



MONITORING

**REGIONAL DEVELOPMENT IN "DATA-POOR" COUNTRIES:
Integrating satellite images, socioeconomic surveys,
and machine learning**

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GLOBAL ISSUE:

Monitoring

sustainable economic development

in data-poor countries

Large development gaps within countries...



Location: Rio de Janeiro, Brazil. Source: @gustavomelloso via Canva

... how can we "monitor" them?

Large regional inequalities ...

Poor
neighborhood



Rich
neighborhood

Location: Sao Paulo, Brazil. Source: Tuca Vieira via El Pais

how can we measure, predict, and explain them?

Persistent regional inequalities ...

Before

After



2004



2021

how can we measure, predict, and explain them?

Regional inequalities are relevant to...

11 SUSTAINABLE CITIES AND COMMUNITIES



10 REDUCED INEQUALITIES



13 CLIMATE ACTION



8 DECENT WORK AND ECONOMIC GROWTH



... multiple Sustainable Development Goals



But, there is a BIG challenge in the study of regional development...

MORTEN JERVEN

POOR NUMBERS

HOW WE ARE MISLED BY AFRICAN DEVELOPMENT
STATISTICS AND WHAT TO DO ABOUT IT



In many poor-countries,
data are:

Unavailable

Unreliable

Uncomparable

Data-poor countries

NEW technologies,
NEW research opportunities

In many poor countries,
new satellite data are:

Reliable

Available

Comparable

American Economic Review 2012, 102(2): 994–1028
<http://dx.doi.org/10.1257/aer.102.2.994>

Measuring Economic Growth from Outer Space

By J. VERNON HENDERSON, ADAM STOREYGARD, AND DAVID N. WEIL*

Received: 15 December 2019 | Revised: 24 June 2020 | Accepted: 17 August 2020
DOI: 10.1111/rsp3.12335

ORIGINAL ARTICLE

We develop lights to with poor is a com sured gr fer from Using lig tries as 1 supranat. in sub-S. (JEL E01

Regional convergence and spatial dependence across subnational regions of ASEAN: Evidence from satellite nighttime light data

Carlos Mendez | Felipe Santos-Marquez

Contents lists available at ScienceDirect

World Development

journal homepage: www.elsevier.com/locate/worlddev

Shedding light on regional growth and convergence in India

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Regional Growth

Regional inequality, convergence, and its determinants – A view from outer space[☆]

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Integrate insights from multiple fields...



... to study sustainable regional development



Example

Mapping multidimensional poverty in Cambodia:

Integrating big data, socioeconomic surveys,
and machine learning

Joint work with

Ate Poortinga

Spatial Informatics
Group

Nyein Soe Thwa

Spatial Informatics
Group

Andrea McMahon

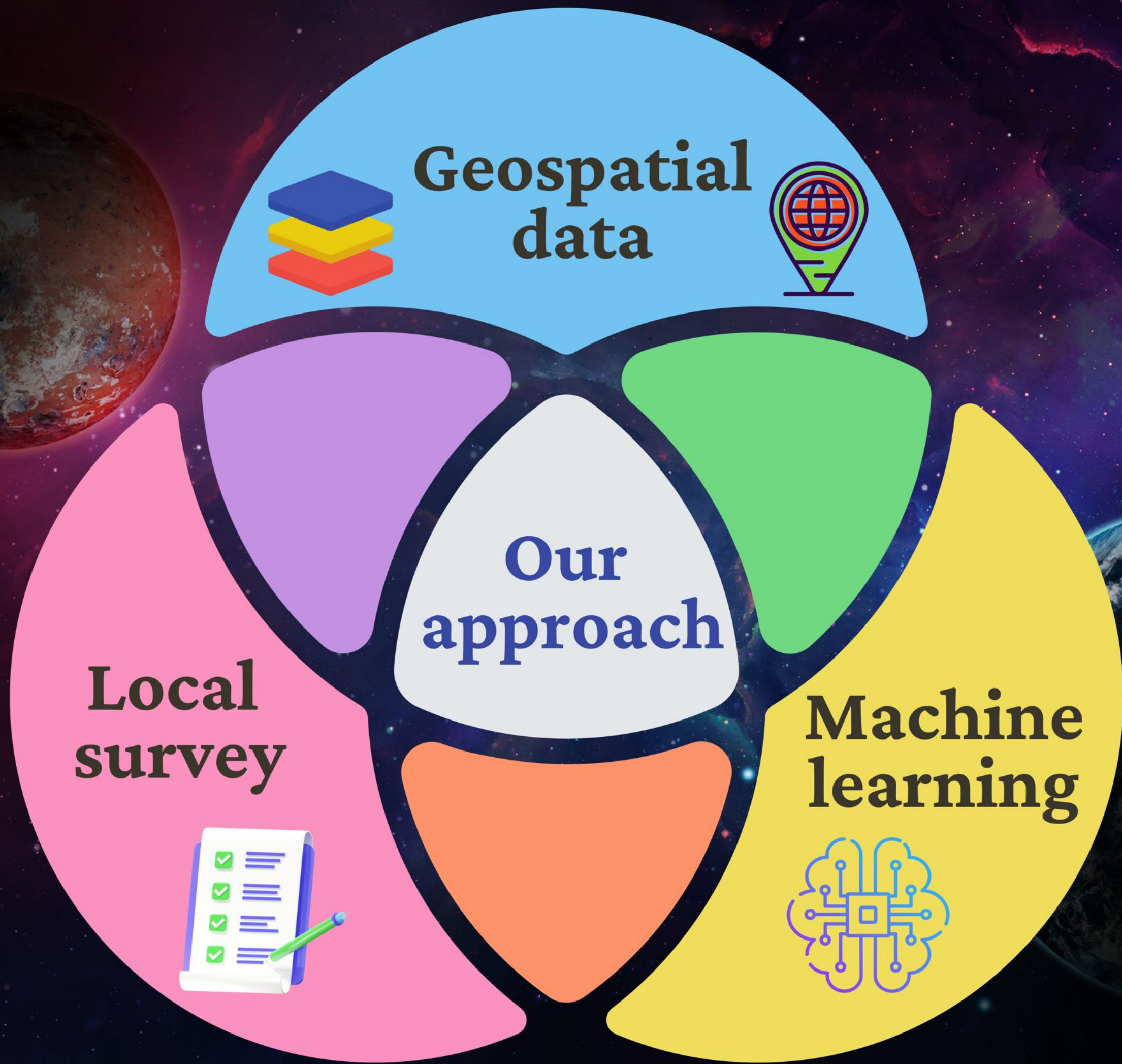
Spatial Informatics
Group

Theara Khoun

UNDP Cambodia

Ivan Gonzalez

UNDP Cambodia

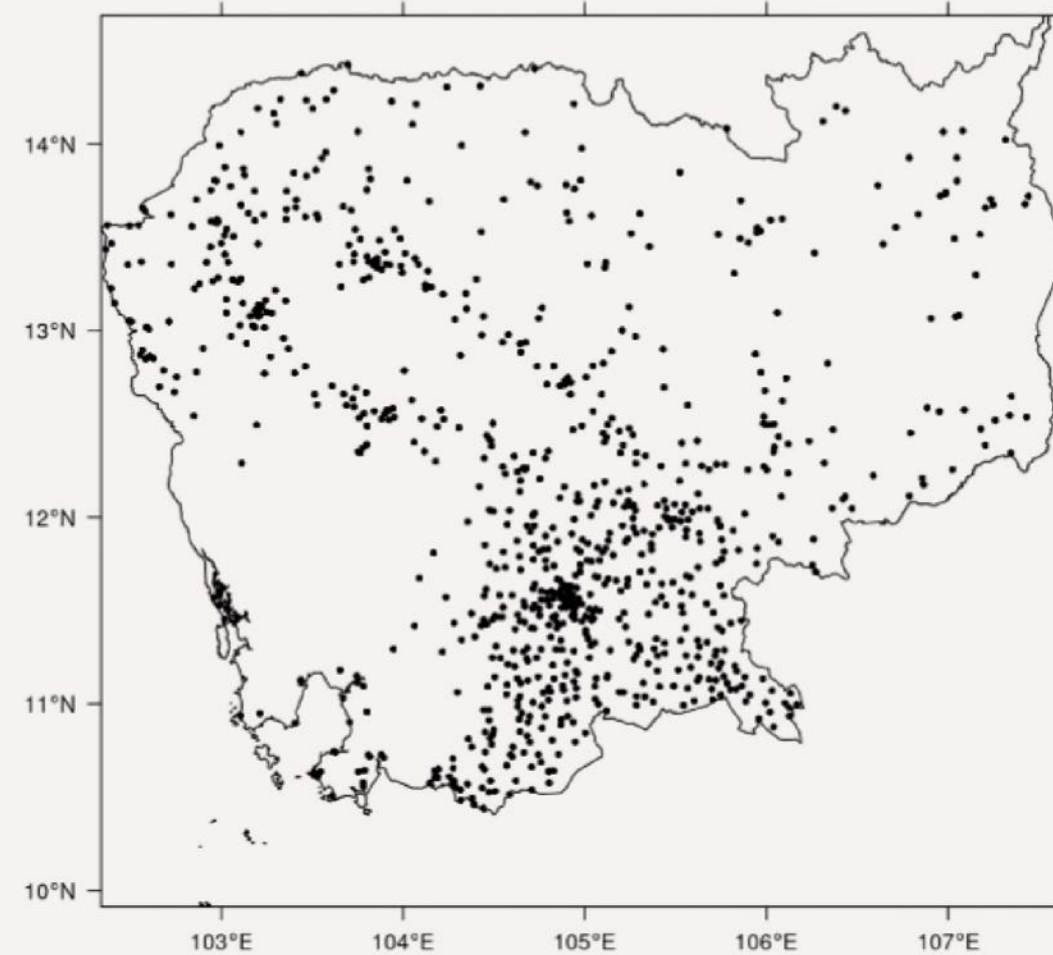


Cambodia socioeconomic survey is useful, but ...



Every 2 years

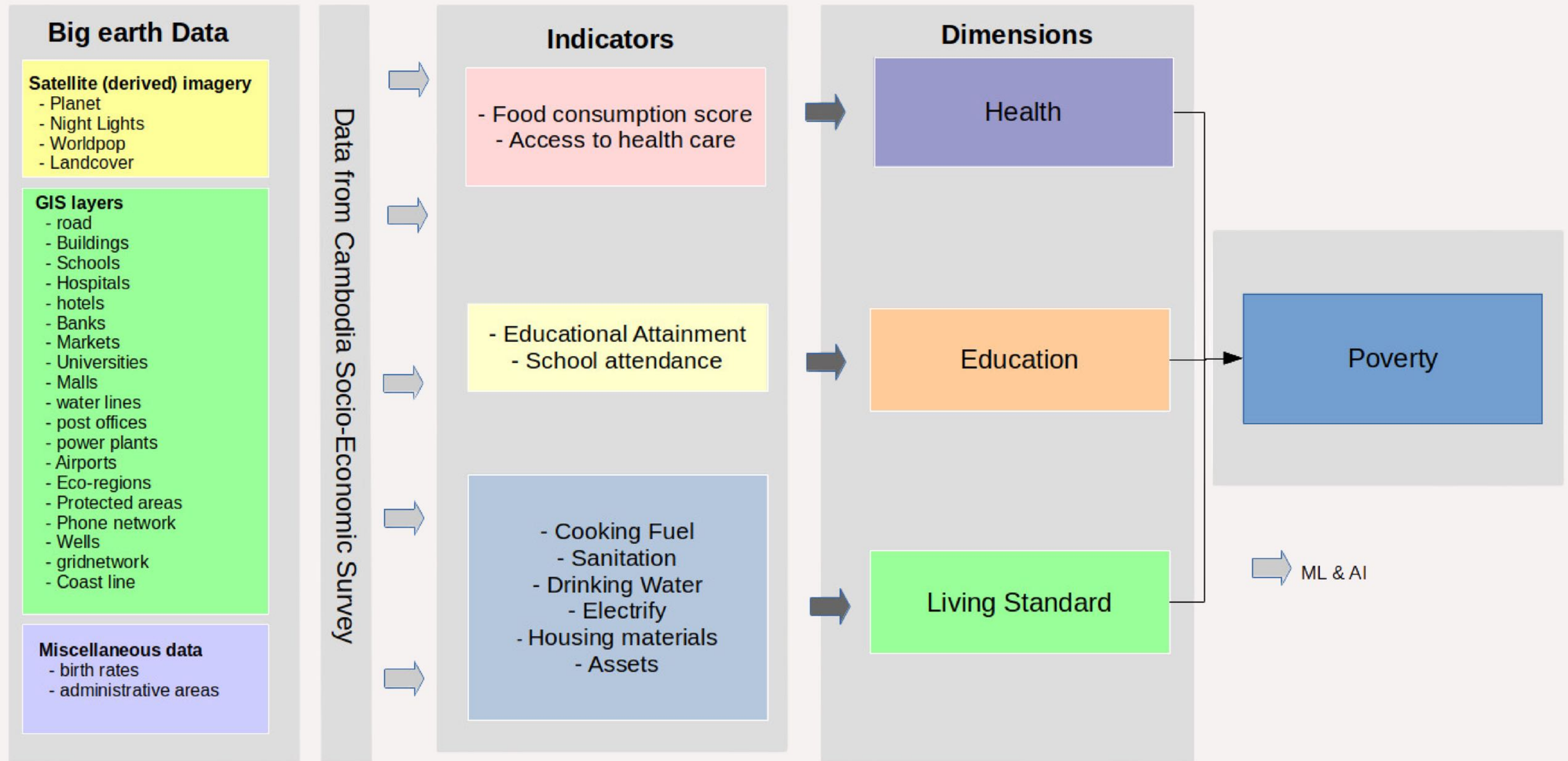
Sample: 10,000 households



Spatial distribution of the survey

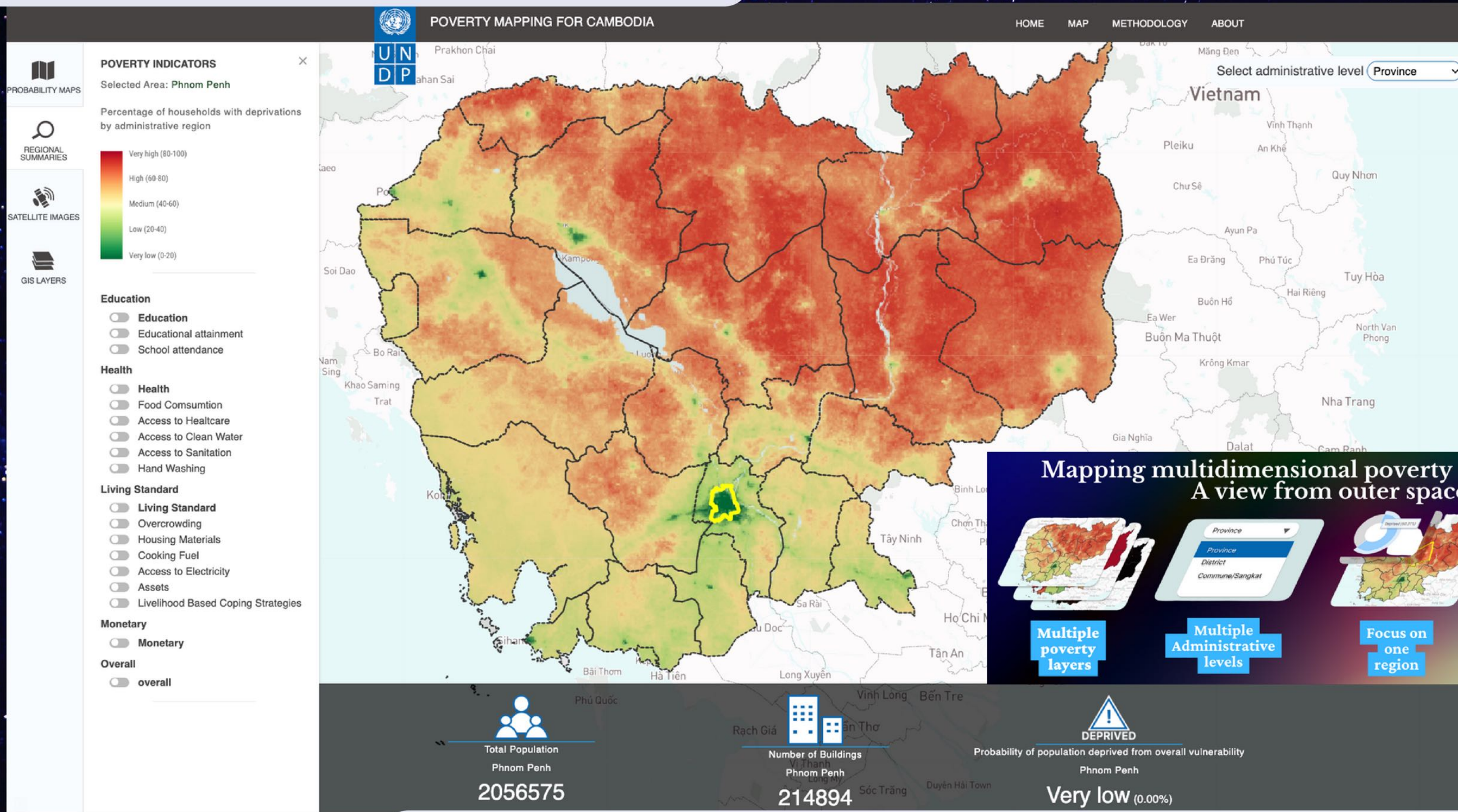
... is costly and has space-time coverage limitations

Cambodia socioeconomic survey + BIG earth observation data ...



... less expensive and enhanced coverage

A tool to predict poverty ...

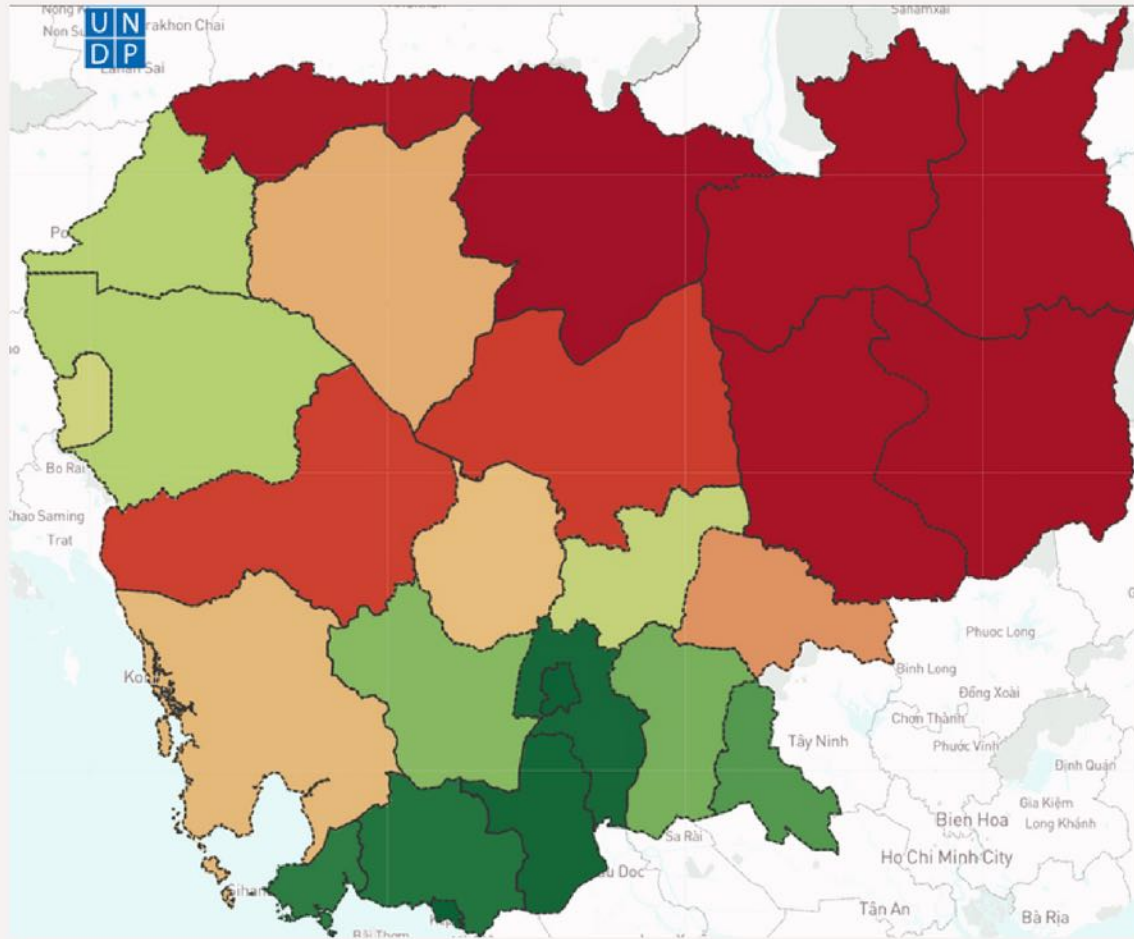


Mapping multidimensional poverty in Cambodia: A view from outer space

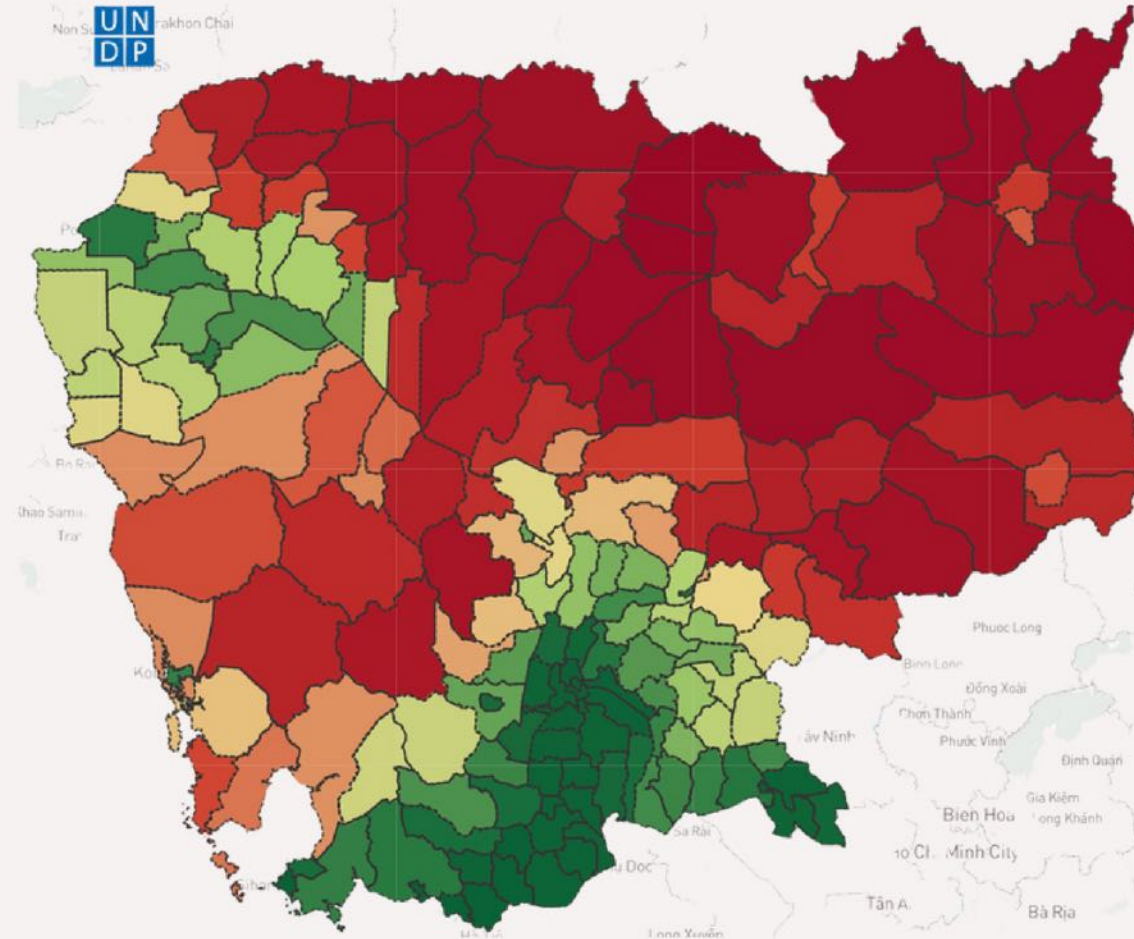
- Multiple poverty layers
- Multiple Administrative levels
- Focus on one region
- Compare multiple regions

... across multiple dimensions and scales

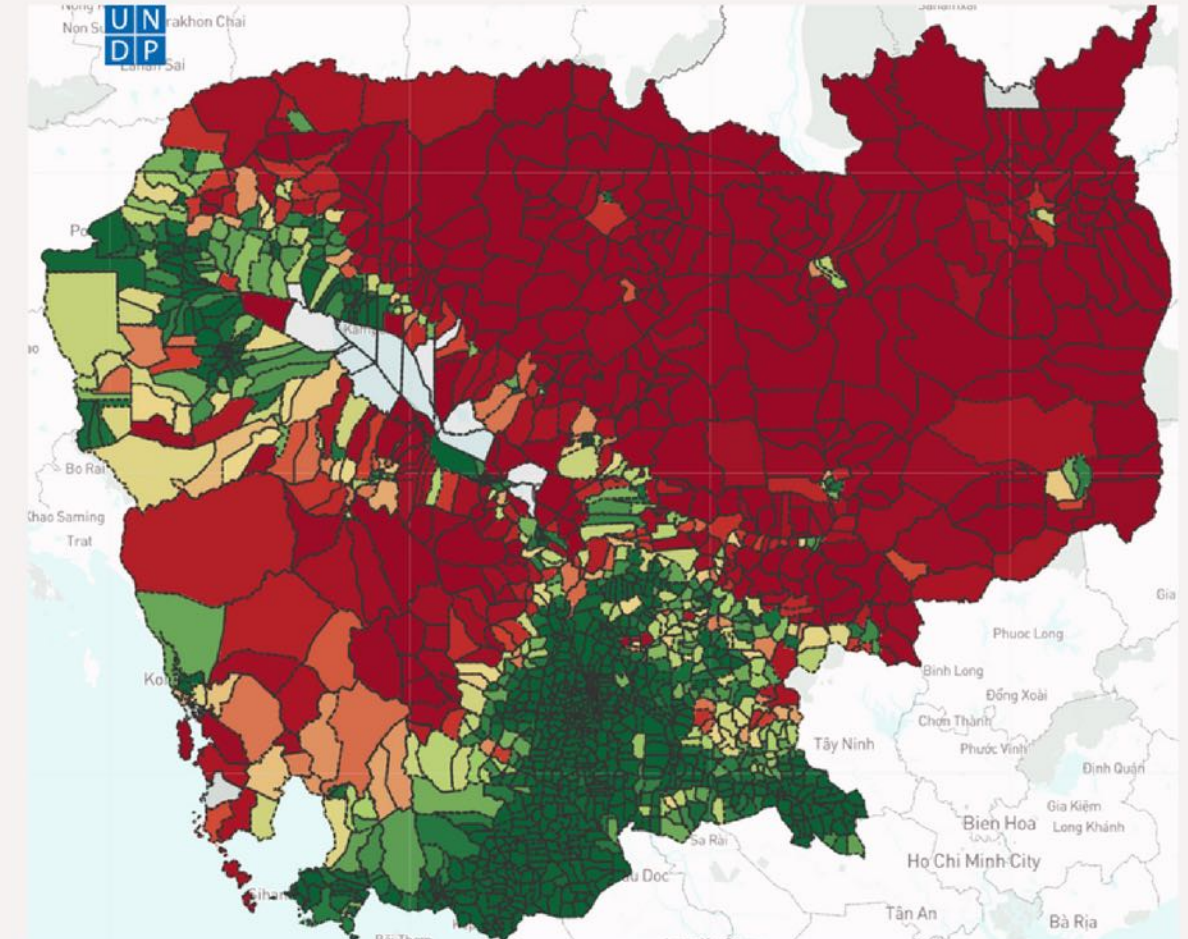
Earth observation data can help us study poverty ...



Provinces



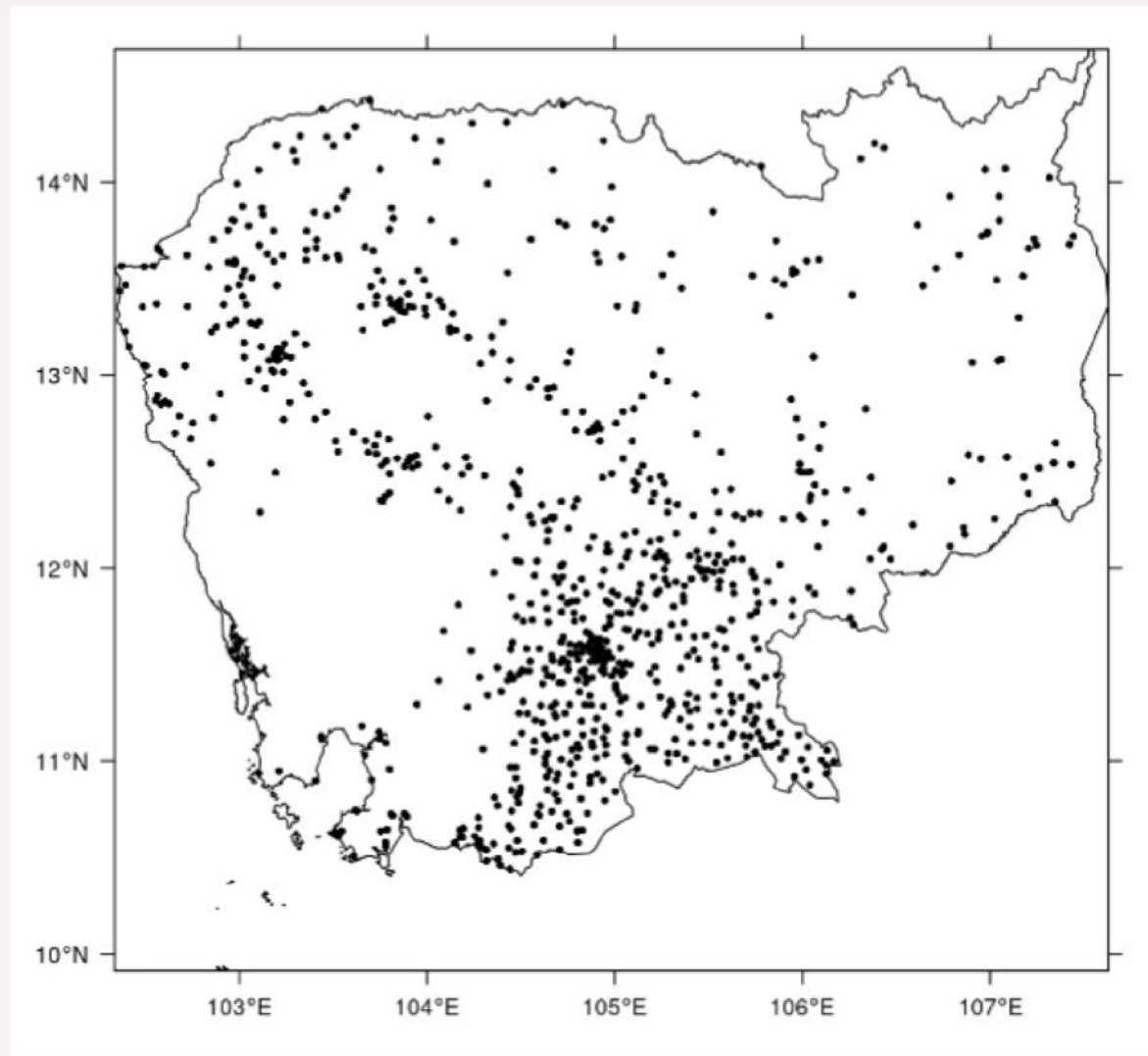
Districts



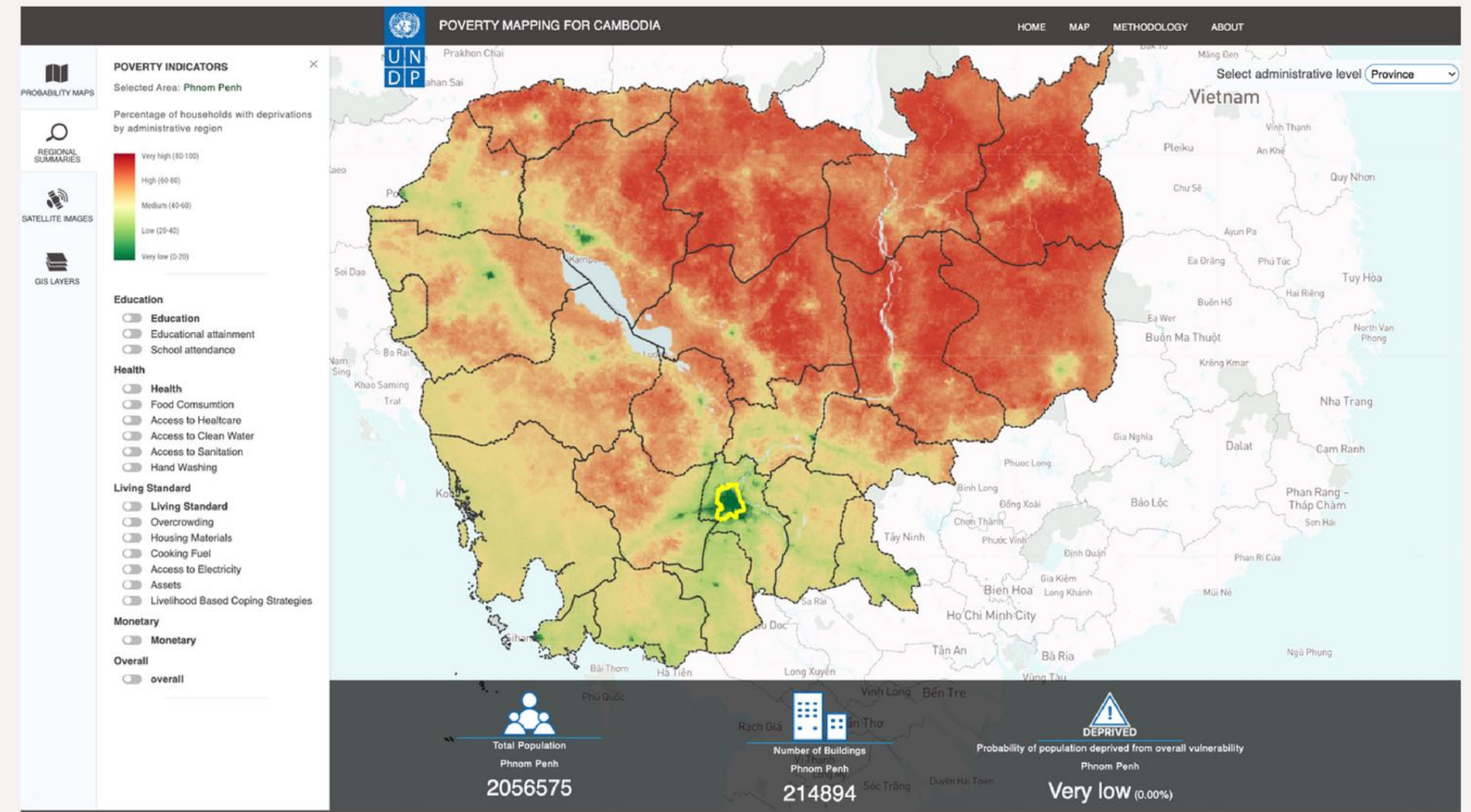
Communes

... at multiple geographical scales or administrative levels

Earth observation data (satellite and GIS layers) can...



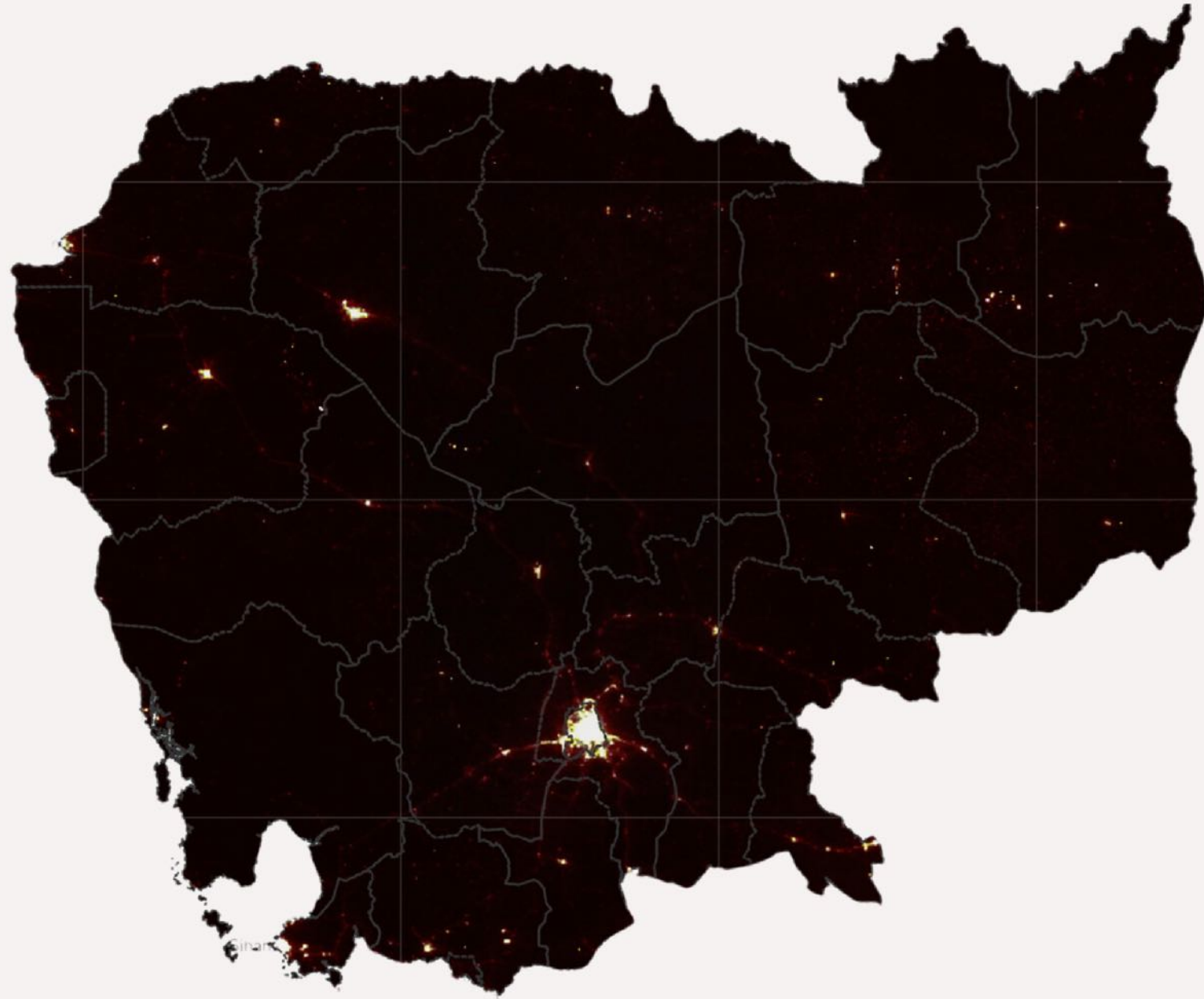
Spatial distribution of survey data



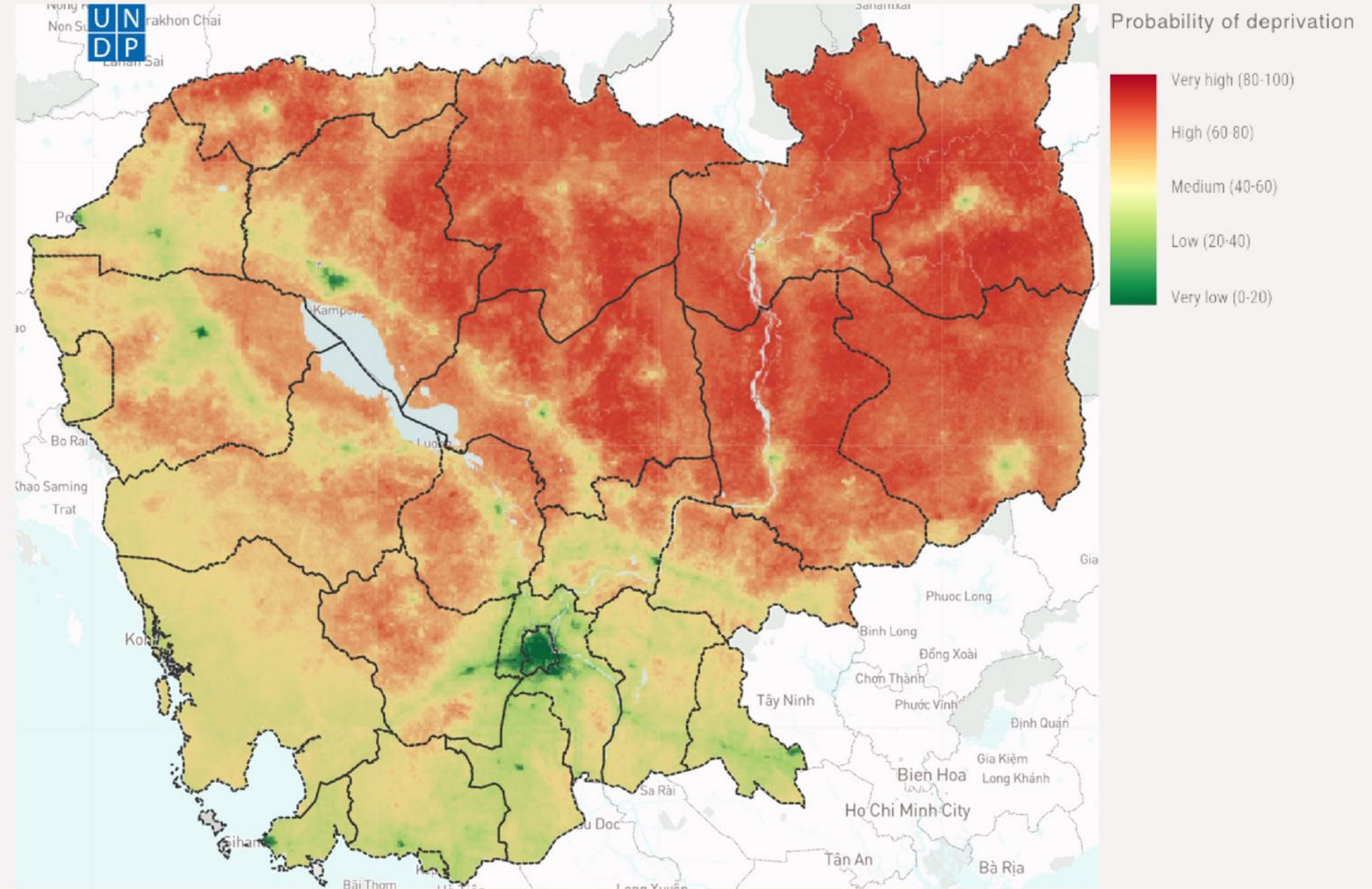
Enhanced results based on EO data and machine learning

... enhance our understanding of multidimensional poverty

Survey data + Daytime satellite images + GIS layers ...



Nighttime lights map



Multidimensional poverty map

... can greatly enhance what we know from nighttime lights



Thank you very much

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