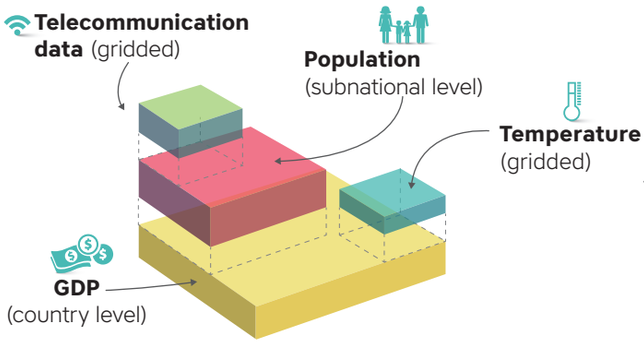
Introducing GDP Disaggregated

Tackling Spatial Mismatch

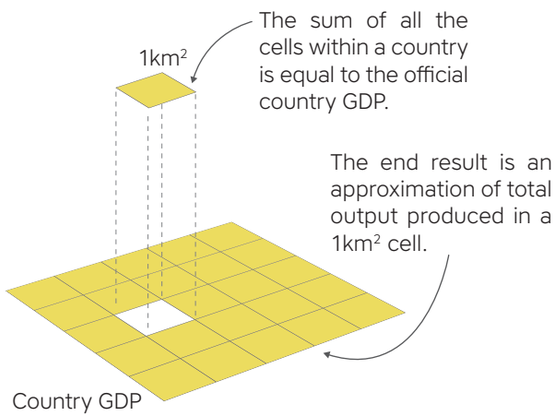


Socio-economic data is often collected, calculated or released at an aggregate level by country or region. Meanwhile, physical, environmental and other kinds of data are available at a finer resolution that makes comparisons difficult. We call this **spatial mismatch.**

Making socio-economic data, like GDP, comparable with other micro level data allows for new and richer analysis that explicitly recognizes the possibility of heterogeneity at a higher resolution. This could help identify local economic hotspots and finer spatial variations on a wide array of interactions and analysis.

What is GDP disaggregation?

GDP Disaggregated is the process by which GDP at a coarse spatial scale is translated to a finer resolution while maintaining consistency with the original dataset. The end result is an approximation of total output produced in a 1km^2 cell, or 'gross cell product', so that the sum of all the cells within a country is equal to the official country GDP.



GDP

Gross Domestic Product (GDP) is a measure of the total output produced in a country. It represents the size of an economy in terms of economic activity, enables policymakers to judge whether the economy is contracting or expanding and is a good thermometer for labor and productive capacity. Although GDP represents an important component of welfare and is the universal benchmark of economic standing, it emphasizes economic output, not economic well-being.

Applications

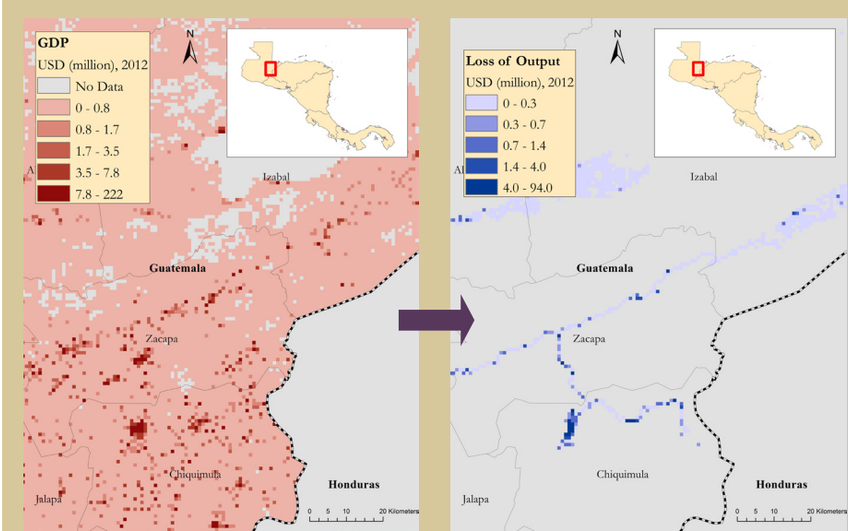
Geography affects economic development. Aggregated economic activity fluctuates as a result of diverse disaggregated phenomena. Gridded GDP data allows for a much richer set of geophysical data to be used in economic analysis on a broad set of issues, including energy, environment, climate change, disaster risk, etc.

Some examples of the uses of Gridded GDP are:

- **Analysis of coastal** protection services
- **Urban development** applications
- **Regional income** distribution proxy for data constrained countries
- **Visualization tool** for agglomeration of economies
- **Input for indicators** on territorial development
- **Climate change** impact assessments

Flood Risk Assessment in Central America

In Central America the disaggregated GDP was used as an input to provide a monetary estimation of the expected annual GDP loss at high spatial resolution under different scenarios of flood duration and protection (GLOFRIS).



The Disaggregation Process

Solid economic theory and statistical analysis are the backbone of the disaggregation process. This procedure assesses the relationship between GDP and different spatially disaggregated variables that influence economic performance at a local level. The procedure is simple, replicable and scalable.

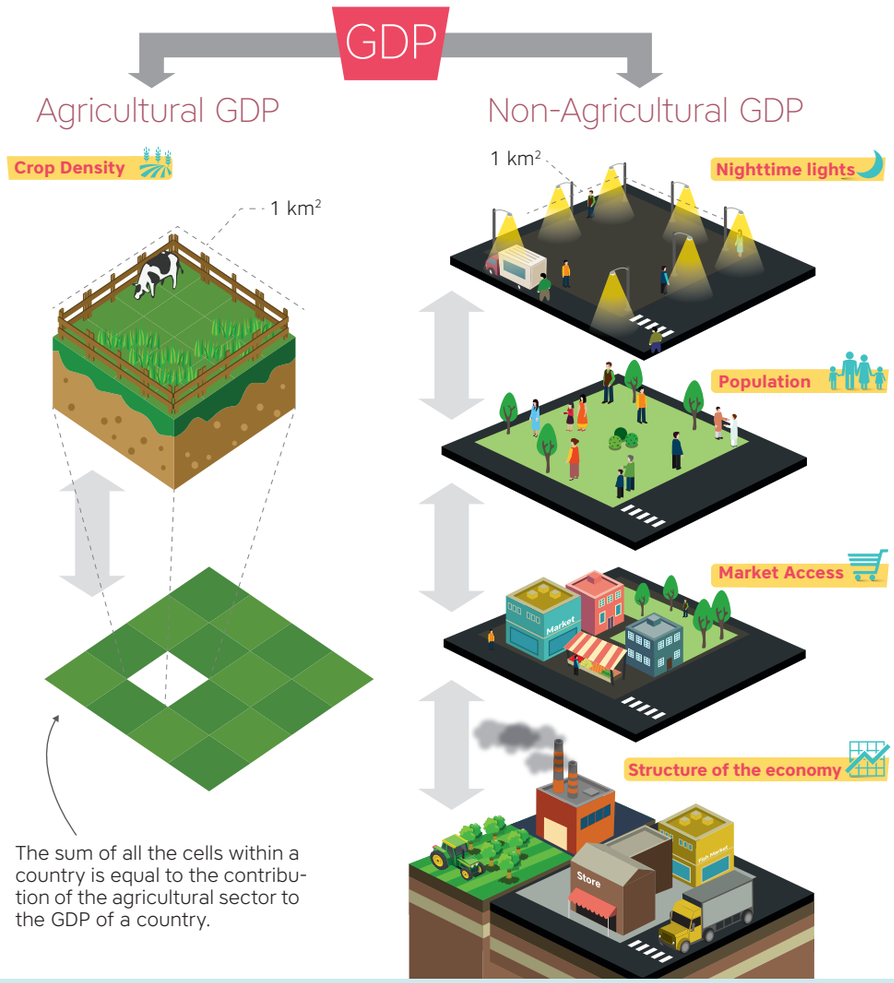
The GDP is broken down into two different components: agricultural and non-agricultural. The reason behind this breakdown is that agricultural production has different geographic characteristics and dynamics. This classification is based on the percentage contribution of agriculture to GDP, as measured by the World Development Indicators.

Agricultural GDP disaggregation

Using global land cover classifications, we calculate the total area of agricultural land within a 1km^2 cell and allocate the agricultural GDP proportionally across the total agricultural area by country.

Non-agricultural GDP disaggregation

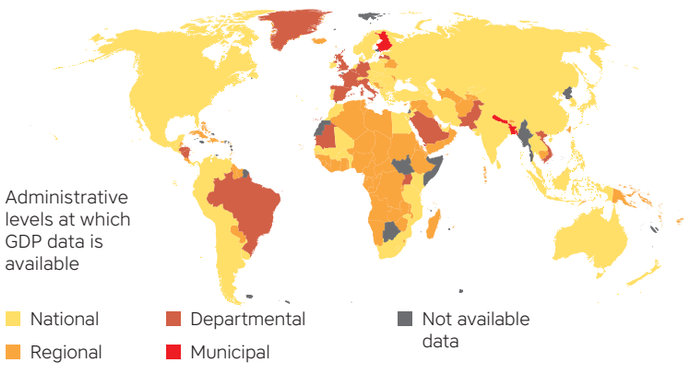
The non-agricultural GDP disaggregation process works with information at different levels of aggregation; some of the variables that we look at are at 1km^2 resolution, while some others are only found at a subnational or national level. The disaggregation method takes this into account and harnesses these differences to reduce estimation errors and increase the accuracy of the final output.



The sum of all the cells within a country is equal to the contribution of the agricultural sector to the GDP of a country.

The disaggregation process step by step:

1 **The data collection process** built one of the most detailed and extensive GDP datasets in existence today. The database comprises more than 7,000 GDP observations between 1999 and 2014, at different administrative levels, for over 84 countries; 47 of which are developing economies. The sources range from international organizations to national and local statistical agencies.



2 **Data homologation –** to begin the analysis at the departmental/regional level, the variables that are initially available at a higher resolution (usually cell level) have to be aggregated to match the resolution of other variables in the model.

3 **Departmental/regional level analysis –** the process looks at the relationship between different variables and GDP, through a regression analysis, to help us understand the departmental/regional breakdown of non-agricultural GDP.

4 **Further disaggregation –** if the regression analysis at the departmental/regional level holds, the results are used to disaggregate further to the next level (usually the cell level).

Robustness test

To examine how the regression coefficient estimates behave, and to test the structural validity of the model, subnational GDP values are estimated with the model and compared with available official observations. This process yields very low errors, proving the plausibility of the disaggregation process.

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