Covered By 4G

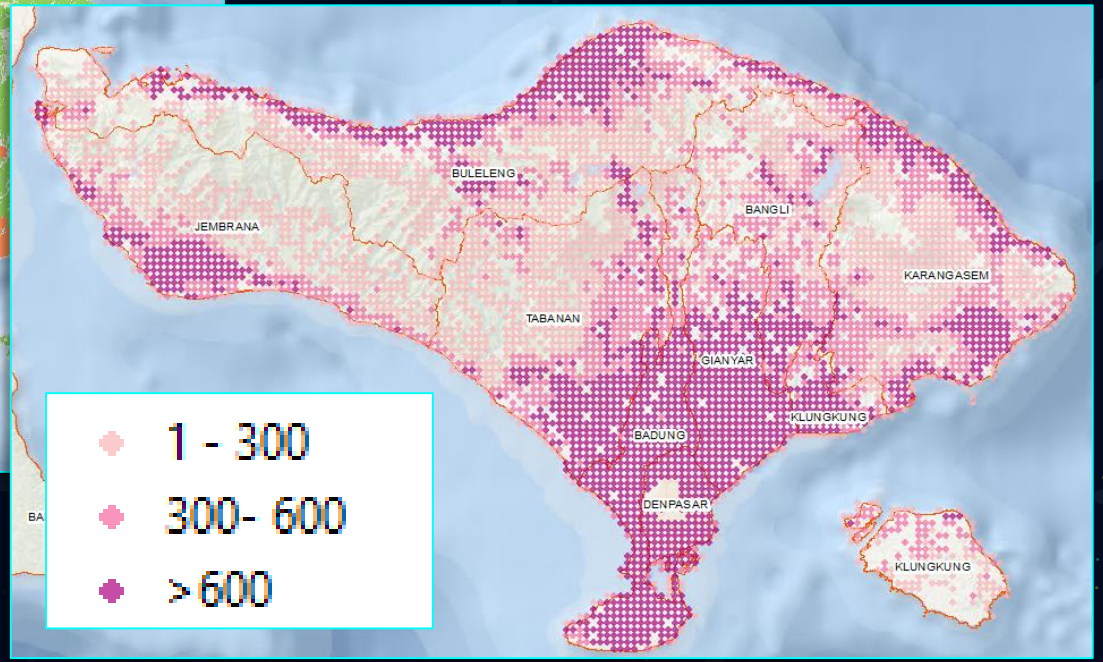




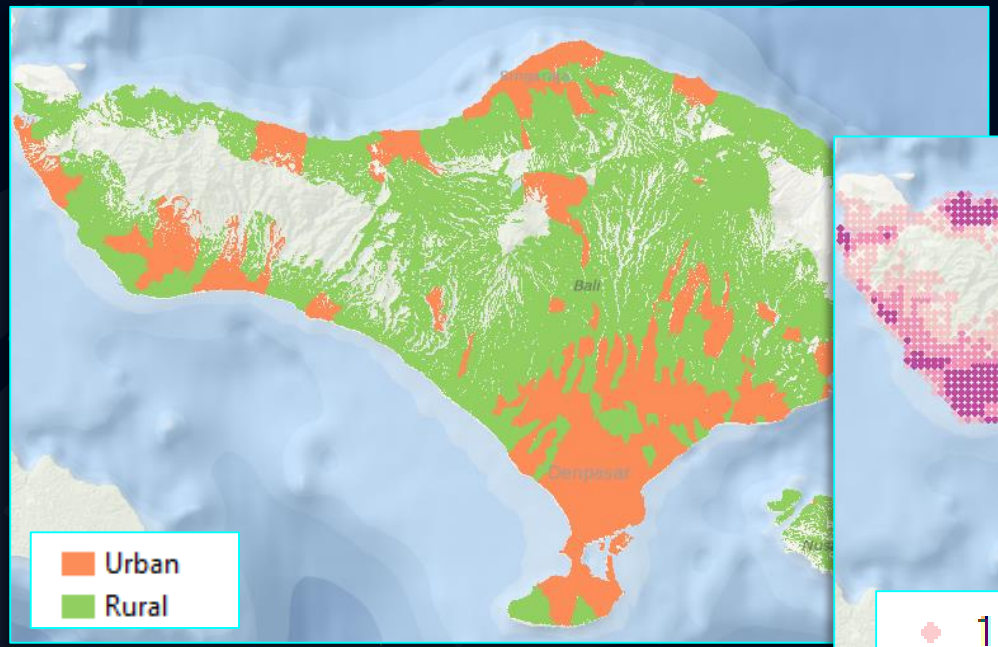
Area	Cell Towers
Urban	11,870
Rural	3,316

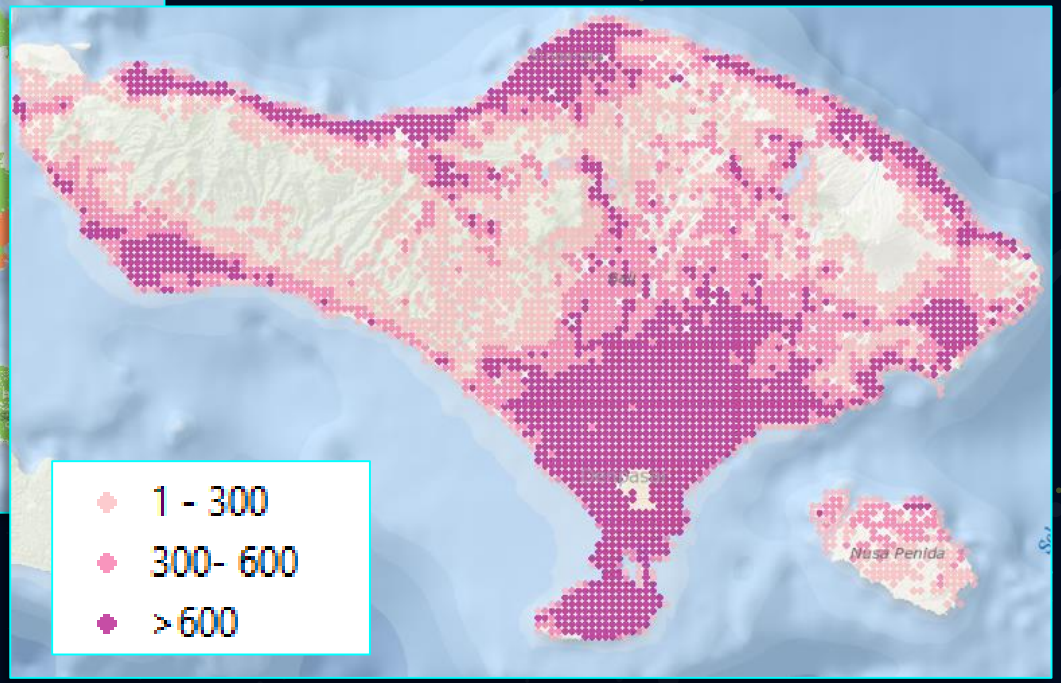
The Population Covered By 2G Technology



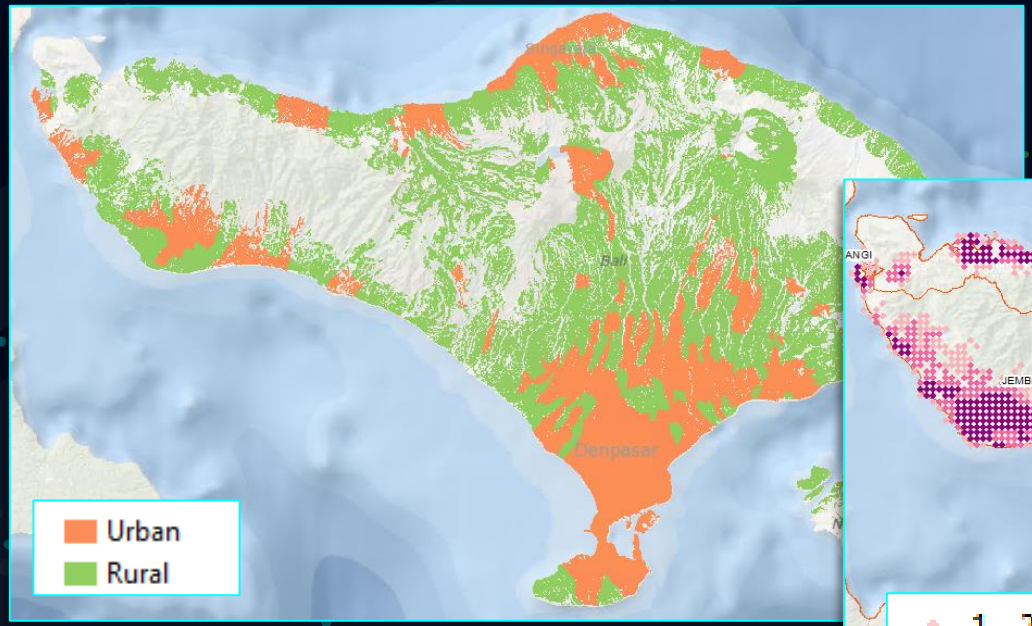


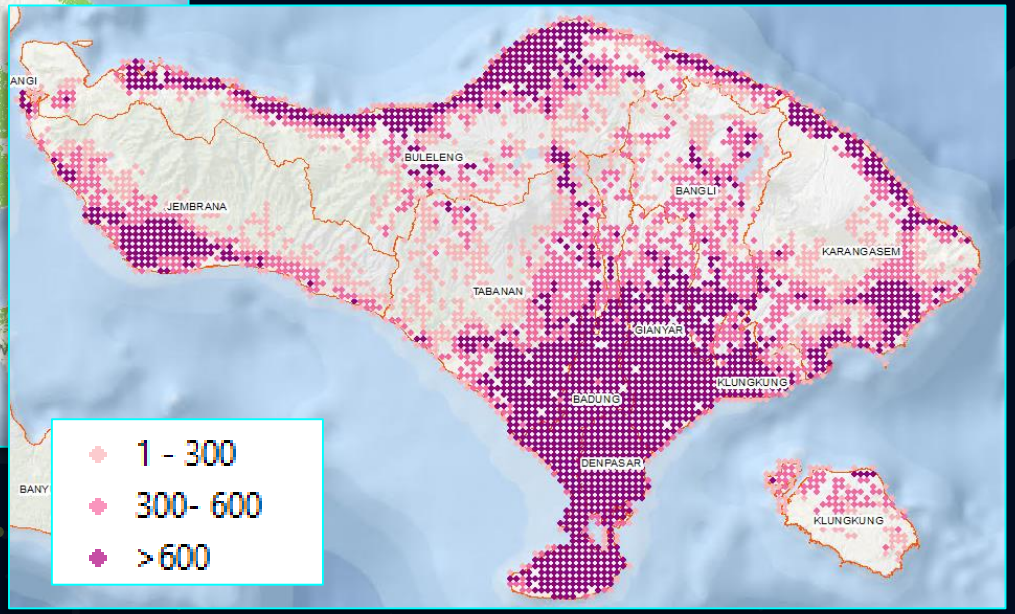
The Population Covered By 3G Technology





The Population Covered By 4G Technology





THANKS!

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