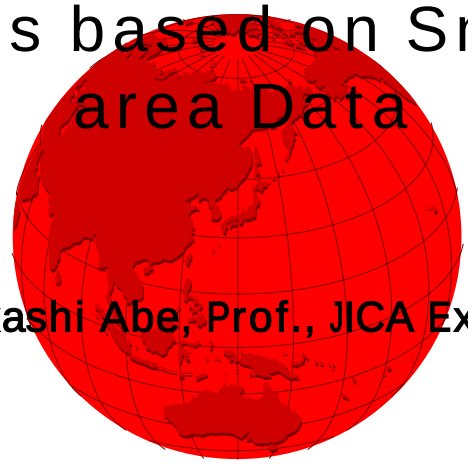
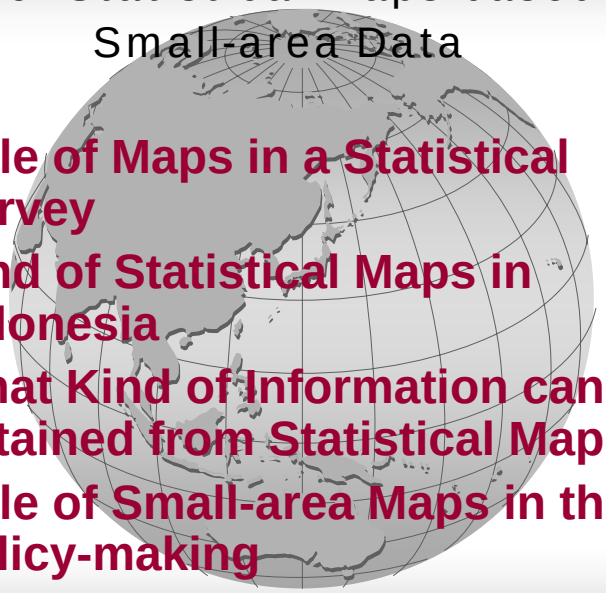
# Role of Statistical Maps based on Small-area Data



Takashi Abe, Prof., JICA Expert



## Role of Statistical Maps based on Small-area Data



1. **Role of Maps in a Statistical Survey**
2. **Kind of Statistical Maps in Indonesia**
3. **What Kind of Information can be obtained from Statistical Map?**
4. **Role of Small-area Maps in the Policy-making**

## 1. Role of maps in a statistical survey

Source: U.N. Department of Economic and Social Affairs Statistical Division (2000): Handbook on geographic information systems and digital mapping.

- **Maps ensure consistency and facilitate census operations (pre-enumeration)**
- **Maps support data collection and can help monitor census activities (during enumeration)**



## 1. Role of maps in a statistical survey

**Pre-enumeration and during enumeration- Census Block Maps in Urban Area**

## 1. Role of maps in a statistical survey

**Pre-enumeration and during enumeration- Census Block Maps in Rural Area**

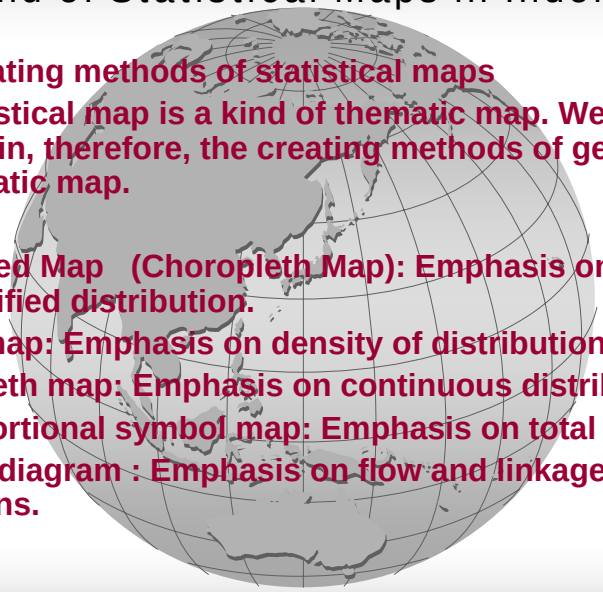



## 1. Role of maps in a statistical survey

- **Maps make it easier to present, analyse and disseminate census results (post-enumeration):**

**Cartographic presentation of census results provides a powerful means for visualizing the results of a census. This supports the identification of local patterns of important demographic and social indicators. Maps are thus an integral part of policy analysis in the public and private sectors.**

## 2. Kind of Statistical Maps in Indonesia



**2-1 Creating methods of statistical maps**

**Statistical map is a kind of thematic map. We will explain, therefore, the creating methods of general thematic map.**

- **Shaded Map (Choropleth Map): Emphasis on classified distribution.**
- **Dot map: Emphasis on density of distribution.**
- **Isopleth map: Emphasis on continuous distribution.**
- **Proportional symbol map: Emphasis on total number.**
- **Flow diagram : Emphasis on flow and linkage among regions.**

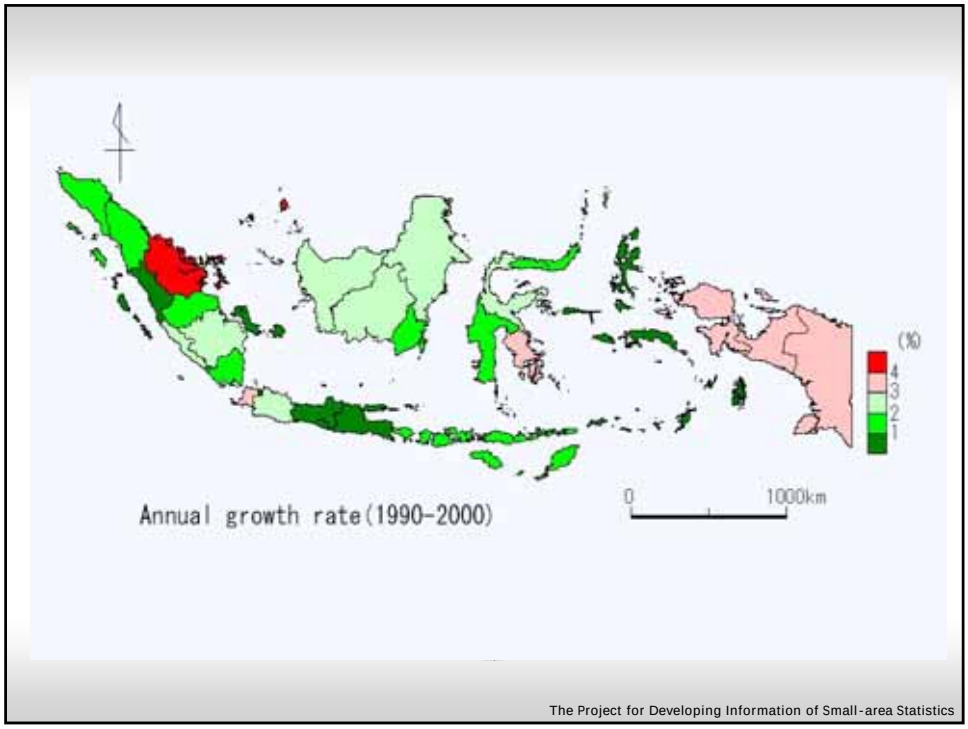


## 2. Kind of Statistical maps in Indonesia

**2-2 Some examples of shaded maps of Indonesia by province**

**We have to change coloring and ranking to fit the characteristics and distribution of data.**

- **Annual growth rate: red and green, 5 ranks**
- **Population Density: dark yellow and sky blue, 7ranks**
- **Total fertility rate: pink and blue, 7 ranks**
- **Infant mortality rate: blue and dark green, 7 ranks**
- **Migration ratio: red and green, 5 ranks**
- **Sex ratio: dark blue and dark red, 7 ranks**

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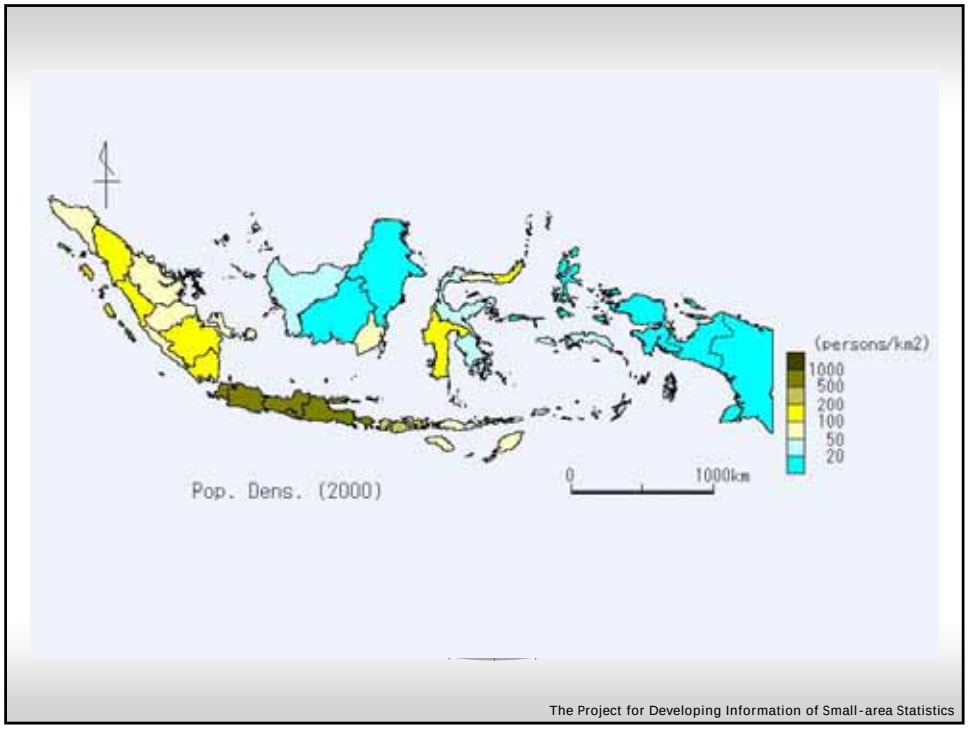


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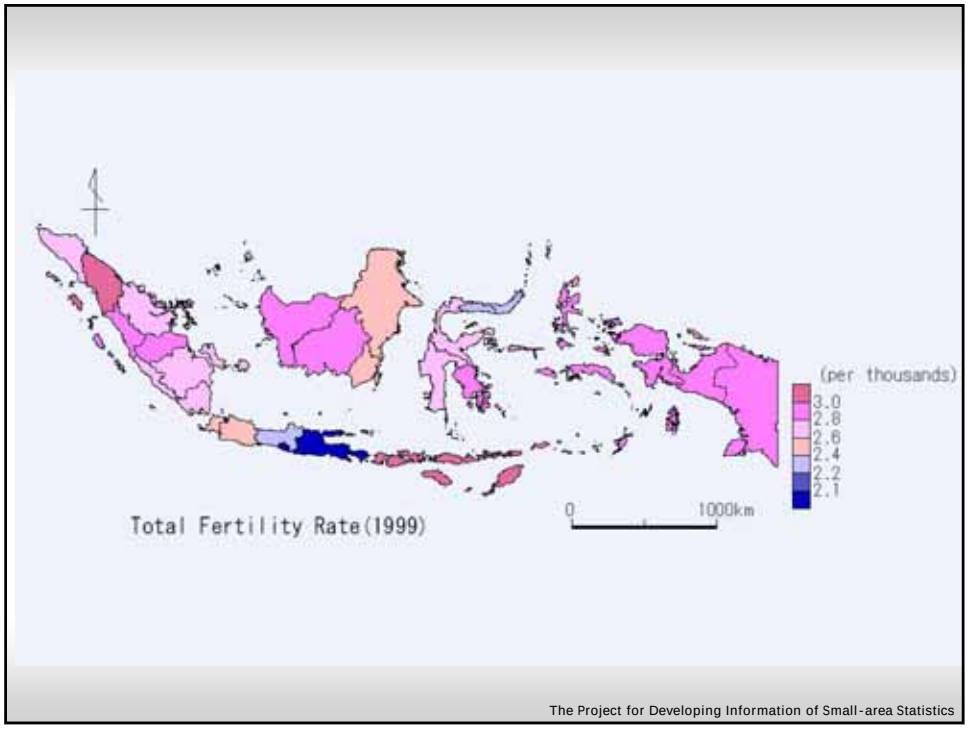
(per thousands)
3.0
2.8
2.6
2.4
2.2
2.1
0
1000km
Total Fertility Rate(1999)
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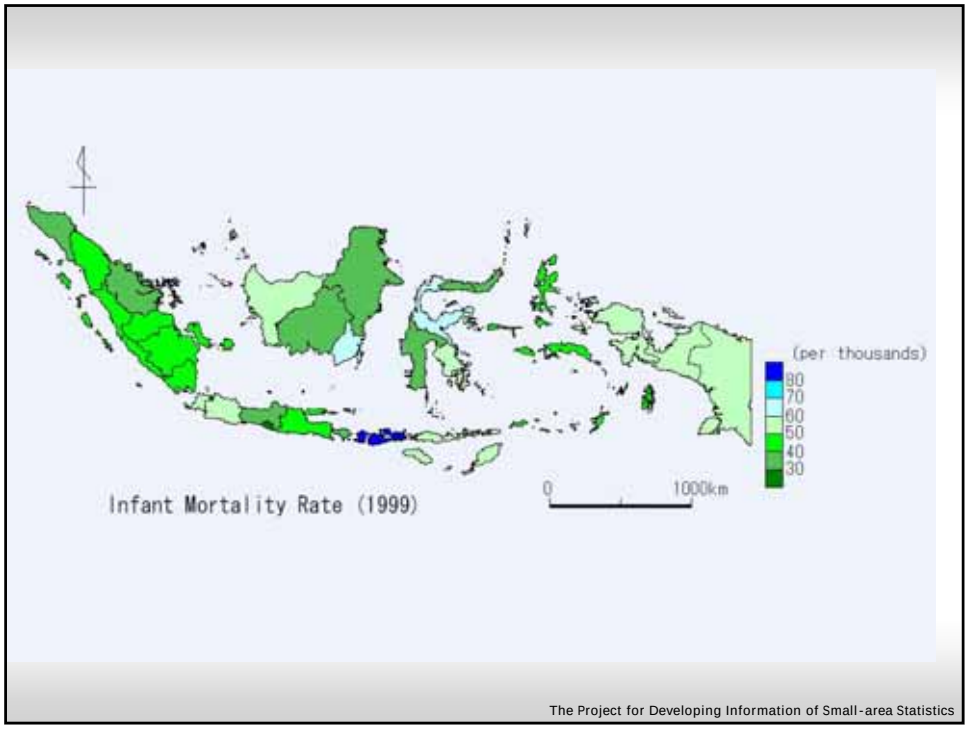
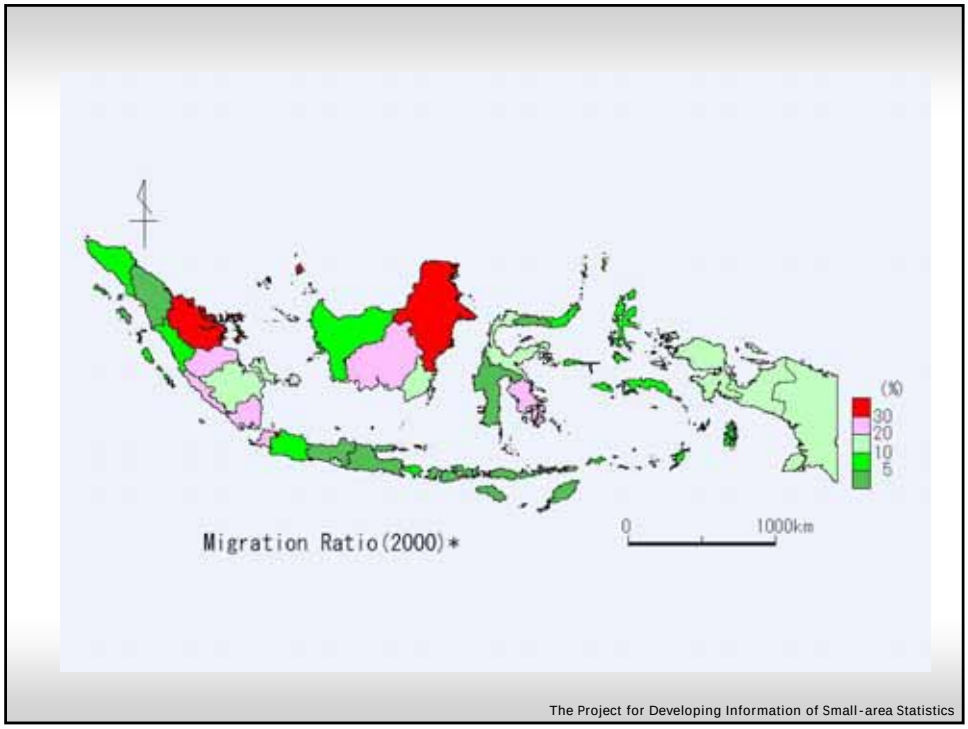
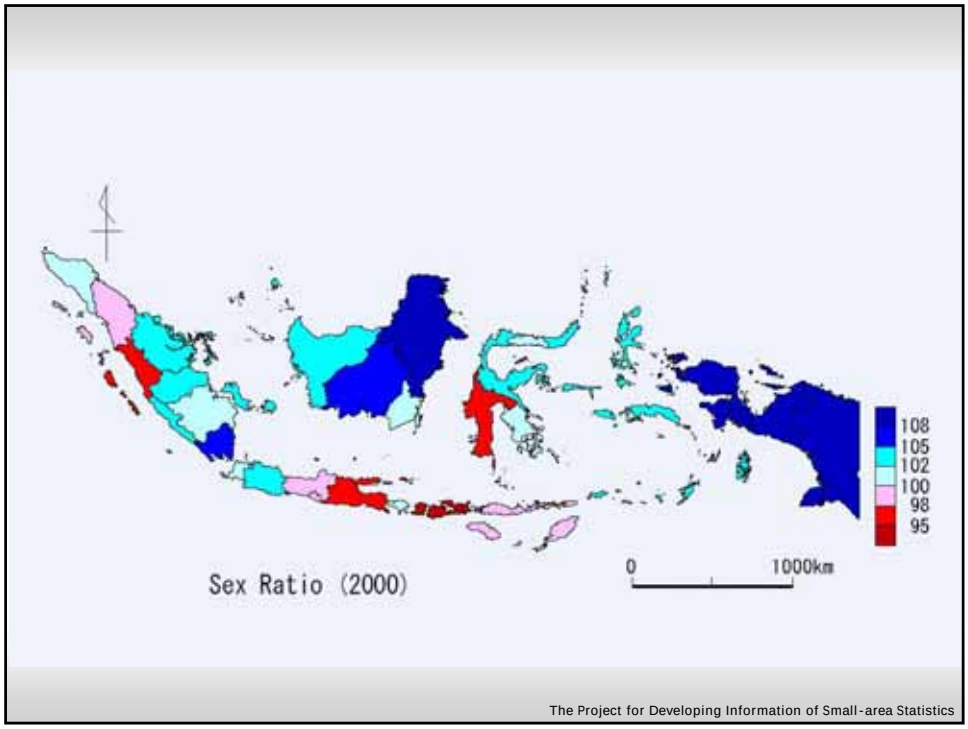

(per thousands)
80
70
60
50
40
30
0
1000km
Infant Mortality Rate (1999)
The Project for Developing Information of Small-area Statistics


(%)
30
20
10
5
0
1000km
Migration Ratio(2000)*
The Project for Developing Information of Small-area Statistics


108
105
102
100
98
95
0
1000km
Sex Ratio (2000)
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## 2. Kind of Statistical maps in Indonesia

### 2-3 Some examples of statistical maps of Indonesia by Kabupaten-Kecamatan and basic grid square

**We have to change the scale of maps to inform statistical data properly.**

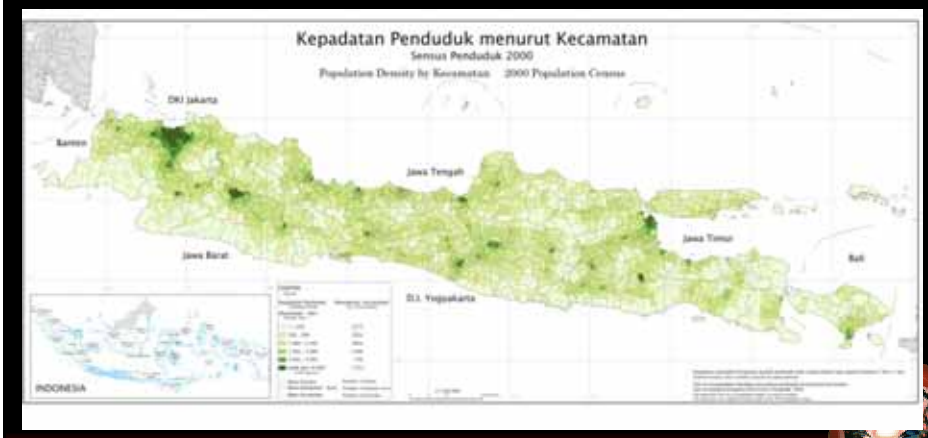
- **Kabupaten level**
- **Kecamatan level**
- **Basic Grid Square level**

- **Population Density**
- **Sex Ratio**
- **Age Structure**



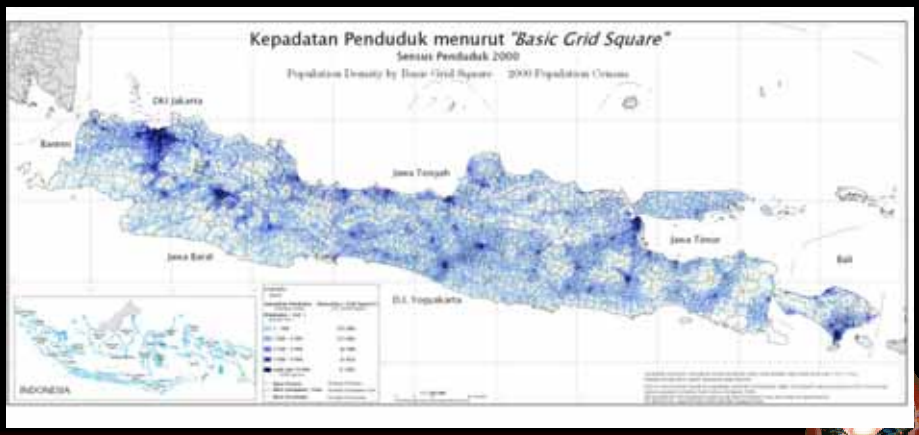
## Population Density by Kabupaten

# Population Density by Kecamatan





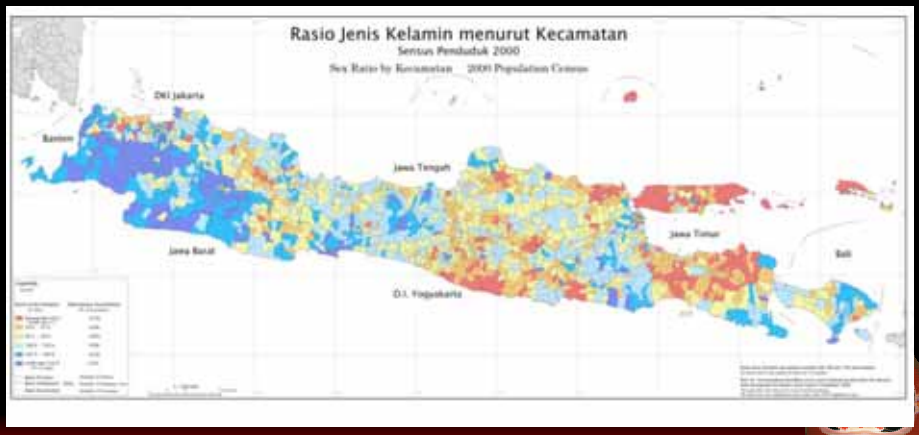

# Population Density by Basic Grid Square



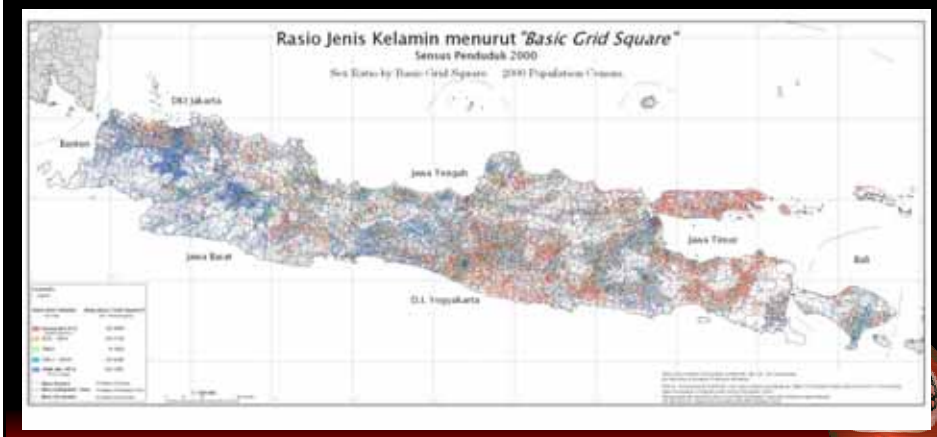
# Sex Ratio by Kabupaten




# Sex Ratio by Kecamatan



# Sex Ratio by Basic Grid Square

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# Age Structure by Kabupaten


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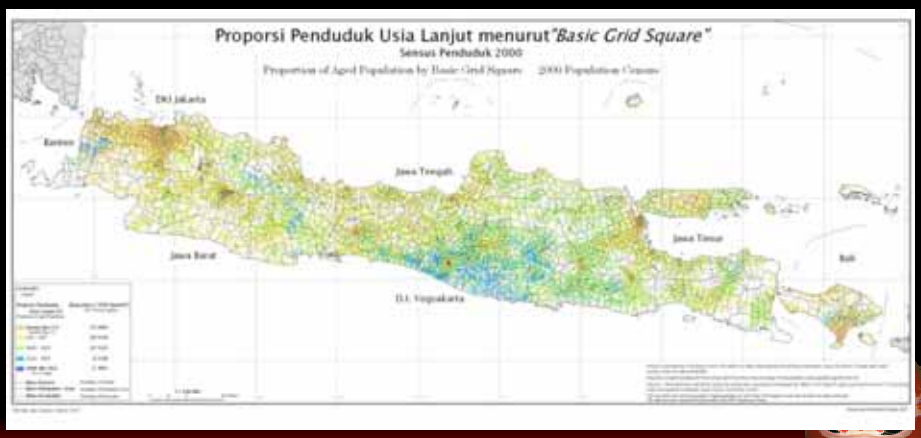
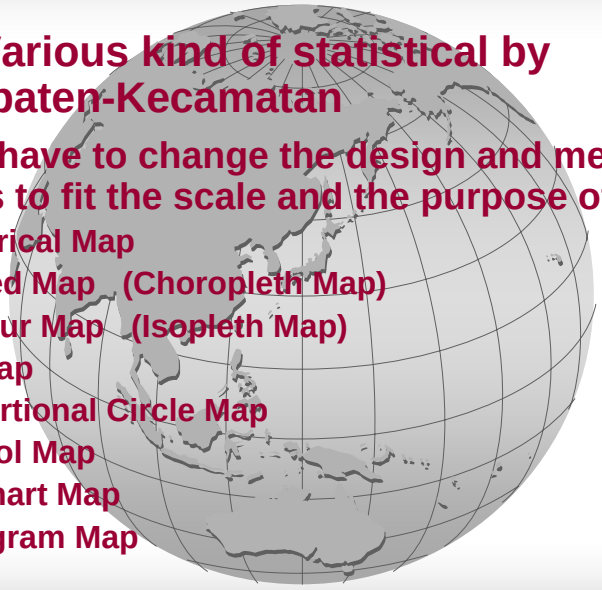
# Age Structure by Kecamatan




# Age Structure by Basic Grid Square





## 2-4 Various kind of statistical by Kabpaten-Kecamatan

**We have to change the design and method of maps to fit the scale and the purpose of maps.**

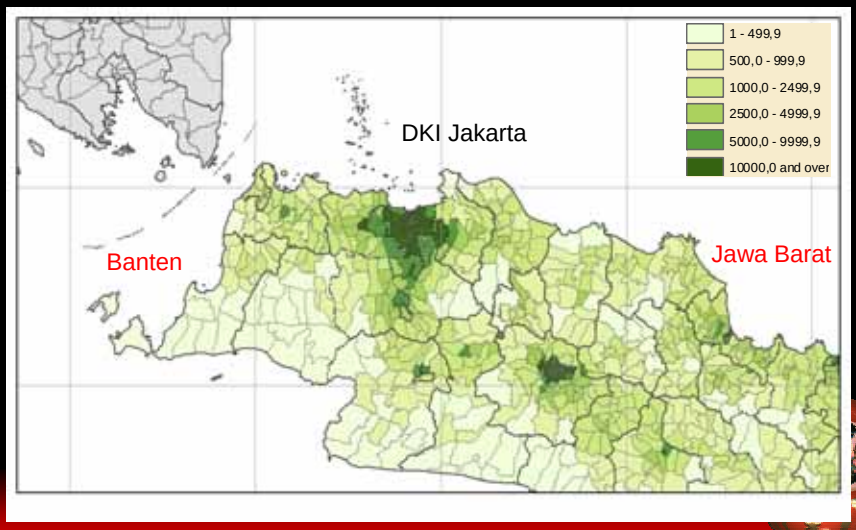
- **Numerical Map**
- **Shaded Map (Choropleth Map)**
- **Contour Map (Isopleth Map)**
- **Dot Map**
- **Proportional Circle Map**
- **Symbol Map**
- **Pie Chart Map**
- **Histogram Map**



## Numerical Map by Kecamatan in large scale

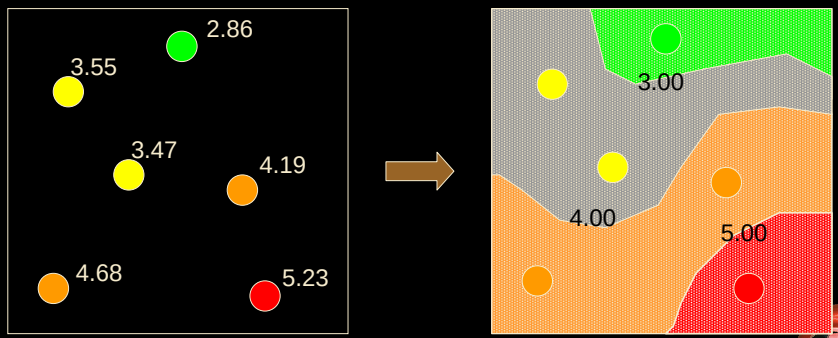

The number shows population by Kecamatan.

# Shaded Map (Choropleth Map) by Kecamatan in small scale

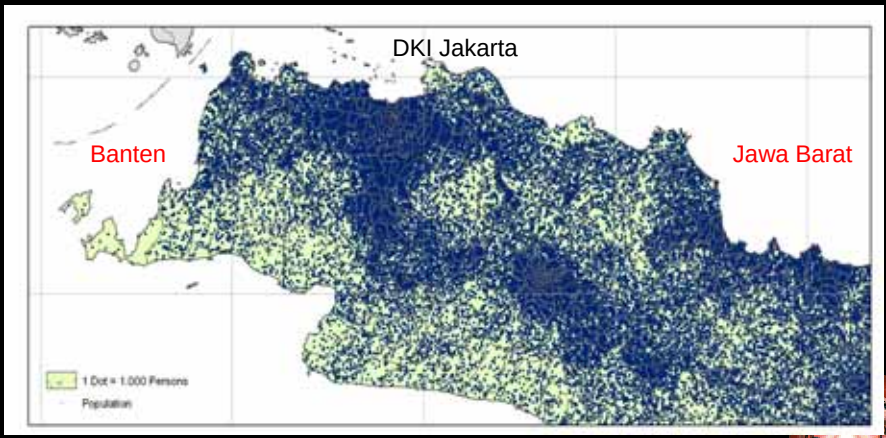





# Contour Map (Isopleth Map) to emphasize continuous distribution



# Dot Map to emphasize density of distribution

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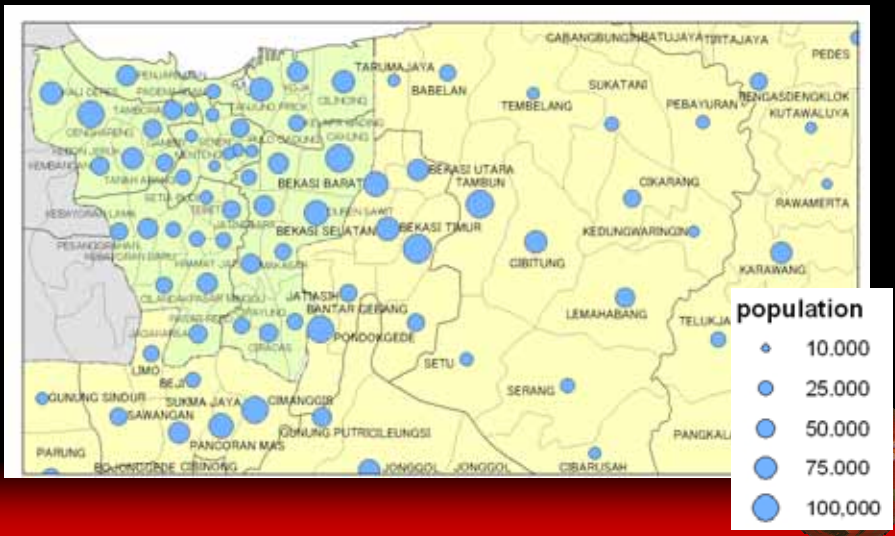
# Proportional Circle Map to emphasize total number

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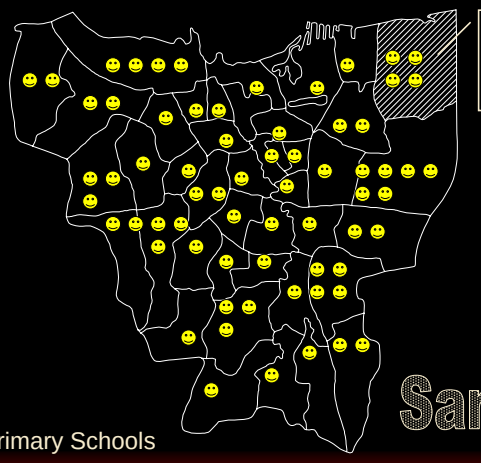
# Symbol Map to emphasize total number



There are 40 Primary Schools in this Kecamatan.

Sample

1 Symbol = 10 Primary Schools

Boundary of Kecamatan

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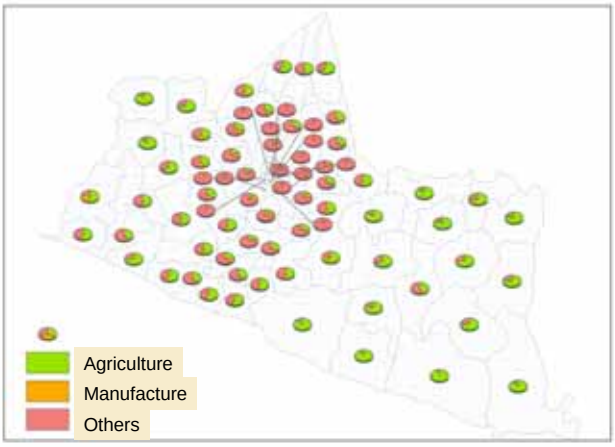
# Pie Chart Map to emphasize characteristics of regions

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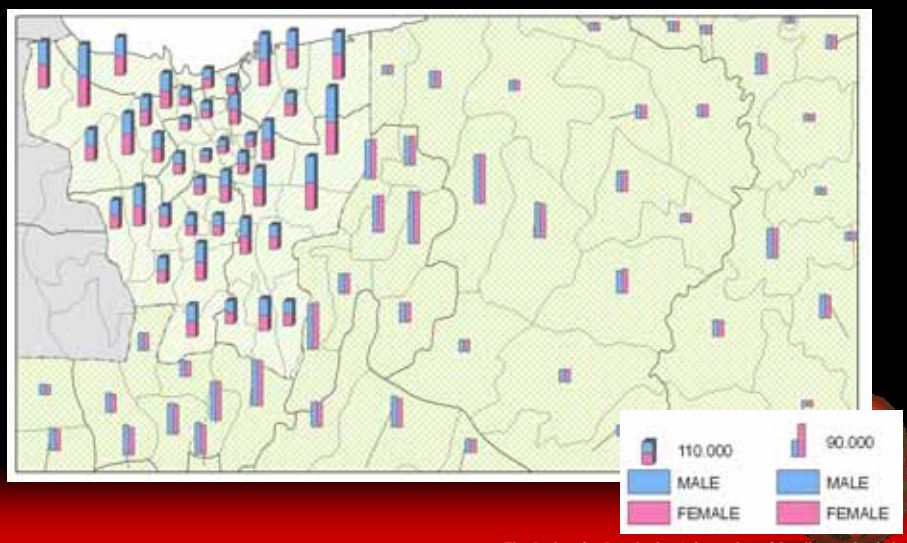
## Histogram Map to show total number and characteristic

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## 3. What Kind of Information can be obtained from Statistical Map?

- To inform people statistical information and geographical information **simultaneously**
- To show geographical relationships among regions
- To show specific region within the country
- To analyse geographical characteristics related to regional imbalance

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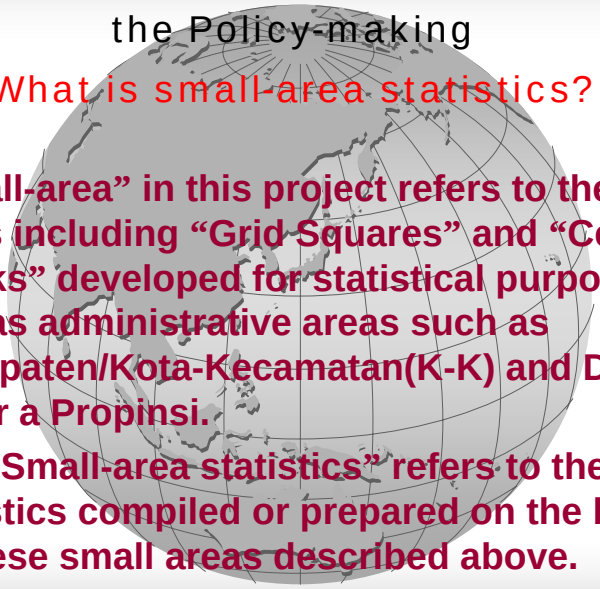
## 4. Role of Small-area Statistical Maps in the Policy-making

### What is small-area statistics?

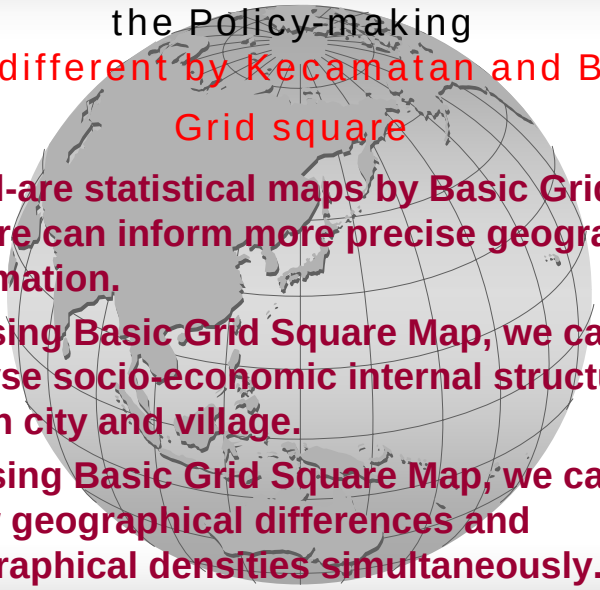


- **“Small-area” in this project refers to the areas including “Grid Squares” and “Census Blocks” developed for statistical purposes as well as administrative areas such as Kabupaten/Kota-Kecamatan(K-K) and Desa under a Propinsi.**
- **The “Small-area statistics” refers to the statistics compiled or prepared on the basis of these small areas described above.**



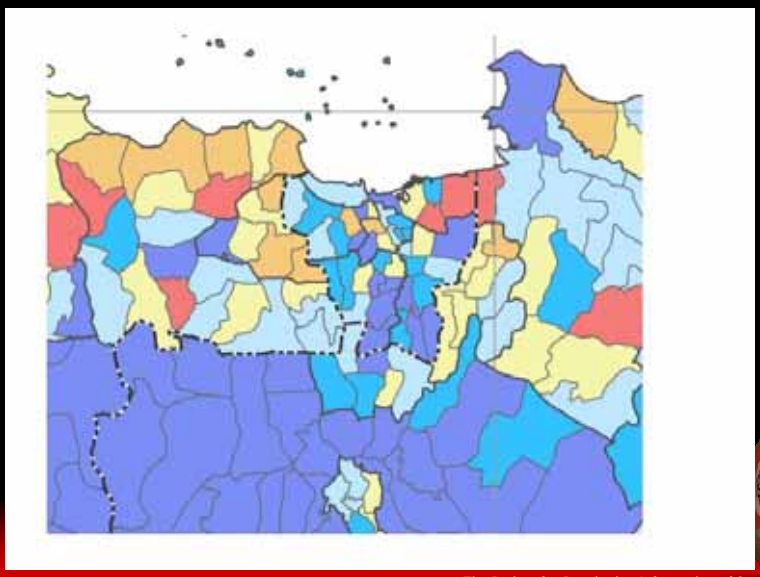
## 4. Role of Small-area Statistical Maps in the Policy-making

### How different by Kecamatan and Basic Grid square



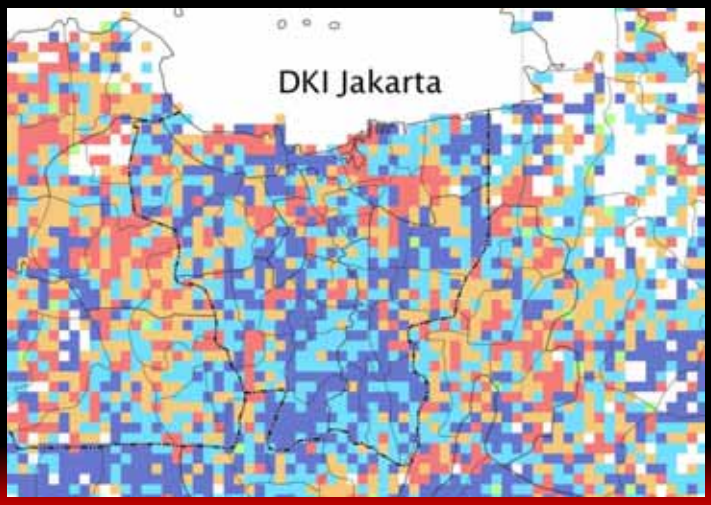
- **Small-are statistical maps by Basic Grid Square can inform more precise geographical information.**
- **By using Basic Grid Square Map, we can analyse socio-economic internal structure within city and village.**
- **By using Basic Grid Square Map, we can know geographical differences and geographical densities simultaneously.**

## Sex Ratio by Kecamatan In DKI Jakarta





## Sex Ratio by Basic Grid Square In DKI Jakarta




## 4. Role of Small-area Statistical Maps in the Policy-making

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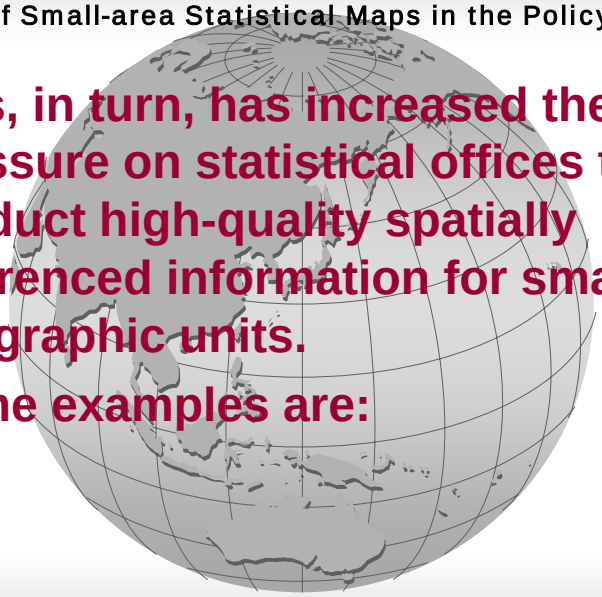
## 4. Role of Small-area Statistical Maps in the Policy-making

Source: U.N. Department of Economic and Social Affairs Statistical Division (2000): Handbook on geographic information systems and digital mapping.

- **The benefits of geographic data automation in statistics are shared by the users of census and survey data. The data integration functions provided by GIS, which allow the linking of information from many different subject areas and other types of information as like environmental data, have led to a much wider use of statistical information.**

4. Role of Small-area Statistical Maps in the Policy-making



- This, in turn, has increased the pressure on statistical offices to product high-quality spatially referenced information for small geographic units.
- Some examples are:

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4. Role of Small-area Statistical Maps in the Policy-making

- Poverty reduction strategy planning
- Emergency planning
- Epidemiological prevention planning
- Flood control planning
- Industrial development planning
- Social and educational service planning
- Utility service planning
- Voting district delineation
- Agricultural development planning

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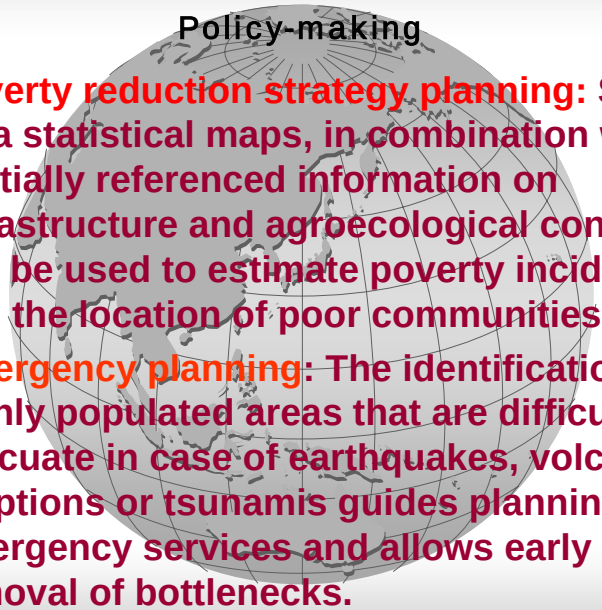
## 4. Role of Small-area Statistical Maps in the Policy-making



1. **Poverty reduction strategy planning: Small-area statistical maps, in combination with spatially referenced information on infrastructure and agroecological conditions, can be used to estimate poverty incidence and the location of poor communities.**
2. **Emergency planning: The identification of highly populated areas that are difficult to evacuate in case of earthquakes, volcano eruptions or tsunamis guides planning for emergency services and allows early removal of bottlenecks.**

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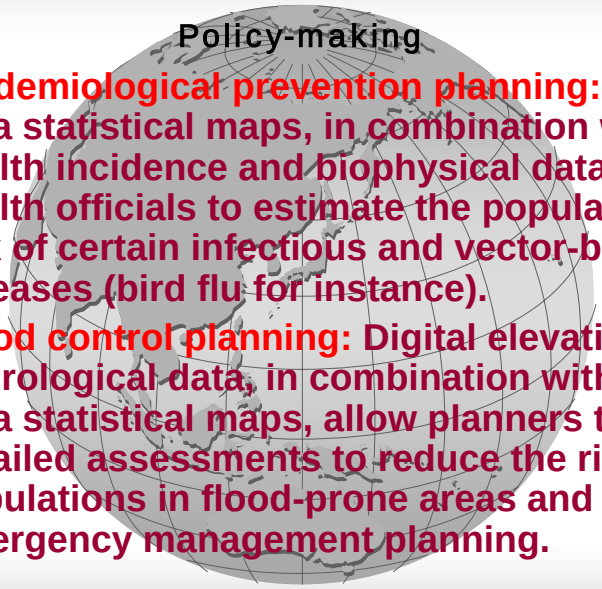
## 4. Role of Small-area Statistical Maps in the Policy-making



3. **Epidemiological prevention planning: Small-area statistical maps, in combination with health incidence and biophysical data, allow health officials to estimate the population at risk of certain infectious and vector-borne diseases (bird flu for instance).**
4. **Flood control planning: Digital elevation and hydrological data, in combination with small area statistical maps, allow planners to make detailed assessments to reduce the risk for populations in flood-prone areas and for emergency management planning.**

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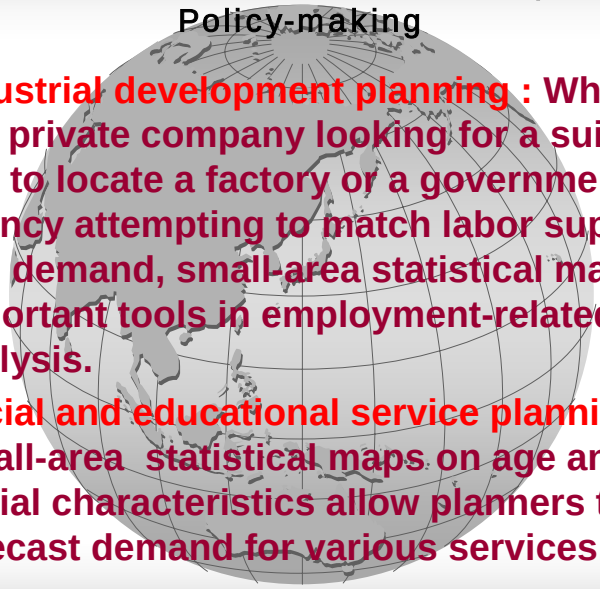
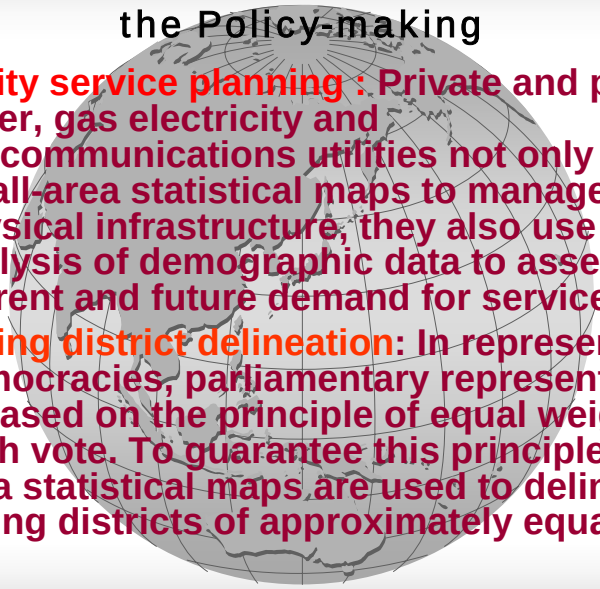
## 4. Role of Small-area Statistical Maps in the Policy-making



5. **Industrial development planning : Whether it is a private company looking for a suitable site to locate a factory or a government agency attempting to match labor supply and demand, small-area statistical maps are important tools in employment-related analysis.**
6. **Social and educational service planning: Small-area statistical maps on age and social characteristics allow planners to forecast demand for various services.**



## 4. Role of Small-area Statistical Maps in the Policy-making



7. **Utility service planning : Private and public water, gas electricity and telecommunications utilities not only use small-area statistical maps to manage their physical infrastructure, they also use spatial analysis of demographic data to assess current and future demand for services.**
8. **Voting district delineation: In representative democracies, parliamentary representation is based on the principle of equal weight for each vote. To guarantee this principle, small-area statistical maps are used to delineate voting districts of approximately equal size.**

## 4. Role of Small-area Statistical Maps in the Policy-making

9. **Agricultural development planning: Geographic information on agroecological conditions, and production data together with small-area statistical maps on the demand for food products, facilitate the analysis of food security issues (Famine warning systems).**

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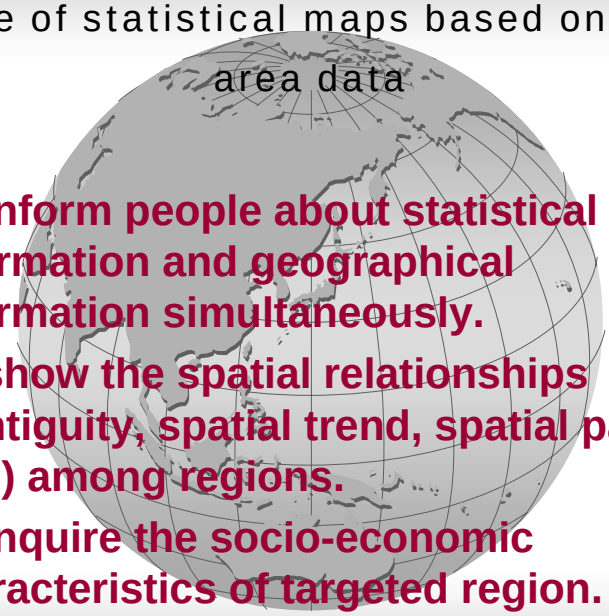
## 4. Role of statistical maps based on small-area data



- **To inform people about statistical information and geographical information simultaneously.**
- **To show the spatial relationships (contiguity, spatial trend, spatial pattern etc. ) among regions.**
- **To inquire the socio-economic characteristics of targeted region.**

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