United Nations Expert Group on the Integration of Statistical and Geospatial Information
First Meeting
New York, 30 October - 1 November 2013

Agenda: Item 8

Geographic Boundaries of Population Census of Japan

Prepared by Japan

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Geographic Boundaries of Population Census of Japan

MAKITA Naoki
National Statistics Center, Japan

First Meeting of the Expert Group on the Integration of Statistical and Geospatial Information

S-1522FC /S-1523FC (Secretariat Building)
UNHQ New York, 30 Oct. – 1 Nov. 2013

National Statistics Center, a working arm of Statistics Bureau (SBJ), is an independent administrative agency. NSTAC employees have status of governmental official.
1. Hierarchy of geographic boundaries
   - Prefecture
     1.1. Municipality
     1.4. City/Rural Block
     1.3. Enumeration District
     1.2. Basic Unit Block

2. Special geographic boundaries
   (Composite geographic boundaries)
   2.1. Densely Inhabited District
   2.2. Metropolitan Area
   (Gridded geographic boundaries)
   2.3. Grid Square
# 1. Hierarchy of geographic boundaries

<table>
<thead>
<tr>
<th>Note</th>
<th>Type</th>
<th># as of 2010 Population Census</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prefecture</strong></td>
<td>First tier of local government</td>
<td>Administrative boundary</td>
</tr>
<tr>
<td><strong>Municipality</strong></td>
<td>Second tier of local government</td>
<td></td>
</tr>
<tr>
<td><strong>City/Rural Block</strong></td>
<td>Boundary intending to simulate subdivision of municipalities. A principal unit for disseminating small area statistics</td>
<td></td>
</tr>
<tr>
<td><strong>Enumeration District</strong></td>
<td>Boundaries based on the number of household (around 50 for each ED) to assign enumerators to deliver and collect questionnaires. The sampling frame for statistical surveys.</td>
<td>Statistical boundary</td>
</tr>
<tr>
<td><strong>Basic Unit Block</strong></td>
<td>Elemental (smallest) boundaries expected to be stable over time The smallest unit for disseminating small area statistics</td>
<td></td>
</tr>
</tbody>
</table>
# 1. Hierarchy of geographic boundaries

<table>
<thead>
<tr>
<th>Prefecture</th>
<th>Note</th>
<th>Type</th>
<th># as of 2010 Population Census</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1. Municipality</td>
<td>• First tier of local government</td>
<td>Administrative boundary</td>
<td>47</td>
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<tr>
<td>1.4. City/Rural Block</td>
<td>• Second tier of local government</td>
<td></td>
<td>1728</td>
</tr>
<tr>
<td>1.3. Enumeration District</td>
<td>• Boundary intending to simulate subdivision of municipalities.</td>
<td>Statistical boundary</td>
<td>Around 22 thou.</td>
</tr>
<tr>
<td>1.2. Basic Unit Block</td>
<td>• A principal unit for disseminating small area statistics</td>
<td></td>
<td>Around 101 thou.</td>
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<tr>
<td></td>
<td>• Boundaries based on the number of household (around 50 for each ED) to assign enumerators to deliver and collect questionnaires.</td>
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<td>Around 189 thou.</td>
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<td></td>
<td>• The sampling frame for statistical surveys.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Elemental (smallest) boundaries expected to be stable over time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The smallest unit for disseminating small area statistics</td>
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<td></td>
</tr>
</tbody>
</table>
1. Hierarchy of geographic boundaries

1.1. Municipality (#=1728)

- There are three kinds of municipality according to the level of development: city (Shi), town (Machi) and village (Mura).
- Originally, a city had been recognized as an urban municipality.
- However, because of repeated policies of promoting municipality consolidation, nowadays, even a large rural municipality may be permitted to become a city.
- So, it is no longer possible to distinguish the level of development of municipalities by city, town or village.
(see Densely Inhabited District)
1. Hierarchy of geographic boundaries

1.1. Municipality (cont.)

The number of municipalities

- The number of municipalities (= cities + towns + villages)
- Consolidations boom after the millennium
- Consolidations boom after the War

The number of cities

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Value</td>
<td>12,000</td>
<td>11,000</td>
<td>10,000</td>
<td>9,000</td>
<td>8,000</td>
<td>7,000</td>
<td>6,000</td>
<td>5,000</td>
<td>4,000</td>
<td>3,000</td>
<td>2,000</td>
<td>1,000</td>
<td>500</td>
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</tr>
</tbody>
</table>

Consolidations boom after the War
1. Hierarchy of geographic boundaries

1.2. Basic Unit Block (≈ 189 thou.)

- BUBs are statistical blocks delineated by clear and stable geographic characteristics and landmarks such as roads, railways, rivers, etc. to establish smallest permanent geographic units.
- One BUB comprises around 20-30 households generally (but not necessarily).
- BUB is the elemental unit for processing and compiling small area statistics of Population Census. Since BUBs are too small for cross-classified tabulation, statistical tables by BUB to be released are limited to be simple. (see City/Rural Block)
Areas submerged by Tsunami after the Great East Japan Earthquake, 11 March 2011

A aerial photo taken by Geospatial Information Authority of Japan (the Japanese NMO) after the Tsunami (released on 18 April 2011)
Areas submerged by Tsunami after the Great East Japan Earthquake 11 March 2011

Fukushima Prefecture

Population and households in the submerged areas of three affected Prefecture

<table>
<thead>
<tr>
<th>Prefecture</th>
<th>Population</th>
<th>No. of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>510,697</td>
<td>179,278</td>
</tr>
<tr>
<td>Iwate</td>
<td>107,503</td>
<td>39,673</td>
</tr>
<tr>
<td>Miyagi</td>
<td>331,902</td>
<td>116,758</td>
</tr>
<tr>
<td>Fukushima</td>
<td>71,292</td>
<td>22,847</td>
</tr>
</tbody>
</table>

The population and household figures by adding up submerged BUBs based on the preliminary tabulation of 2010 Population Census are released on 21 April 2011.

1. Hierarchy of geographic boundaries

1.3. Enumeration District (# ≅ 101 thou.)

- The entire area of Japan is divided exclusively and exhaustively into EDs, before Population Census is taken place every five years.

  - The EDs for the 2010 census were demarcated on October 1, 2009, a year before the Census Day. The EDs were subsequently partially amended up to the Census Day (and BUBs as necessary) to incorporate changes after demarcation. Thus, the EDs were finally demarcated as of the census date.
1. Hierarchy of geographic boundaries

1.3. Enumeration District (Cont.)

- Each ED is normally a combination of two or more BUBs so that an ED contains around 50 households to assign an enumerator for questionnaire delivery and collection.

In cases a BUB contains too many households such as high rise apartment houses, it is counted as one ED or is divided into two or more Eds.

- EDs are also used as a sampling frame for household surveys of official statistics as well as for some of public and academic statistical surveys.
1. Hierarchy of geographic boundaries

1.4. City/Rural Block (# ≅ 22 thou.)

- An C/R Block is constructed by combining EDs (and BUBs) so that the block simulates a subdivision of municipalities.

- C/R Block is the principal unit for disseminating small area statistics of Population Census. Since C/R Blocks are large enough, statistical tables by C/R Block can offer complex cross-classified data. (see Basic Unit Block)

- Since C/R Blocks are created with permanently stable BUBs to simulate subdivision of municipalities, topological interoperability between them is not necessarily ensured.
1. Hierarchy of geographic boundaries

- These geographic boundaries are managed by a 'Census Mapping System.' (see the brochure)

- **5 + 9 digits Code system**
  - Prefecture: 2 digits
  - Municipality: 3 digits
  - City/Rural Block: 3+1 digits
  - Enumeration District: 2 digits
  - Basic Unit Block: 2+1 digits

  '+1' s are reserved for a possible future partition of C/R Blocks and BUBs
2. Special geographic boundaries

- Composite geographic boundaries
  2.1. Densely Inhabited District
  2.2. Metropolitan Area

- Gridded geographic boundaries
  2.3. Grid Square
2. Special geographic boundaries

2.1. Densely Inhabited District

- A DID consists of adjoining basic unit blocks that have high population density of 4,000 persons/km$^2$ and overall population adds up to 5,000 residents or more.
- DID has been established since 1960. Population Census 2010 identified 1319 DIDs.
- DID is used as one of criteria for the amount of annual grants from the central government to prefectures/municipalities. DID is also used as a basis for urban planning and its redevelopment, disaster management measures, etc.
2. Special geographic boundaries

2.1. Densely Inhabited District (cont.)

- DID of Musashi Murayama city, Tokyo

http://www.stat.go.jp/data/chiri/gis/index.htm
(in Japanese language)
2. Special geographic boundaries

2.1. Densely Inhabited District (cont.)

The number of municipalities

it is no longer possible to distinguish the level of development of municipalities by city, town or village.
2. Special geographic boundaries

2.1. Densely Inhabited District (cont.)

Population by type of municipality in proportion

[Graph showing population trends for cities and towns/villages from 1920 to 2010]
2. Special geographic boundaries

2.1. Densely Inhabited District (cont.)

Population by type of municipality and DID

- Population of cities
- Population of DIDs
- Population of non DIDs
- Population of towns/villages


%
2. Special geographic boundaries

2.2. Metropolitan Area

- A MA is adjoining municipalities defined based on the result of Population Census for the purpose of forming broad urbanized areas across the administrative boundary.

- Each MA has "central city(ies)" and "surrounding areas" (cities, towns and villages) that have a high degree of economic and social integration.

- MAs have been established since 1960. Population Census 2010 identified 10 MAs.
2. Special geographic boundaries

2.2. Metropolitan Area (cont.)

- Kanto Metropolitan Area
2. Special geographic boundaries

2.3. Grid Square

- Grid Square Statistics of Population Census (GPC) have been produced since 1970 by reorganizing the result of the Population Census.
- GPC makes time series comparison easier than small area statistics based on administrative boundaries and C/R Blocks because the latter inevitably varies over time.
- "Standard Grid Square and Grid Square Code" which divides the whole area of Japan according to latitude and longitude is announced by government, and many small area statistics follow the format (economic census, agricultural census, environmental surveys, etc.)
2. Special geographic boundaries

2.3. Grid Square (cont.)

Total Population, 2010 all Japan at Basic Grid Square level

A Basis Grid Square is a square about 1km on a side. There are approx. 380,000 BGSs.
2. Special geographic boundaries

2.3. Grid Square (cont.)
Proportion of Aged Population 1 (65 years and older),
All Japan at Basic Grid Square level

2000

2010
Thank you for your attention!