POVERTY MAP - COLOMBIA 2018 - 2019

PROSPERIDAD SOCIAL

April 2021

OUTLINE

I.   Context and source of information

II.   Poverty Maps Using Small Area Estimation

III. Model applied to the poverty map in Colombia

IV. Results of the Monetary Poverty and Extreme Poverty Map 2019

V.   Comparison with current coverage of cash conditional transfers program - Familias en Acción

VI. Applications and future work

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CONTEXT AND SOURCE OF INFORMATION

SOURCE OF INFORMATION

The National Administrative Department of Statistics is the entity in charge of providing official information on poverty and living conditions in Colombia.

Integrated Household Survey –
-Gran Encuesta Integrada de Hogares (GEIH):
- Official source of the labor market report, monetary poverty, extreme poverty and inequality.
- Approximately 230,000 surveyed households and 438 selected municipalities.
- Monthly information surveys.
- Disaggregation at the national level, urban / rural area, 13 metropolitan areas, 24 main cities and states.
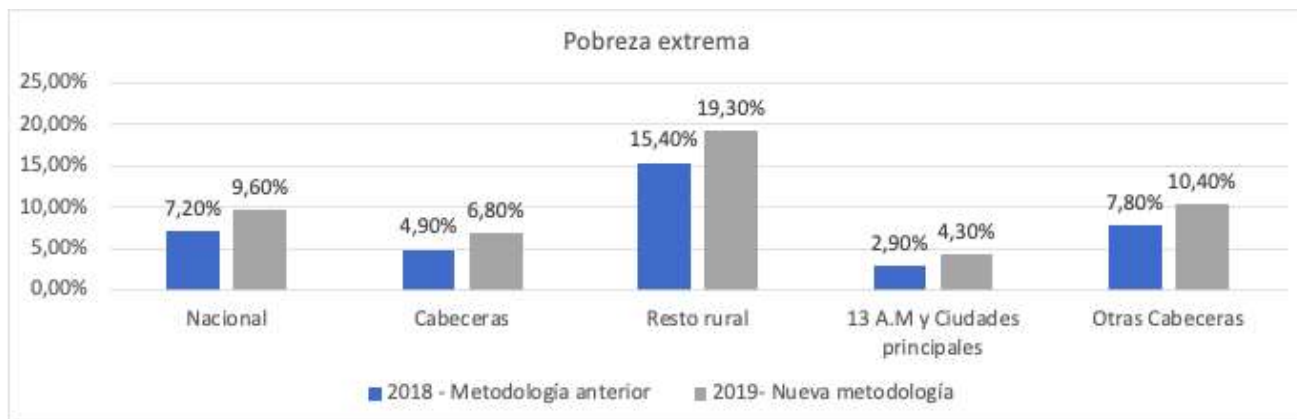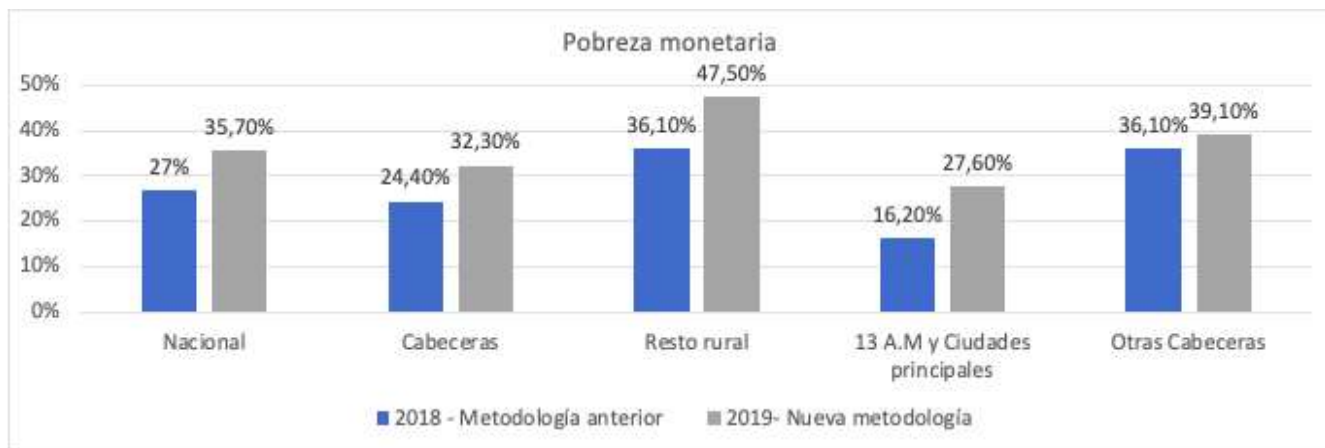
National Population and Housing Census (CNPV):-
Censo Nacional del Población y Vivienda (CNPV):
- Official source for the Multidimensional Poverty report at the municipal level.
- Approximately 15 million households registered and coverage of 1,122 municipalities.
- Decennial update, last update 2018

OFFICIAL INFORMATION

Pobreza monetaria

Pobreza extrema

These graphs represent the most up-to-date data on monetary poverty and extreme poverty published by DANE . It is important to highlight that in 2019, Colombia performed a methodological update *(definition of the basic food basket, Orshansky's coefficient and levels of disaggregation of the PL and LI).*

At the aggregate level, it is possible to identify important gaps between urban areas, rural areas and main cities. Therefore, having information with greater disaggregation will allow taking actions to reduce gaps in poverty.
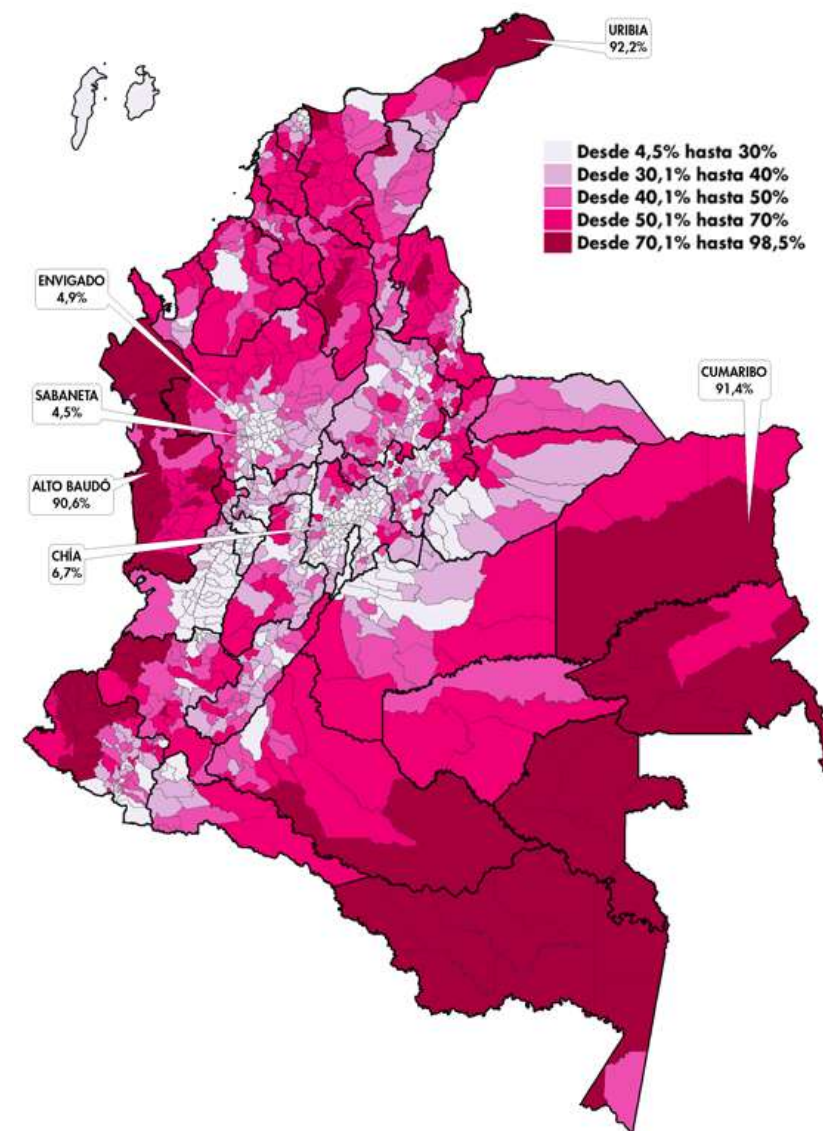
OFFICIAL INFORMATION

Currently, the 2018 National Housing Population Census allows to have an estimate of multidimensional poverty at the municipal level, which is useful to know the household deprivations.

However, there are programs and policies where it is required to know the details of monetary poverty and extreme poverty in order to define targeting processes, coverage, target population, budgets, and others.

In Colombia, Prosperidad Social is the government entity in charge of the operation of the 5 Cash Transfer programs in the country:

1. Familias en Acción
2. Jóvenes en Acción
3. Colombia Mayor
4. Ingreso Solidario
5. Esquema de devolución del IVA

URIBIA
92,2%

Desde 4,5% hasta 30%
Desde 30,1% hasta 40%
Desde 40,1% hasta 50%
Desde 50,1% hasta 70%
Desde 70,1% hasta 98,5%

ENVIGADO
4,9%

CUMARIBO
91,4%

SABANETA
4,5%

ALTO BAUDÓ
90,6%

CHÍA
6,7%

POVERTY MAPS USING SMALL AREA ESTIMATION

WHY IT IS IMPORTANT TO BUILD A POVERTY MAP?

A poverty map is the monetary poverty estimation at a lower level of geographical disaggregation than the ones presented by the surveys, in Colombia at the municipal level. This would be a public policy instrument that will allow to:

1. Comprehend in a deeper way the poverty of the country.

2. Generate a crucial change in the dialogue on poverty, including motivation for new strategies and approaches.

3. Provide the guidelines to structure the operational details of specific programs and the redistribution of resources.

4. Create the concern and interest in evidence-based policy making.

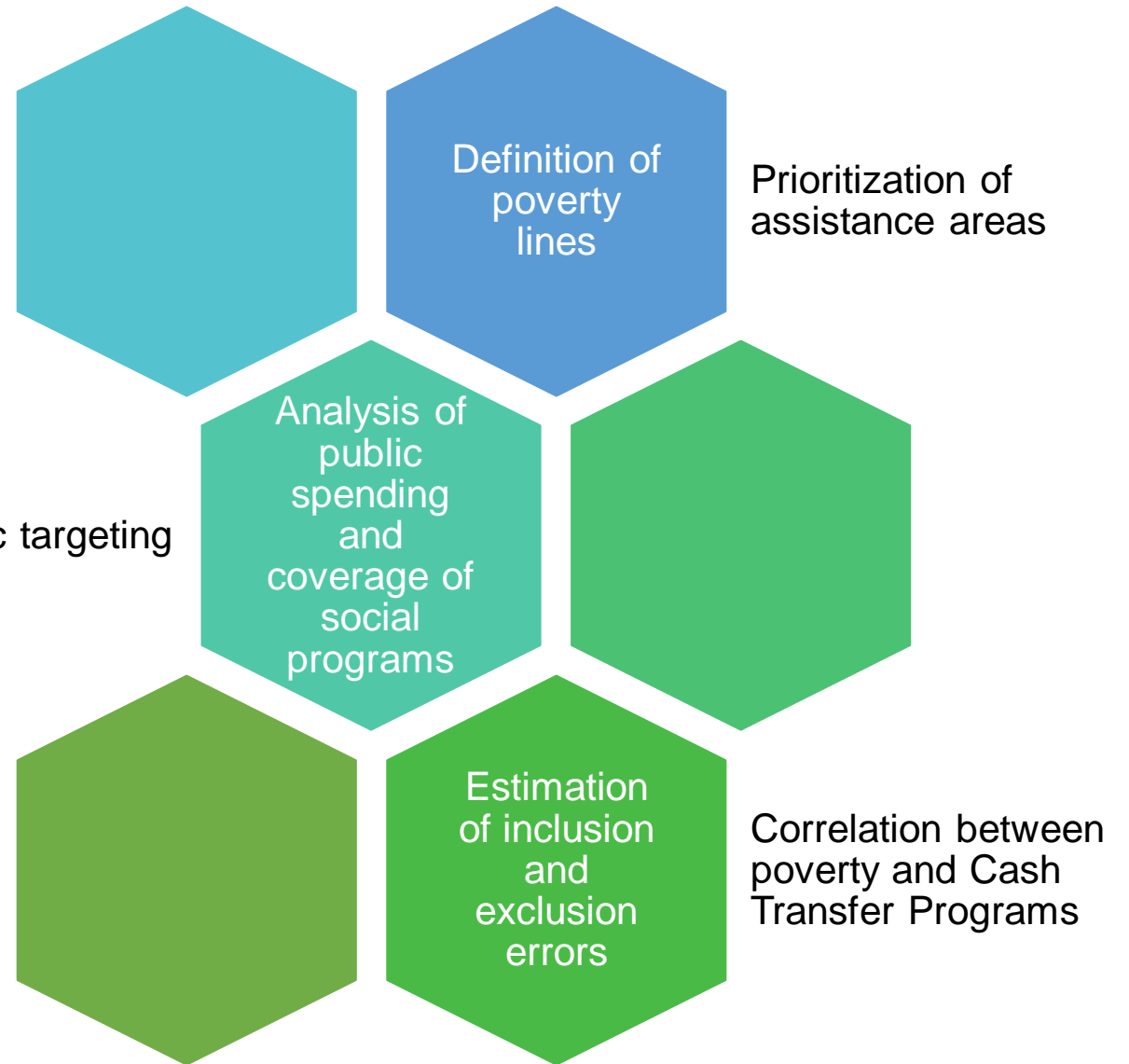La equidad es de todos · Prosperidad Social

WHAT PRODUCTS COULD BE OBTAINED FROM A POVERTY MAP?

These products allow an efficient resource management and will facilitate the fulfillment of goals to reduce gaps and to decrease the incidence of monetary and extreme poverty.

Definition of poverty lines

Prioritization of assistance areas

Analysis of public spending and coverage of social programs

Geographic targeting

Estimation of inclusion and exclusion errors

Correlation between poverty and Cash Transfer Programs
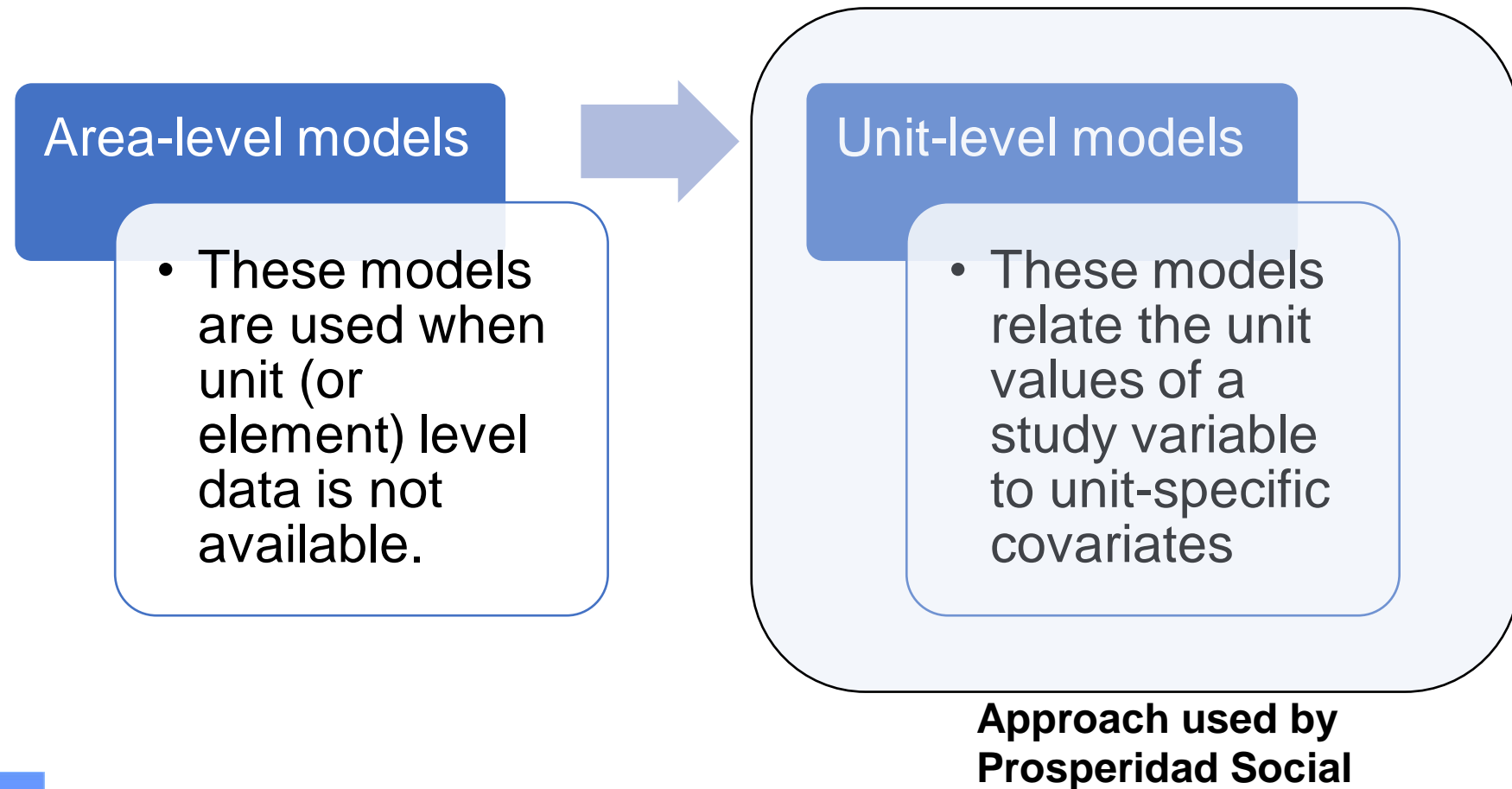
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MODEL APPLIED TO THE POVERTY MAP IN COLOMBIA

SMALL AREA ESTIMATION

Small area models explain the variation in the area beyond what auxiliary variables included in the model could explain. There are two approaches to small area models:

Area-level models

- These models are used when unit (or element) level data is not available.

Unit-level models

- These models relate the unit values of a study variable to unit-specific covariates

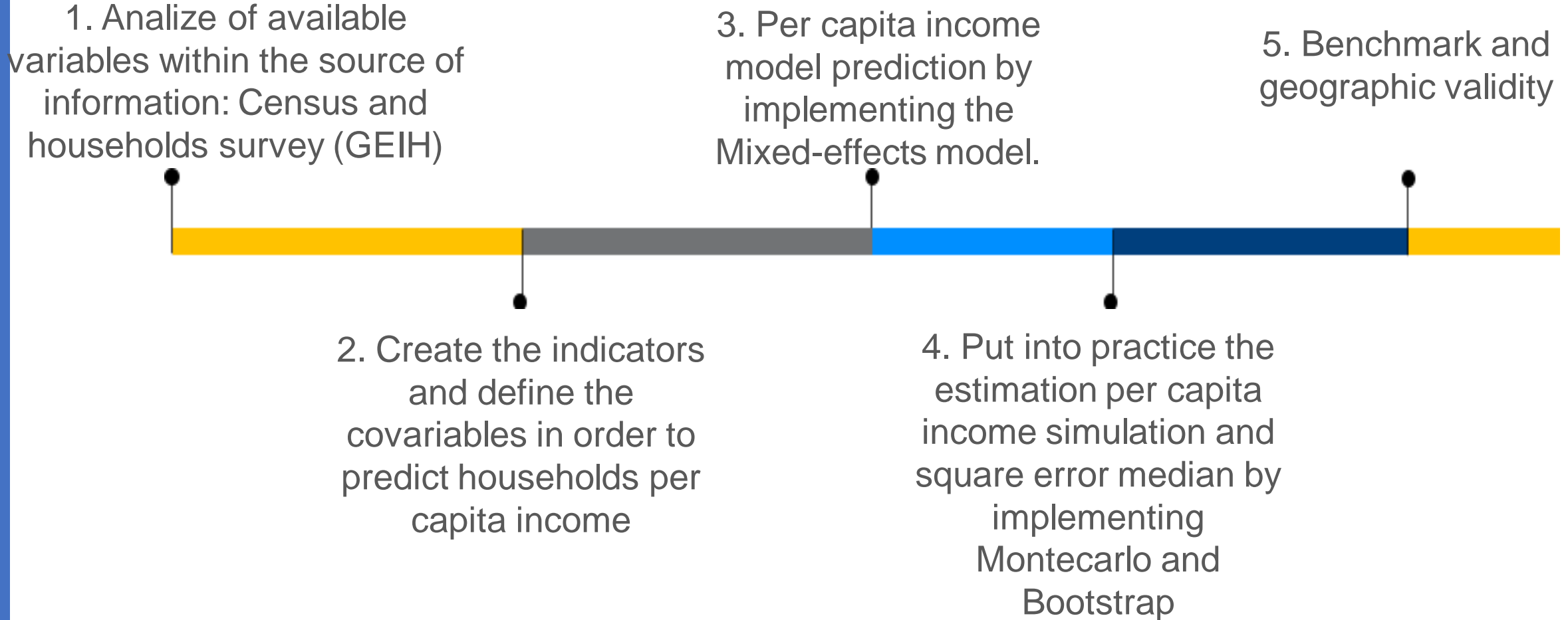**Approach used by Prosperidad Social**

METHODOLOGY

For the estimation of Monetary Poverty and Extreme Poverty, we use the Empirical Bayes (best) Method, based on a Nested Error Model, proposed by Molina and Rao (2010). At the very beginning that model was applied for the estimation of Monetary Poverty in the Spain province.

The advantages of the model are:

1. The data is analize at a unit level in our specific case: households. The households contain detail information about the social and economic conditions of the munipalities.

2. The model allows to estimate the poverty indicators in function of an objective variable, in our case, the per capita income. For example: Monetary Poverty, Extreme Poverty, Gini Coefficient, Poverty Gaps, etc.

3. The model allows to estimate other areas or domains different from municipalities, with the restriction of the variability measurement such as coefficient of variation. For example: people with disability, regions or gender.

Bassed en https://repositorio.cepal.org/bitstream/handle/11362/44214/5/S1900419_es.pdf

STEP BY STEP

1. Analize of available variables within the source of information: Census and households survey (GEIH)

3. Per capita income model prediction by implementing the Mixed-effects model.

5. Benchmark and geographic validity

2. Create the indicators and define the covariables in order to predict households per capita income

4. Put into practice the estimation per capita income simulation and square error median by implementing Montecarlo and Bootstrap

ESTIMATED MODEL

Members household **+** Labor Market **+** Education **+** Health **+** Life conditions **+** Housing conditions **=** **Per capita Income**

1. The objective variable is the logarithm of per capita income plus a constant of COP $ 123,618, this constant minimizes the Fisher's coefficient of skewness for the model errors.

2. The dataset (household survey) in 2018 and 2019 has some zeros in the per capita income variable, we didn't make transformations to this variable.

3. The fixed effects were defined by municipalities and urban/rural area

4. For each model 2018 and 2019, we used the poverty line according to the official methodology for each year as presented by DANE (The National Administrative Department of Statistics). In Colombia, DANE defined new poverty lines and basic food basket for the monetary poverty measurement 2019.

MONETARY POVERTY AND EXTREME POVERTY ESTIMATION

The model can predict the household per capita income for each register in the census using the input variables (census and household survey) and objetive variable (household survey). Taking into account household per capita income and FGT (Foster-Greer-Thorbecke) expression we need to define differents indicators as: poverty, gaps, inequality, etc
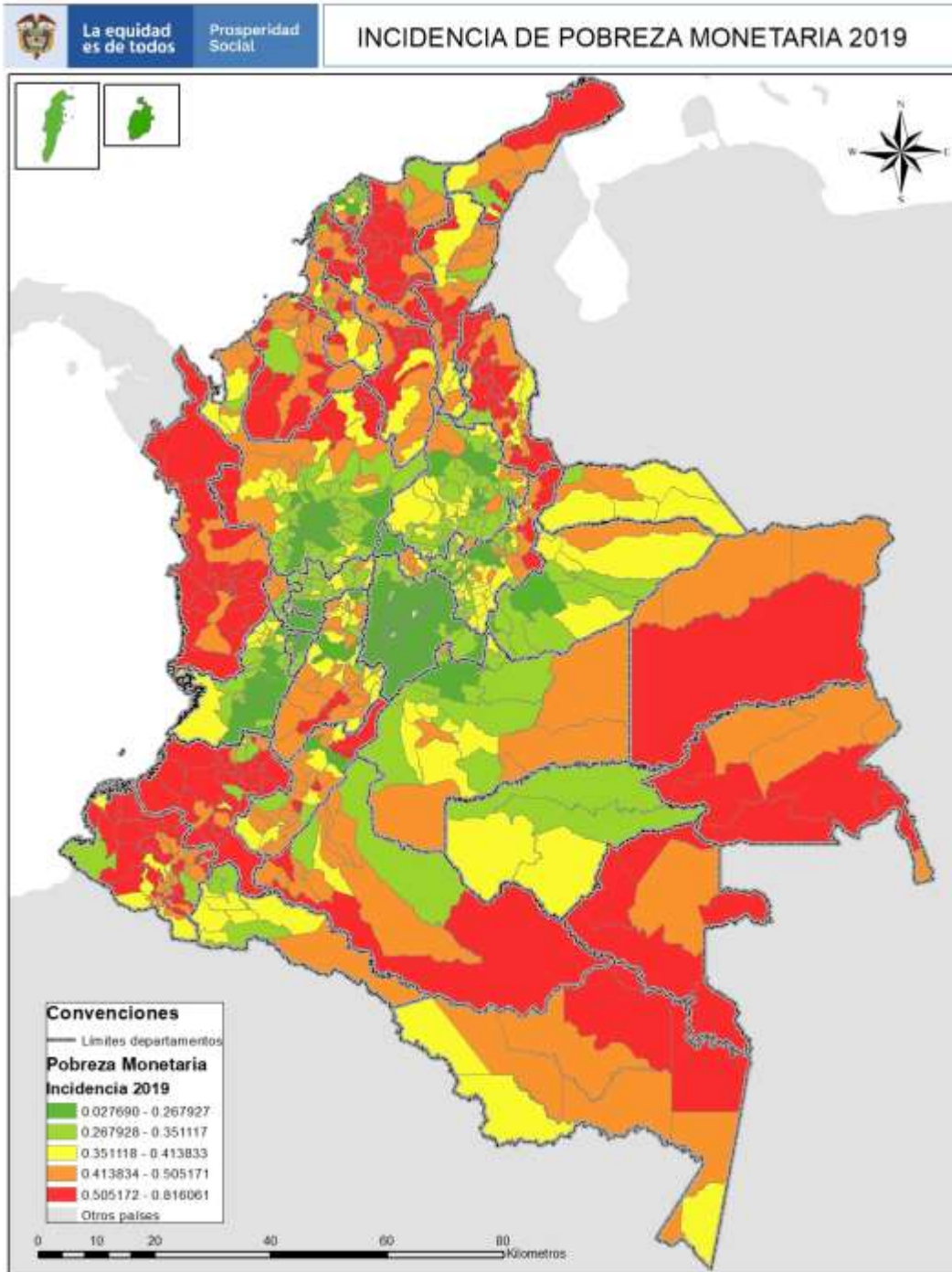
Census

$$F_{\alpha d}^{B}(\boldsymbol{\theta}) = \frac{1}{N_d}\left(\sum_{i \in s_d} F_{\alpha,di} + \sum_{i \in r_d} F_{\alpha,di}^{B}(\boldsymbol{\theta})\right),$$

Household survey

POVERTY MAP RESULTS - 2019

According to our estimation for the poverty map, Colombia has a monetary poverty incidence of 35,7% using a benchmark to differents levels:
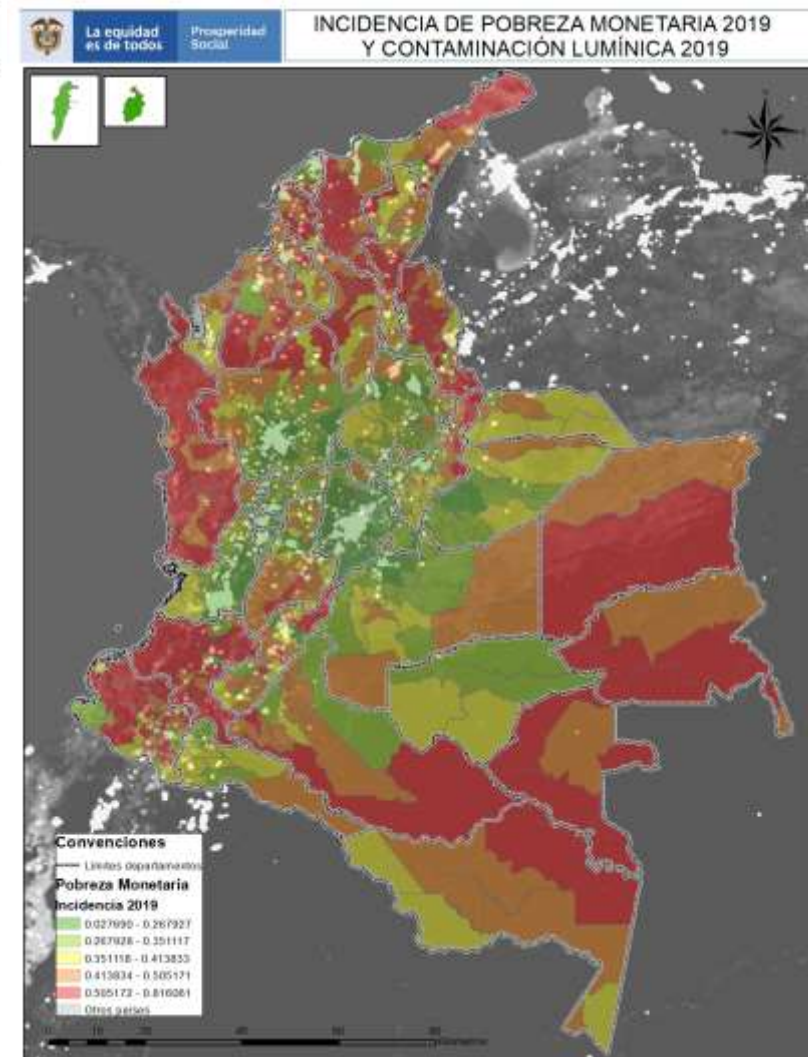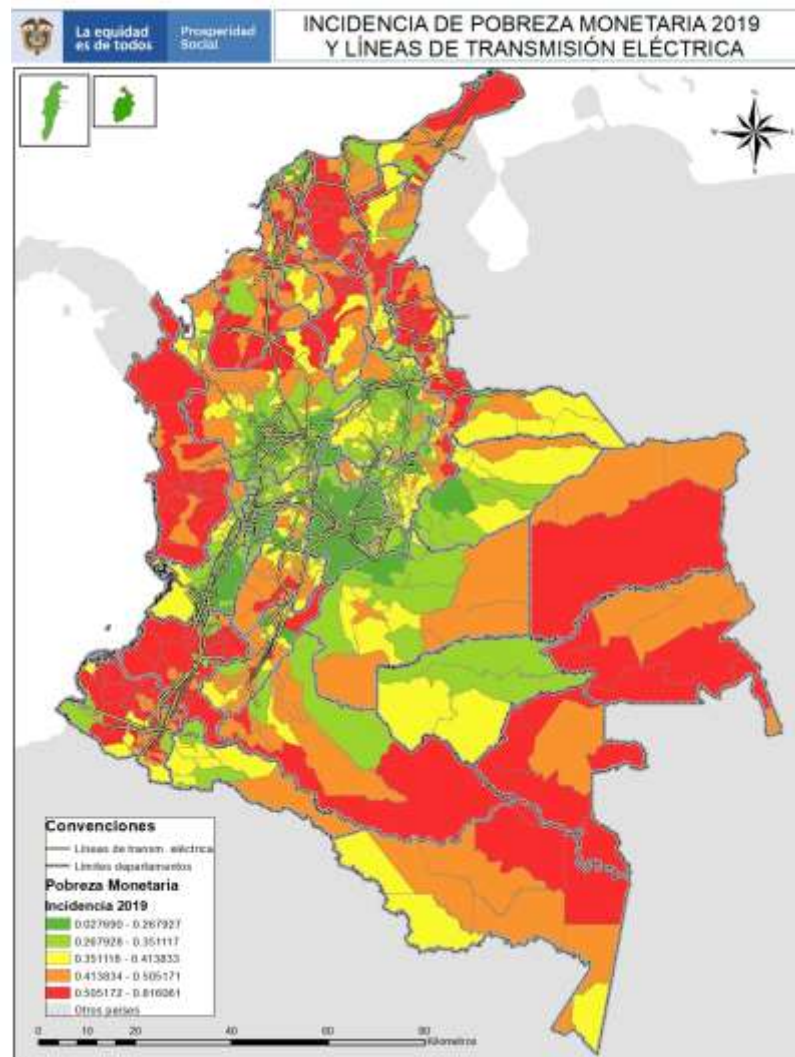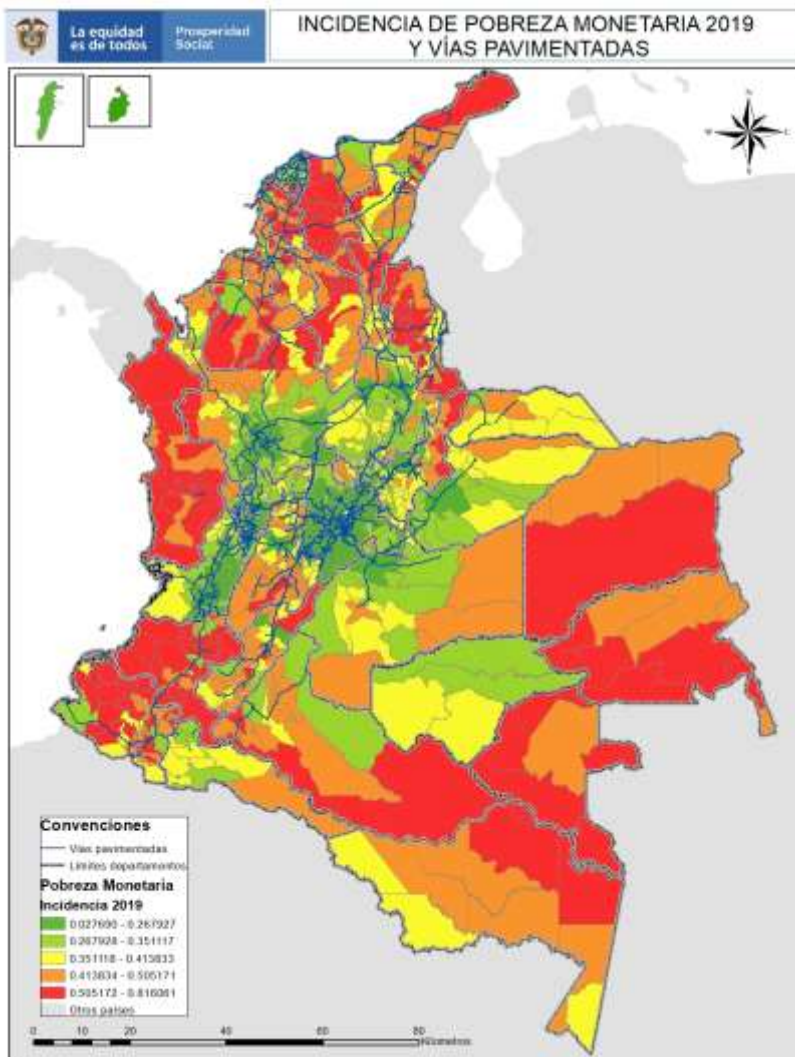
1. National
2. Urban
3. Principal Cities
4. States

The Benchmark allows to correct skewness and having the same estimations with the household survey (official measurement)
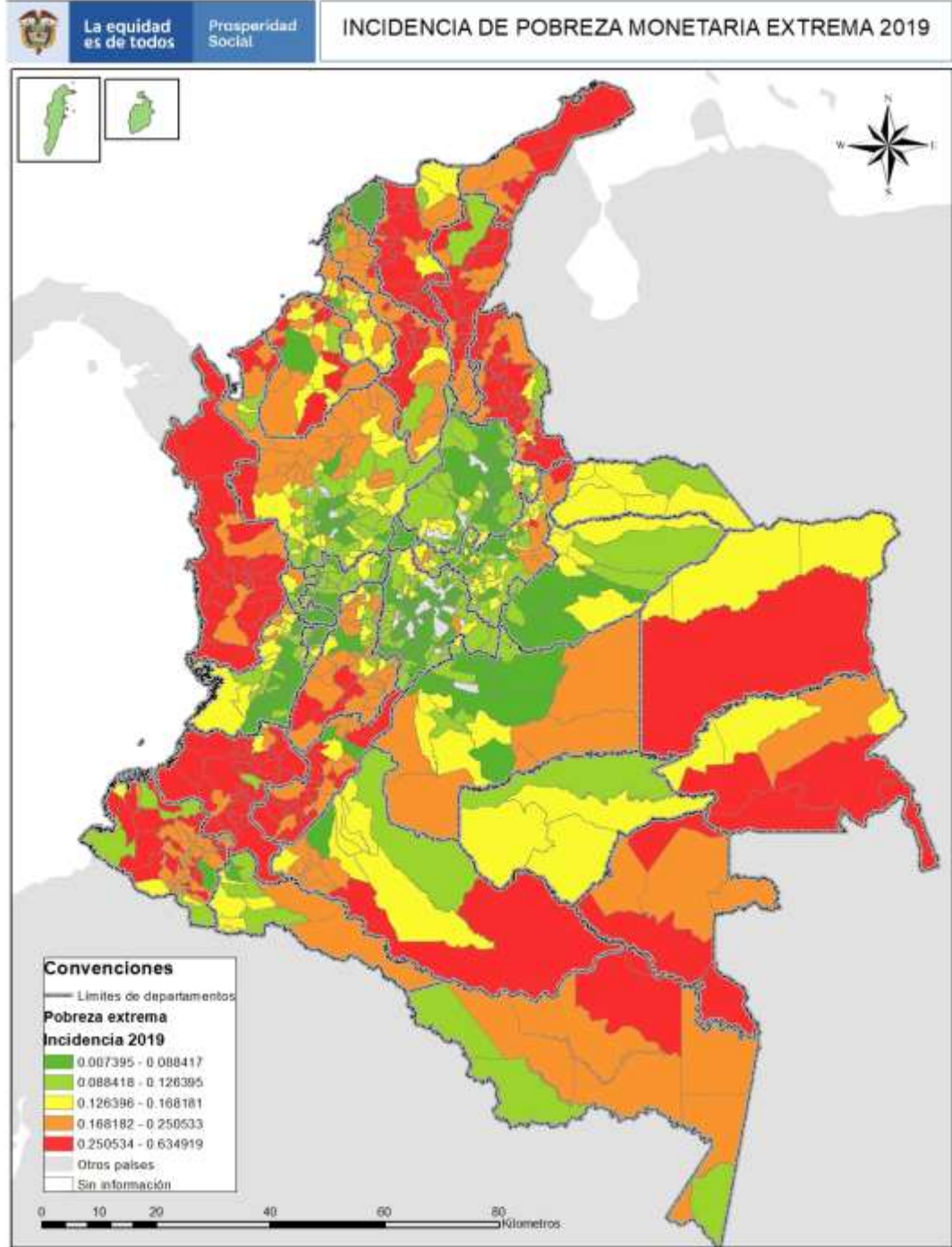
MONETARY POVERTY MAP 2019 – COMPARISON OTHER VARIABLES

There are 35 municipalities without estimation because the coefficient of variation greater than 30%.

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Convenciones
— Limites de departamentos
Pobreza extrema
Incidencia 2019
- 0.007395 - 0.088417
- 0.088418 - 0.126395
- 0.126396 - 0.168181
- 0.168182 - 0.250533
- 0.250534 - 0.634919
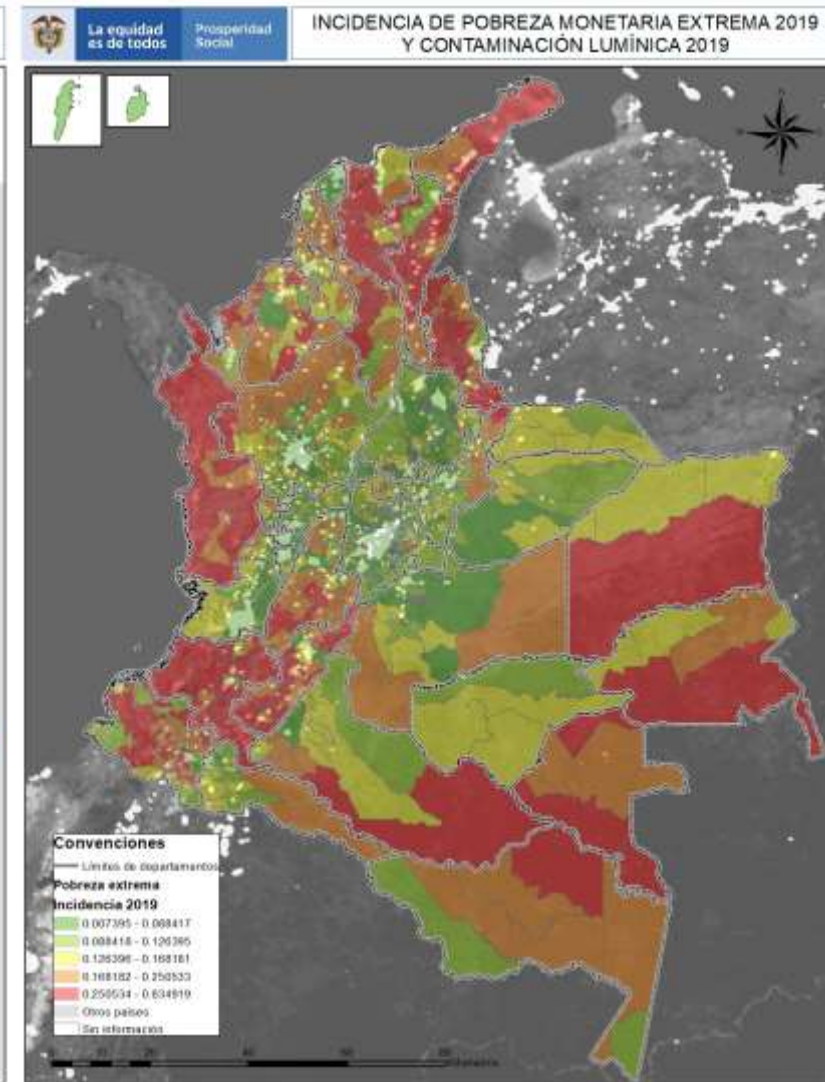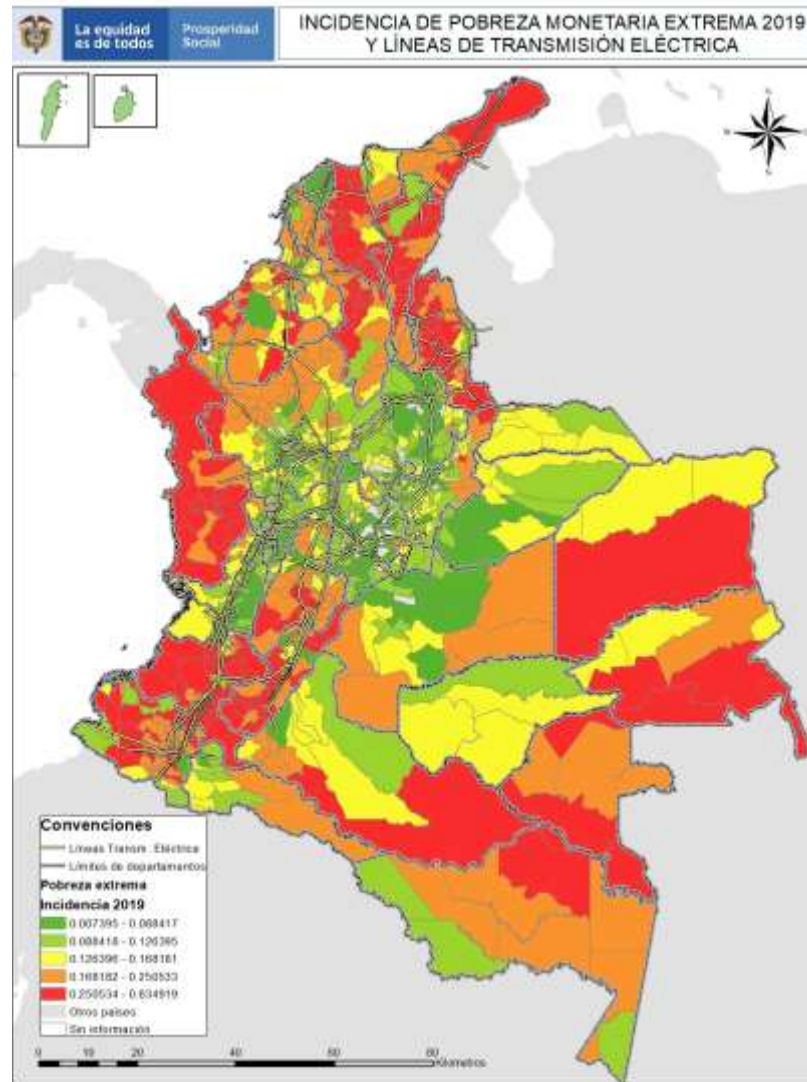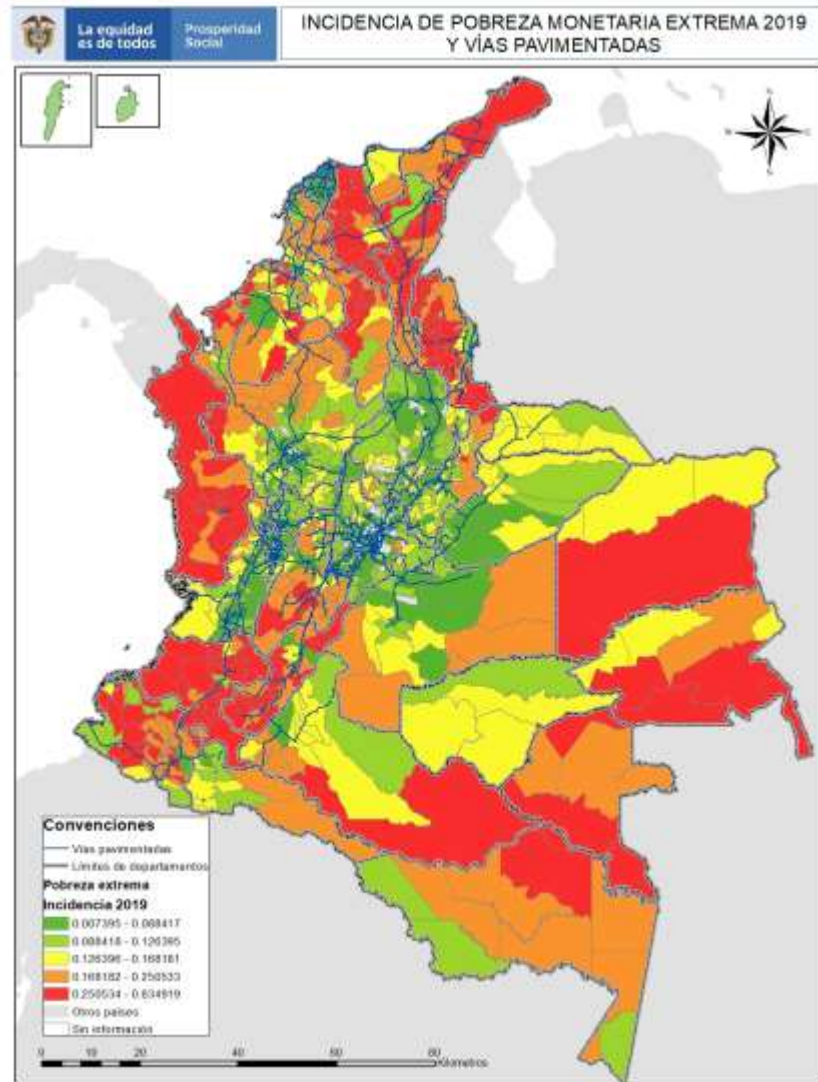- Otros países
- Sin información

According to our estimation for the poverty map, Colombia has a extreme poverty incidence of 9,6% using a benchmark to differents levels:

1. National
2. Urban
3. Principal Cities
4. States

The Benchmark allows to correct skewness and having the same estimations with the household survey (official measurement)

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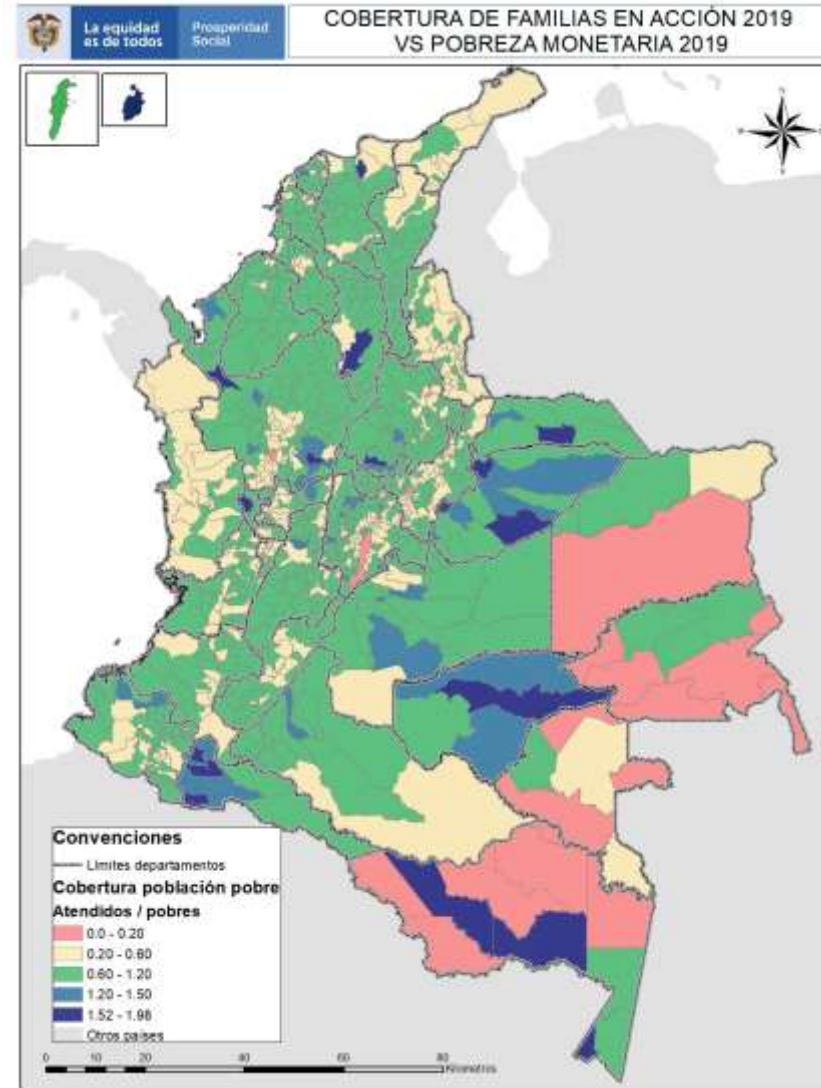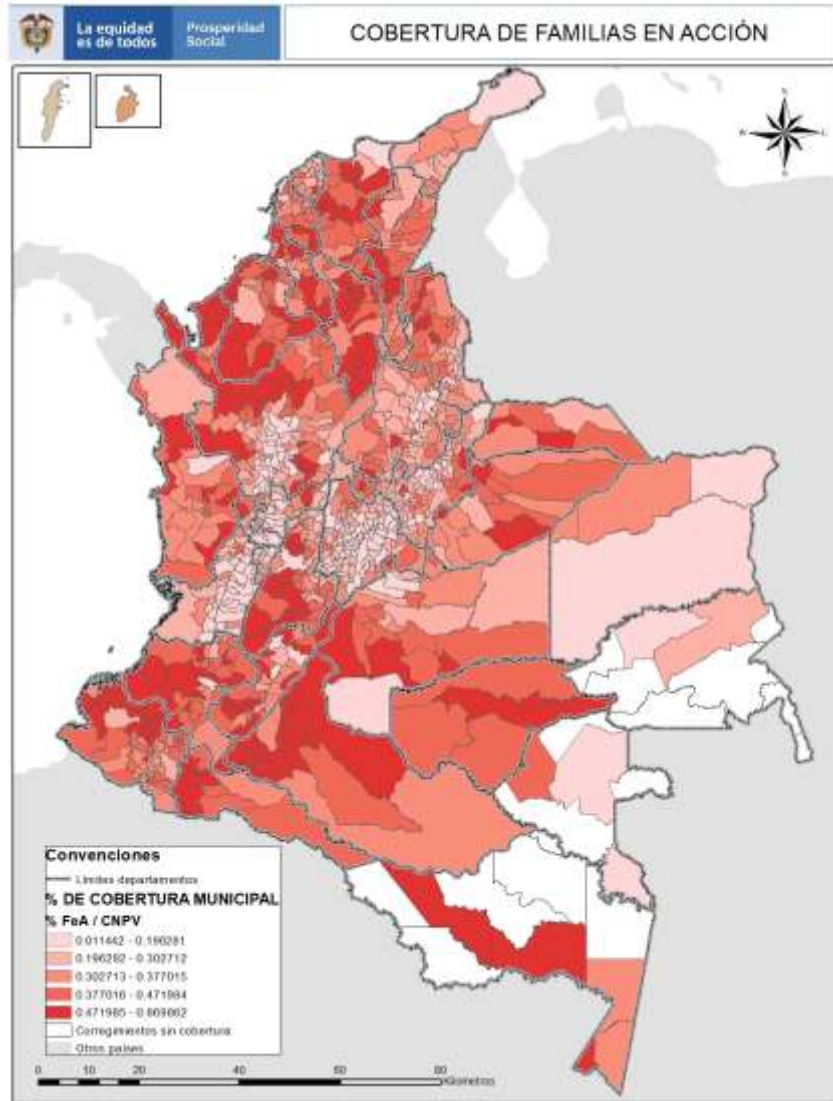# EXTREME POVERTY MAP 2019 – COMPARISON OTHER VARIABLES

USES AND APPLICATIONS OF POVERTY MAPS IN PROSPERIDAD SOCIAL

FAMILIAS EN ACCIÓN COVERAGE

According with the municipalities poverty estimation, there is a correlation of 70% between Familias en Acción and monetary poverty, with the assumption that Familias en Acción attends to only poor houselhods

FAMILIAS EN ACCIÓN COVERAGE

Top 10 municipalities with coverage greater than the number of poor:

Municipality Code	Departament	Municipality	Familias en Acción coverage/ poor households
91405	Amazonas	La chorrera (CD)	1,98
88564	San Andrés y Providencia	Providencia	1,92
5480	Antioquia	Mutatá	1,92
85279	Casanare	Recetor	1,86
86755	Putumayo	San Francisco	1,87
68773	Santander	Sucre	1,74
85015	Casanare	Chameza	1,68
86757	Putumayo	San Miguel	1,67
86885	Putumayo	Villagarzón	1,66
85400	Casanare	Támara	1,66

Top of 10 municipalities with the lowest coverage in relation to the number of poor:

Municipality Code	Departament	Municipality	Familias en Acción coverage/ poor households
99773	Vichada	Cumaribo	0,06
5631	Antioquia	Sabaneta	0,12
5212	Antioquia	Copacabana	0,13
11001	Cundinamarca	Bogotá D.C.	0,14
5266	Antioquia	Envigado	0,14
54347	Norte De Santander	Herrán	0,16
15001	Boyaca	Tunja	0,18
68276	Santander	Floridablanca	0,19
5129	Antioquia	Caldas	0,19
5360	Antioquia	Itagui	0,19

[1] Using census population total

APPLICATIONS

1. The poverty map is an input for a GIS system that allows analyze variables related to poverty, as well as, generate conclusions about the causes of poverty in the country

2. The poverty map is an input for targeting the territorial strategies to overcome poverty. For example:

   a. PDET (Municipalities of armed conflict)
   b. Caribbean (Priority Region in the National Development Plan)
   c. Pacific (Priority Region in the National Development Plan)

3. The poverty map is an input for the definition of territorial coverage of Cash Transfers programs in Colombia

CONCLUSIONS

- The methodology used by Prosperidad Social is based on the unit models that have been approved by the World Bank and The ECLAC in the generation of poverty maps at the sub-national level and the models used by EUROSTAT and OECD in other statistical fields.

- The estimated model allows the production of the data disaggregated to other non-geographic domains (individual or household characteristics), which are of interest to public policies and allow "leaving no one behind"

- The poverty map allows defining strategies and coverage for cash transfer programs, according to the number of poor households in each municipality and increase impact on reduce poverty.

¡Gracias!

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