



Republic of the Philippines

**Philippine Statistics Authority**

---

ESA/STAT/AC.320/28

Expert Group Meeting on Data Disaggregation

27-29 June 2016

New York

**The Philippine Statistics Authority (PSA)  
Small Area Poverty Estimation Project  
By Bernadette Balamban**



Republic of the Philippines

**Philippine Statistics Authority**

---

# **The Philippine Statistics Authority (PSA) Small Area Poverty Estimation Project**

**Expert Group Meeting on Data Disaggregation  
June 27-29, 2016, New York City**



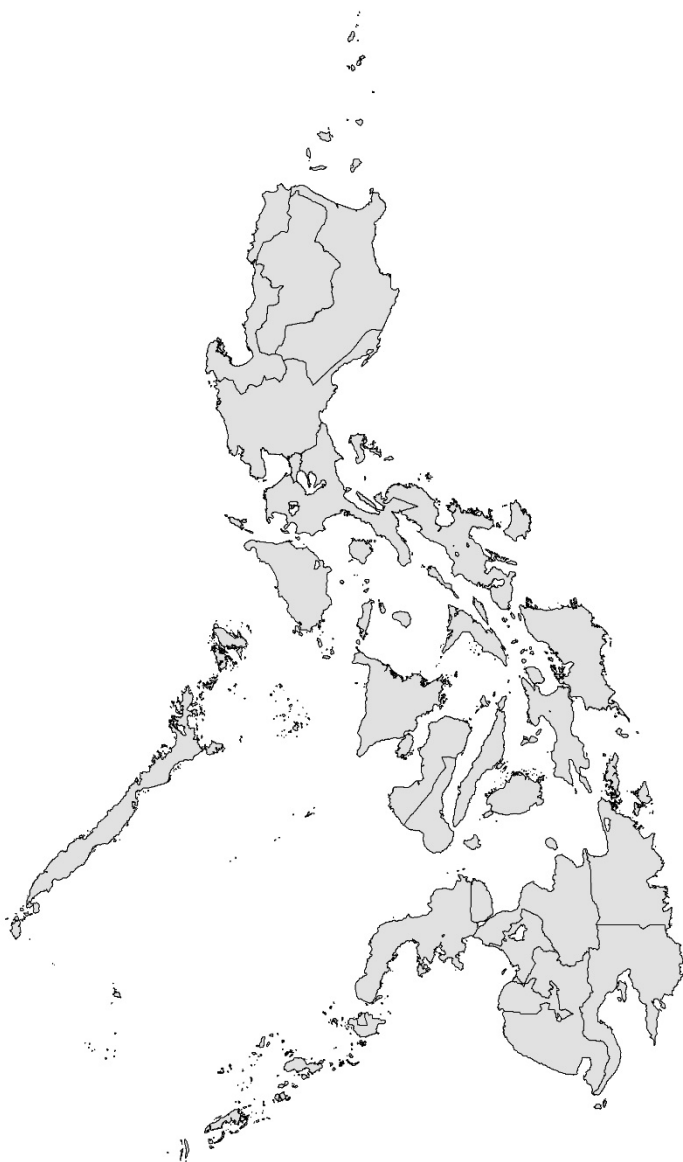
# Outline of Presentation

- I. Introduction**
- II. Methodology**
- III. Some Results**
- IV. Actual Policy Uses**
- V. Next Steps**

# I. Introduction

**As of 31 December 2015**

- **17 Regions**
- **79 Provinces**
- **145 Cities and  
1,489 Municipalities**
- **42,036 Barangays**



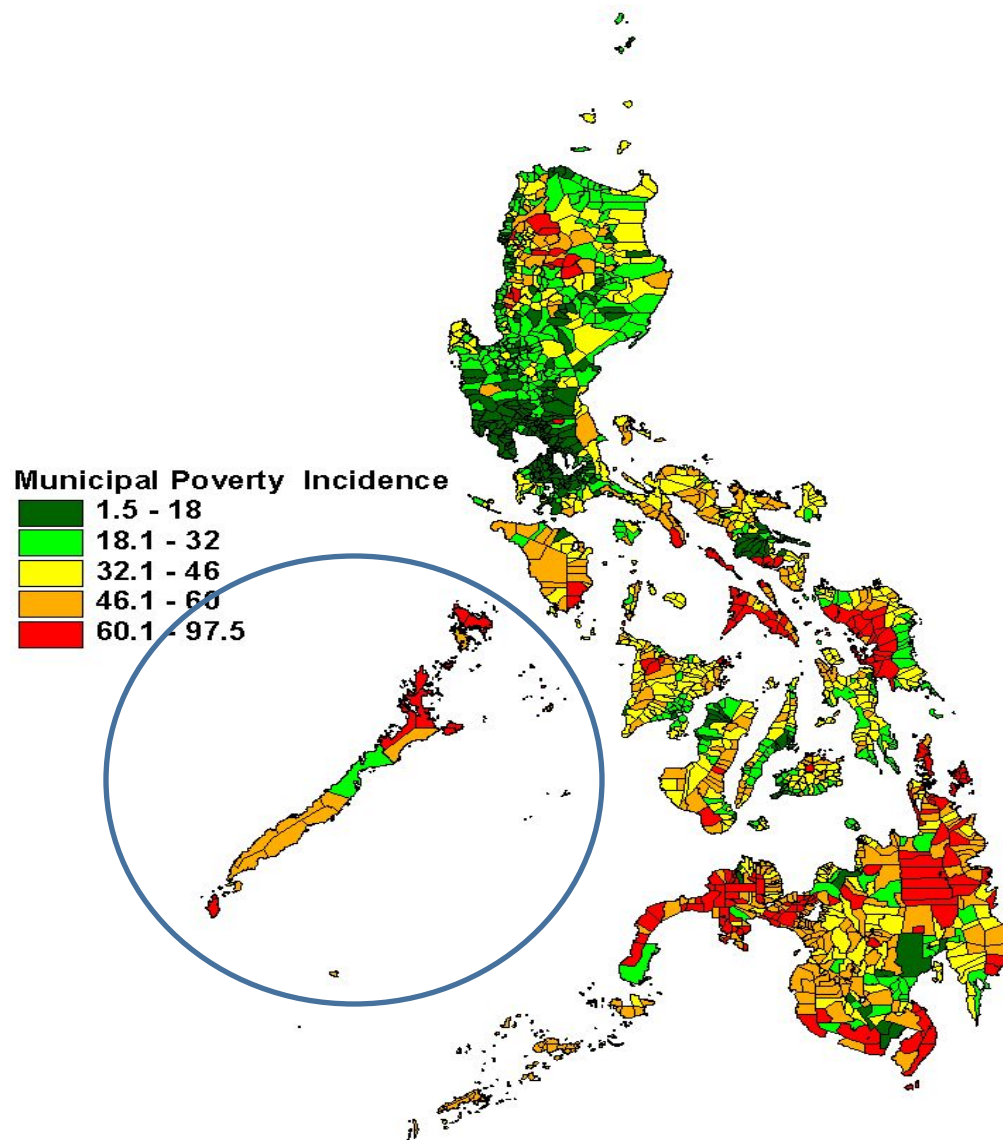
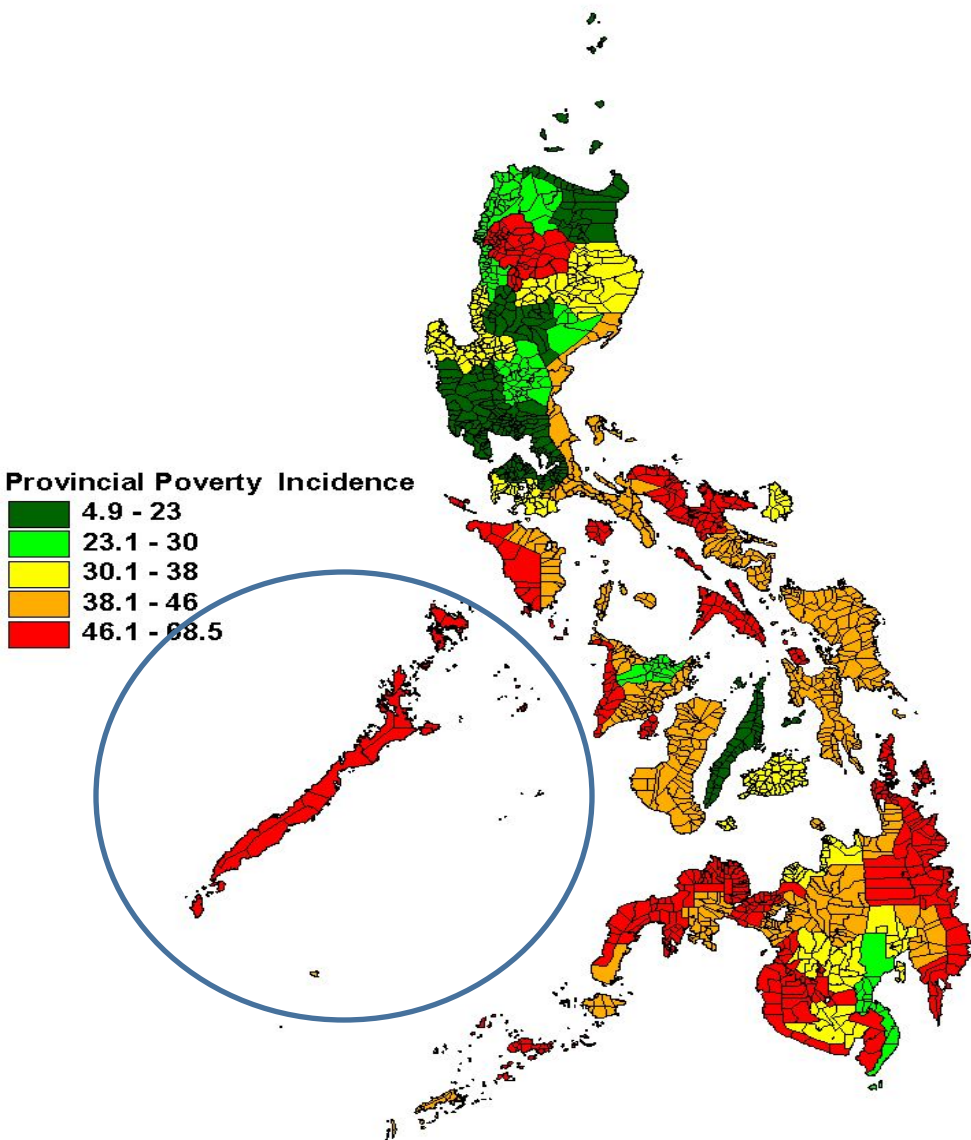


# I. Introduction

- **Official poverty statistics in the Philippines are available at the national, regional and provincial levels. This are directly estimated from the Family Income and Expenditure Survey (FIES).**
- **However, more geographically disaggregated statistics are needed to make better decisions.**
- **Thus, there is a strong clamor from policymakers and program implementers for information on smaller domains like the cities and municipalities, specially for poverty statistics.**



# I. Introduction



# I. Introduction

- **Small Area Estimation** could be used to target the municipalities and cities where most of the poor are found. The smaller the area, the better is the targeting.
- Given limited resources, local government officials, as well as those in the national government, would like to know how they can best allocate resources, which area needs to be prioritized.
- Programs could be better monitored if the estimates were made in smaller domains.

# I. Introduction

- **Recognizing the need to be relevant and responsive, the former National Statistical Coordination Board (NSCB), which is now part of the PSA, with external funding and technical support from World Bank and AusAid and recently from the Philippine government, implemented projects on SAE to generate poverty incidences at the city/municipal levels.**
- **Adopted the [Elbers, Lanjouw and Lanjouw \(ELL\) methodology](#) of the World Bank**
- **The Project was made possible through technical assistance from the following:**
  - 2000 – [Dr. Stephen Hasslett and Dr. Geoff Jones](#)**
  - 2003 – [Dr. Peter Lanjouw, Dr. Roy Vanderweide, Dr. Zita Albacea](#)**
  - 2006, 2009 and 2012 – [Dr. Zita Albacea](#)**





# I. Introduction

<b>Project</b>	<b>Output</b>	<b>Year Released</b>	<b>Funding Source</b>	<b>Methodology/ Data Sets Used</b>
<b>Poverty Mapping in the Philippines</b>	<b>2000 city/ municipal level poverty estimates</b>	<b>2005</b>	<b>World Bank</b>	<b>ELL; National Model 2000 CPH, 2000 FIES/ Labor Force Survey (LFS)</b>
<b>Intercensal Updating of Small Area Estimates (SAE) on Poverty</b>	<b>2003 city/ municipal level poverty estimates</b>	<b>2008</b>	<b>World Bank</b>	<b>Modified ELL; Regional Model 2000 CPH, 2003 FIES/LFS Barangay Listing</b>
<b>Updating of SAE on Poverty</b>	<b>2006 city/ municipal level poverty estimates</b>	<b>2013</b>	<b>World Bank, AusAid, Gov't. of the Philippines (GOP)</b>	<b>Modified ELL; Regional Model 2000 CPH, 2006 FIES/LFS Barangay Listing</b>
<b>Updating of SAE on Poverty</b>	<b>2009 city/ municipal level poverty estimates</b>	<b>2012</b>	<b>World Bank, AusAid, GOP</b>	<b>Modified ELL; Regional Model 2007 CP, 2009 FIES/LFS Barangay Listing</b>
<b>Updating of SAE on Poverty</b>	<b>2012 city/ municipal level poverty</b>	<b>2014</b>	<b>GOP</b>	<b>Modified ELL; Regional Model 2010 CPH, 2012 FIES/LFS Barangay Listing</b>

### **Main idea**

- **Merge information** from different types of data sources to come up with small area poverty estimates
- **“Borrow strength”** from the much more detailed coverage of the census data to supplement the direct measurements of the survey

### Basic procedure

- **Use the household survey data to estimate a model of per capita income ( $Y$ ) as a function of variables that are common to both the household survey and the census ( $X$ 's).**
- **Use the resulting estimated equation/model to predict per capita income for each household in the census.**
- **The estimated household-level per capita income are then compared with the threshold to identify poor and non-poor households.**
- **Proportion of poor individuals are then aggregated for small areas, such as cities and municipalities.**

### Regression Model

$$\ln Y_{ij} = X_{ij}\beta + h_i + e_{ij}$$

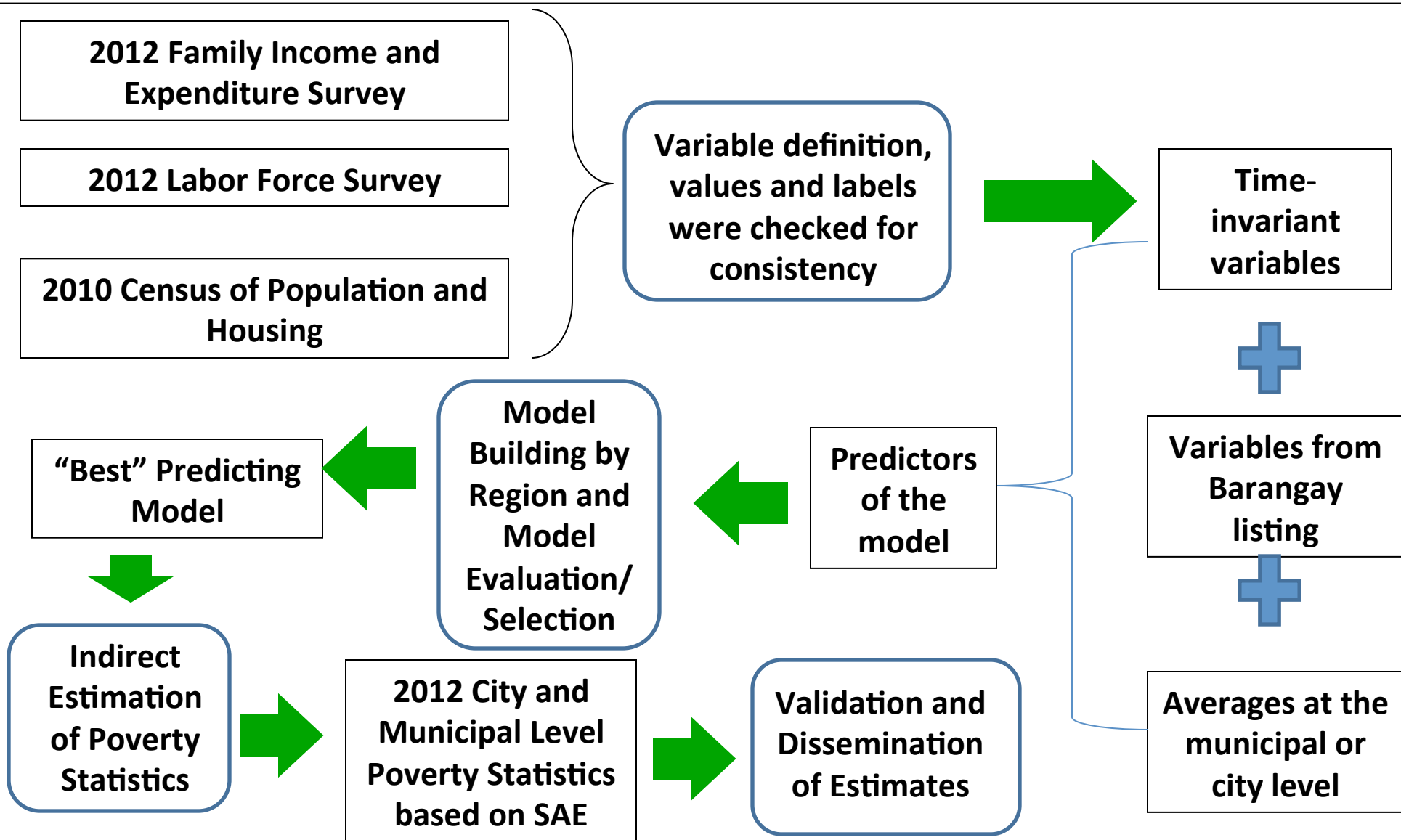
where  $Y_{ij}$  is the target variable (per capita income) is log-transformed to make the distribution more symmetrical;

$X_{ij}$  are the household and community level characteristics;

$h_i$  is the error term held in common by the  $i^{\text{th}}$  cluster; and

$e_{ij}$  is the household level error within the cluster.

# II. Methodology

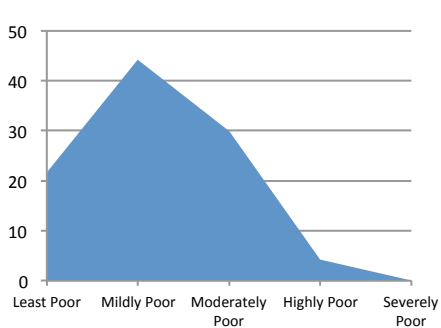


### Criteria in Choosing the “Best” Predicting Model

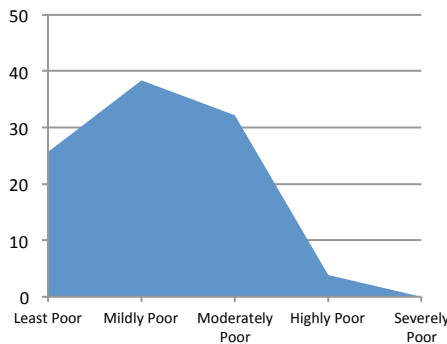
- The relationship of the variables, whether positive or negative, on Y is generally **consistent** with earlier researches on poverty (e.g. education should have a positive effect on income).
- The models should be **robust**, which means that small changes to the model do not greatly affect the significance or signs of the variables.
- Estimated regional poverty incidence **does not largely differ from the official regional poverty estimates** (within 2 standard error away from the official estimates). Preserve the ranking of the official provincial estimates within a region.
- **‘Good’ statistical properties of the model** like acceptable model adequacy; significant regression coefficients; parsimonious model;

# III. Some Results

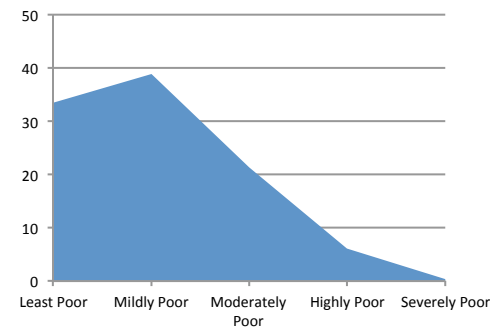
Poverty Classification	Poverty Incidence Among Population (%)	2006	2009	2012
<b>Level 1</b>	At most 20.0	357	419	545
<b>Level 2</b>	21.0 to 40.0	717	628	635
<b>Level 3</b>	41.0 to 60.0	484	524	349
<b>Level 4</b>	61.0 to 80.0	70	63	99
<b>Level 5</b>	Greater than 80.0	0	0	5
		<b>1,628</b>	<b>1,634</b>	<b>1,633</b>



2006



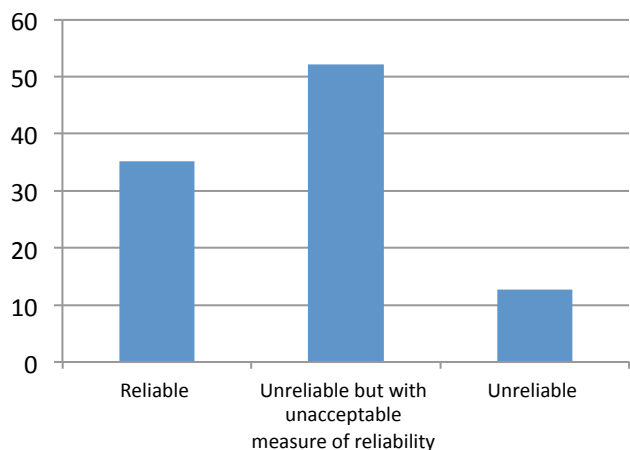
2009



2012

## III. Some Results

Type of Estimates	Coefficient of Variation (%)	Count	%	< RCF
<b>Reliable</b>	At most 10.0	574	35.2	35
<b>Unreliable but with acceptable measure of reliability</b>	10.1 to 20.0	851	52.1	87
<b>Unreliable</b>	Greater than 20.0	208	12.7	100



- Almost 87% of the resulting estimates are with acceptable measures of reliability. The rest are unreliable and should be used with much caution.
- Most reliable estimate is for the Municipality of Katipunan, Zamboanga del Norte with coefficient of variation of 3.3% and most unreliable is for the Municipality of Cainta in the Province of Rizal with coefficient as high as 84.8%.

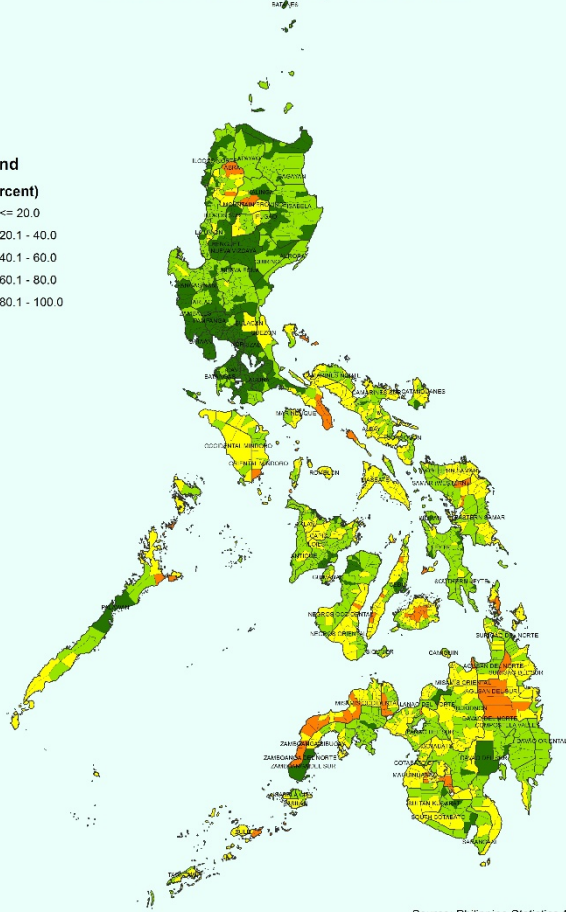


# III. Some Results

2006 SAE Poverty Incidence

**Legend**  
(in percent)

- ≤ 20.0
- 20.1 - 40.0
- 40.1 - 60.0
- 60.1 - 80.0
- 80.1 - 100.0

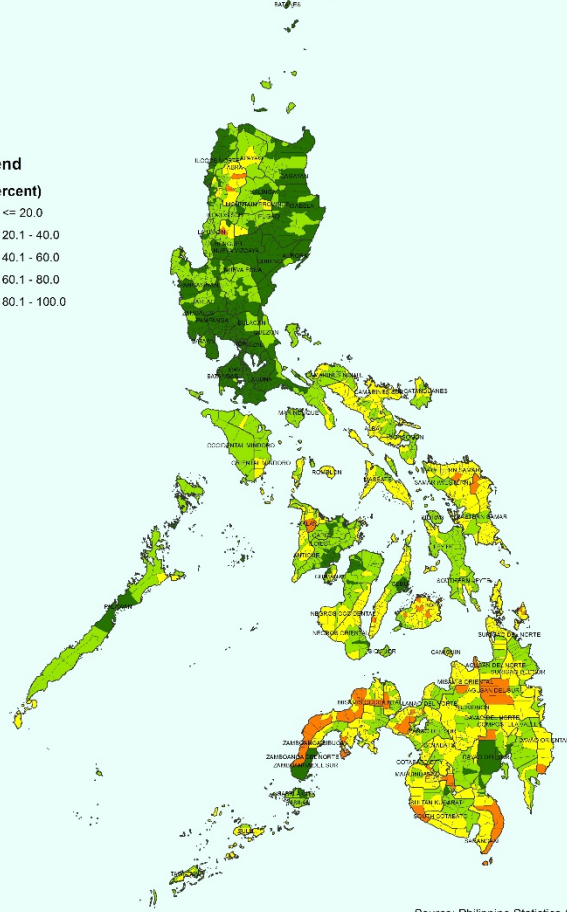


Source: Philippine Statistics Authority

2009 SAE Poverty Incidence

**Legend**  
(in percent)

- ≤ 20.0
- 20.1 - 40.0
- 40.1 - 60.0
- 60.1 - 80.0
- 80.1 - 100.0

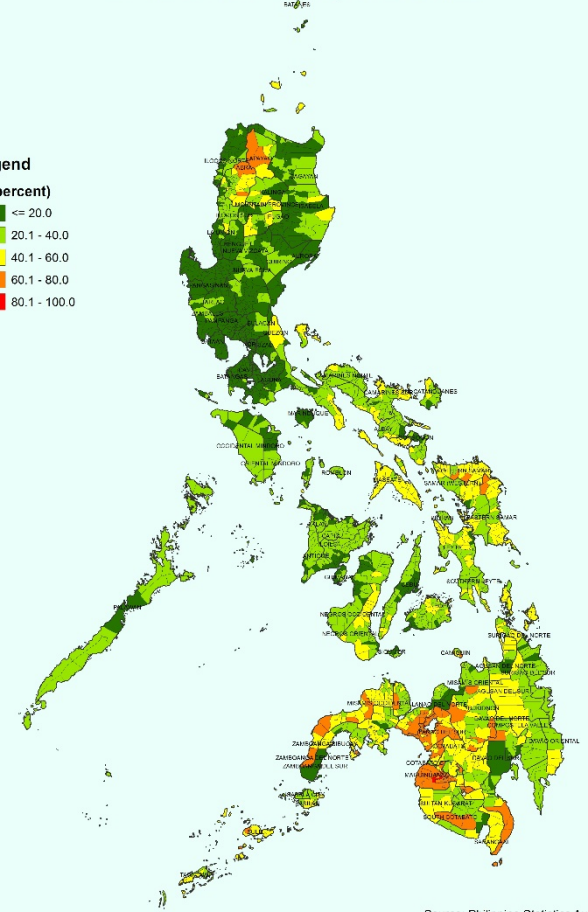


Source: Philippine Statistics Authority

2012 SAE Poverty Incidence

**Legend**  
(in percent)

- ≤ 20.0
- 20.1 - 40.0
- 40.1 - 60.0
- 60.1 - 80.0
- 80.1 - 100.0



Source: Philippine Statistics Authority

## IV. Actual Policy Uses

### A. In targeting beneficiaries of programs/projects

- **Used the 2006 and 2009 SAE to identify the beneficiaries of Kalahi-CIDSS in Agusan del Norte in its implementation in 2013**

### B. In policy formulation and planning

- **Used as input in the BLISTT master planning activity (BLISTT stands for Baguio, La Trinidad, Itogon, Sablan, Tuba and Tublay in the Cordillera Autonomous Region);**

### C. In poverty monitoring

- **Used by the Pangasinan and La Union Provincial Government in the assessment of the progress of municipalities in their implementation of poverty reduction programs**

- **Adoption of an official methodology**
- **Study the use of other SAE techniques**
- **Production of infographic materials**
- **Generation of 2015 city and municipal level poverty statistics in 2017-2018**
- **Explore the use of the SAE technique in other variables**
- **Adoption of the 2013 Master Sample in our household surveys, with province as domain**



- **Explore the possibility of using “big data” as possible input in the monitoring of SDG indicators, addressing some of the data gaps, including the challenge of disaggregation**
- **Pilot on Batanes-Palawan Statistical Development Project 2016-2017**



**Thank you!**  
**Maraming salamat po!**

**URL: <http://www.psa.gov.ph>**