

Preparation of the Grid Square Statistical Data in Indonesia

**Seminar on Use, Analysis and Application of
Small-area Statistics**

7 March 2007
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Grid Square Statistics in Japan

- Dr. OTOMO: Father of Japan's Grid Square Statistics for the 1970 Population Census
 - I developed computer programs for processing the 1965 census data experimentally to produce Grid Square statistics on paper and MT,
 - before going to UNECAFE (ESCAP) in 1971.
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Grid Square Code: yyxxab									
c	0	1	2	3	4	5	6	7	8
0	349	230	120	200	120	345	432	164	200
	169	100	60	106	60	165	222	77	106
	180	130	60	94	60	180	210	67	94
1	210	403	297	180	297	147	80	200	180
	106	207	140	80	140	77	45	120	80
	104	196	157	100	157	70	35	80	100
2		432	210	340	210	260	100	80	
		222	108	169	108	125	40	45	
		210	102	171	102	135	60	35	
3		80	567	290	567	150			
		45	280	150	280	70			
		35	287	140	287	80			
4			230	456	230	124			
			100	237	100	110			
			130	219	130	114			

What are small area statistics?

- ☐ Statistics for areas smaller than
Propinsi
- ☐ Hierarchy in administrative areas
Propinsi
Kabupaten/Kota
Kecamatan
Desa

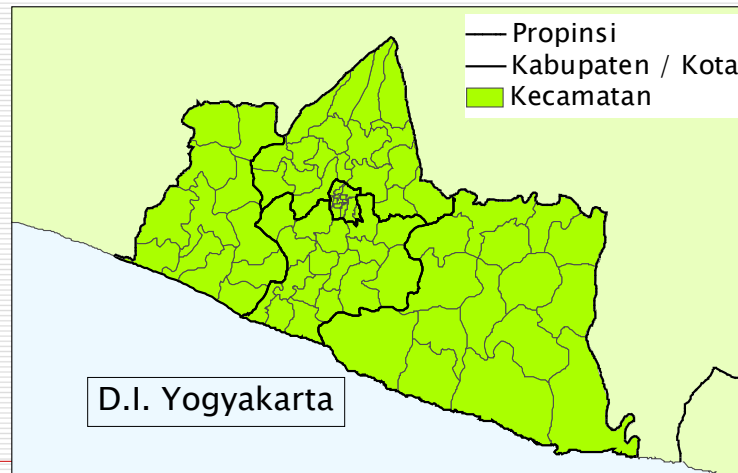
Propinsi



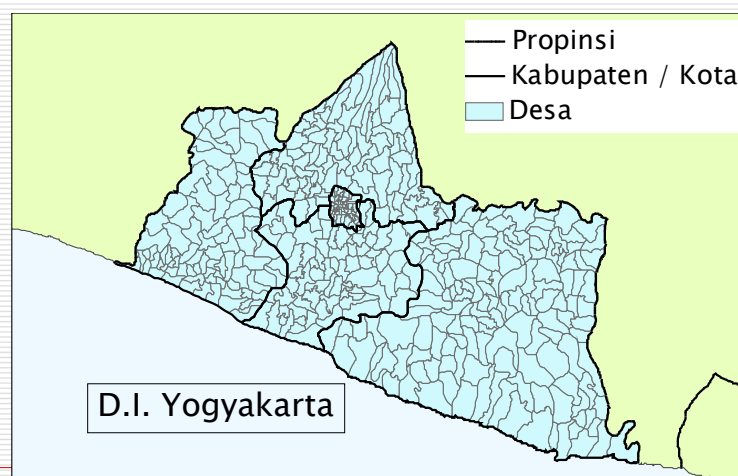
Kabupaten / Kota



Kecamatan



Desa



Maps and Statistics (1)

Statistics for DI Yogyakarta Propinsi

Statistics by Kabupaten

Statistics by Kecamatan

	A	B	C	D	E	F	G
1							
2	Kabupaten/ Kota Name	Kecamatan Name	Sex Ratio(%)		Kabupaten Name	Sex Ratio(%)	
3	Kulonprogo	Temon	96.0		Kulonprogo	97.0	
4		Wates	98.5		Bantul	99.0	
5		Panjatan	96.4		Gunung Kidul	95.1	
6		Galur	98.2		Sleman	101.8	
7		Lendah	98.7		Yogyakarta	95.8	
8		Sentolo	97.8		Total	98.3	
9		Pengasih	95.4				
10		Kokap	99.5				
11		Nanggulan	95.9				
12		Girimulyo	94.7				
13		Samigaluh	93.3				
14		Kalibawang	98.5				
15	Total		97.0				
16	Yogyakarta	Mantriweron	96.9				
17		Kraton	89.4				
18		Mergangsan	93.7				
19		Umbulharjo	98.0				
20		Kotagede	99.6				
21		Gondokusuman	94.7				
22		Danurejan	94.4				
23		Pakualaman	95.9				
24		Gondomanan	86.3				
25		Ngampilan	89.4				
26		Wirobrajan	104.7				
27		Gedongtengen	90.8				
28		Jetis	97.5				
29		Tegalrejo	97.6				
30	Total		95.8				
31							

Maps and Statistics (2)

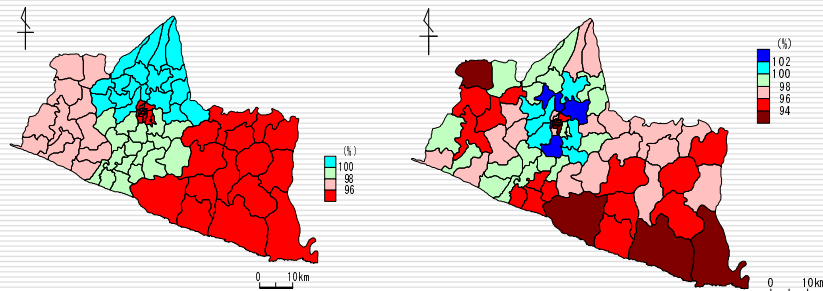


Fig a. Sex Ratio by Kabupaten
in DI Yogyakarta

Fig b. Sex Ratio by Kecamatan
in DI Yogyakarta

Small Area Statistics in Indonesia

*Statistics for
Kabupaten/Kota, Kecamatan
Desa
Census Blocks
Grid Squares*

Desa Statistics

- ❑ Data already produced by BPS from the 2000 Population Census.
 - ❑ Boundaries have been digitized.
 - ❑ GIS can be applied.
 - ❑ But, still large.
-

Census Block Statistics

- ❑ Data already produced by BPS from the 2000 Population Census.
 - ❑ *Maps* have not been digitized yet.
 - ❑ But, each CB has its Center Point with digitized information of location.
 - ❑ Central Points (CPs) have to be marked manually!
(NOT YET for Kalimantan, Sumatera, Irian etc.)
-

Use of CB data

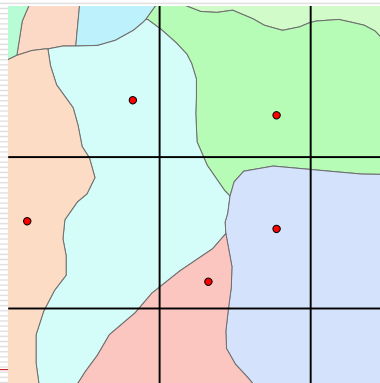
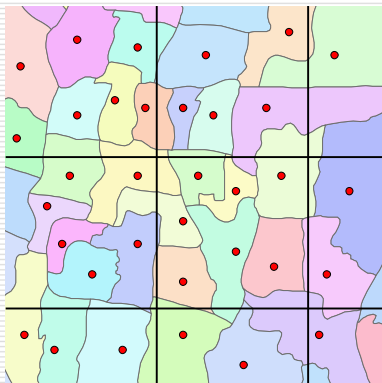
-Center Points (CPs)-

- Application of GIS using Center Points
- Production of Grid Square data from CB data using Center Points

Census Blocks vs. Grid Squares

Grid Squares are larger than
Census Blocks.

Census Blocks are larger than
Grid Squares.



[• Center Point]

Grid Square Statistics

- ☐ Grid Square statistics can provide numerical information together with positional information.
 - ☐ Being compiled from the Census Block data.
-

Small Area Data Bases (1)

For Desas, CBs, and Grid Squares

Contents

- ☐ Population Census and Housing data
 - ☐ Agricultural Census data
 - ☐ Economic Census data
 - ☐ Various administrative data
 - ☐ Natural data (altitude, rain fall, etc.)
-

Small Area Data Bases (2)

For Desas, CBs and Grid Squares

Provision/Production

- ☐ TXT and CSV formats or EXCEL sheets
- ☐ Develop a production process for the 2000 Population Census,
- ☐ And apply it to other data contents.

Grid Square Coding System (1)

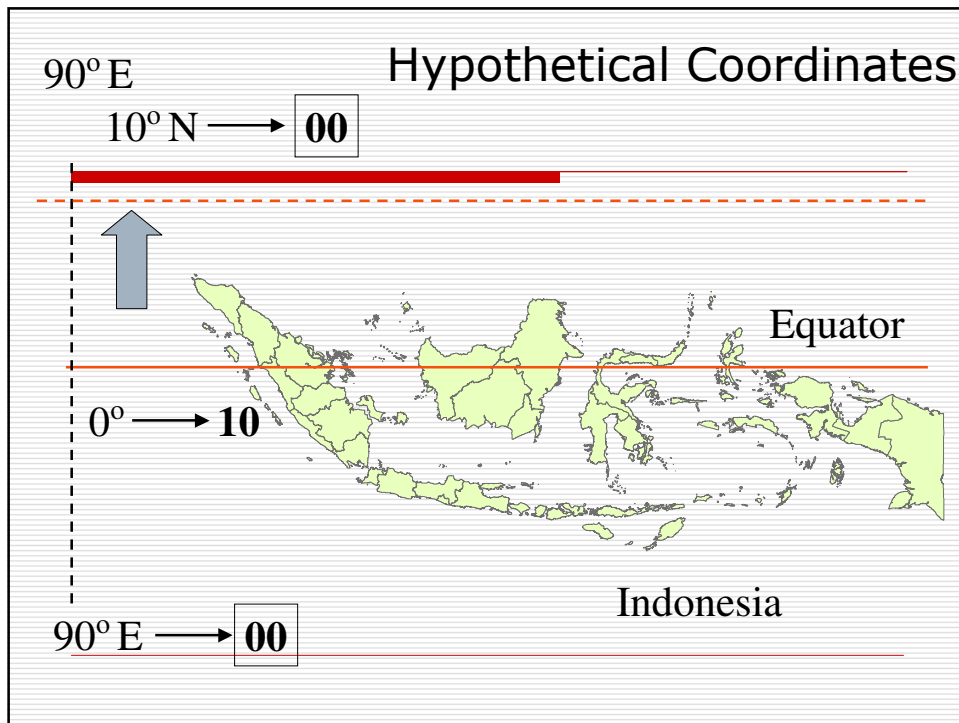
To cover the whole Indonesia in one system (hypothetical coordinates)

10 Degrees North in Latitude

-> 0 Degree

90 Degrees East in Longitude

-> 0 Degree



Grid Square Coding System (2)

Primary Grid Square:

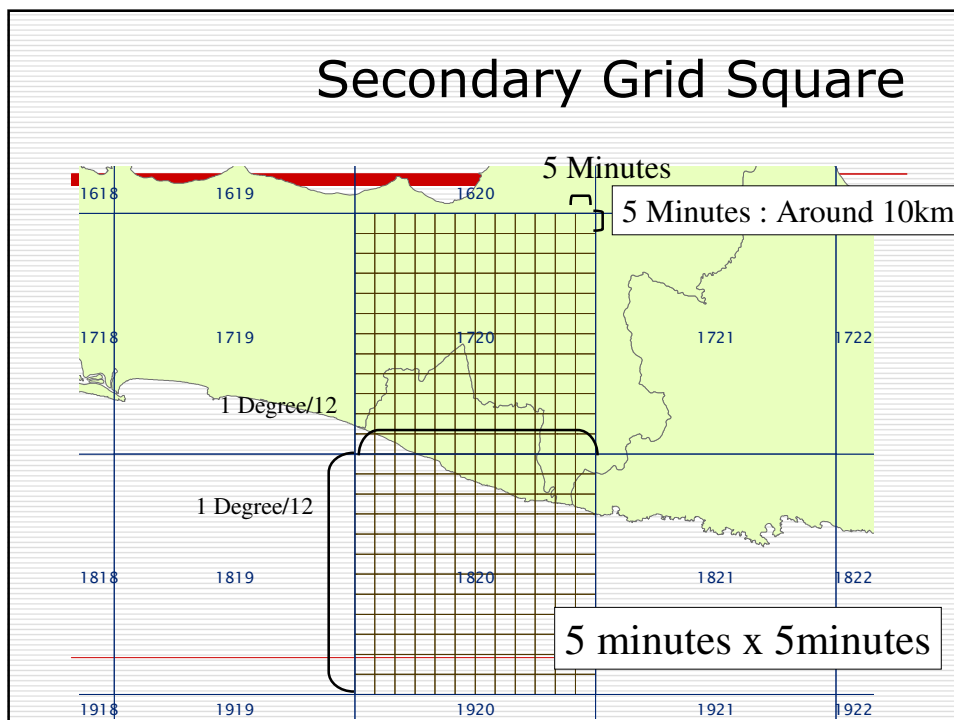
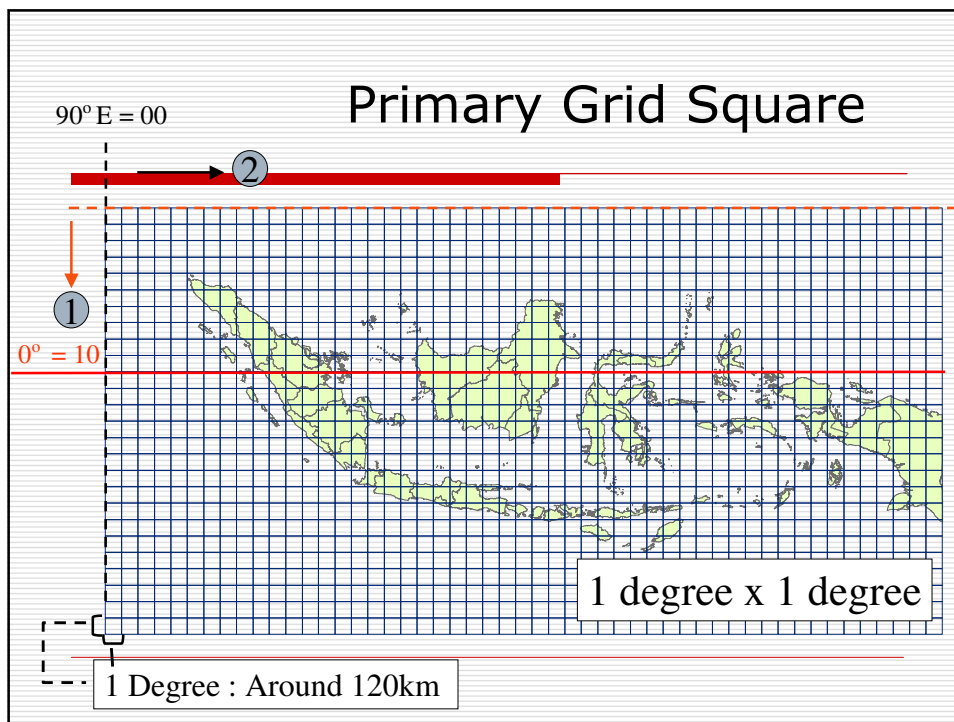
1 degree x 1 degree (120 km)

Secondary Grid Square:

5 minutes x 5 minutes (10 km)

Tertiary Grid Square:

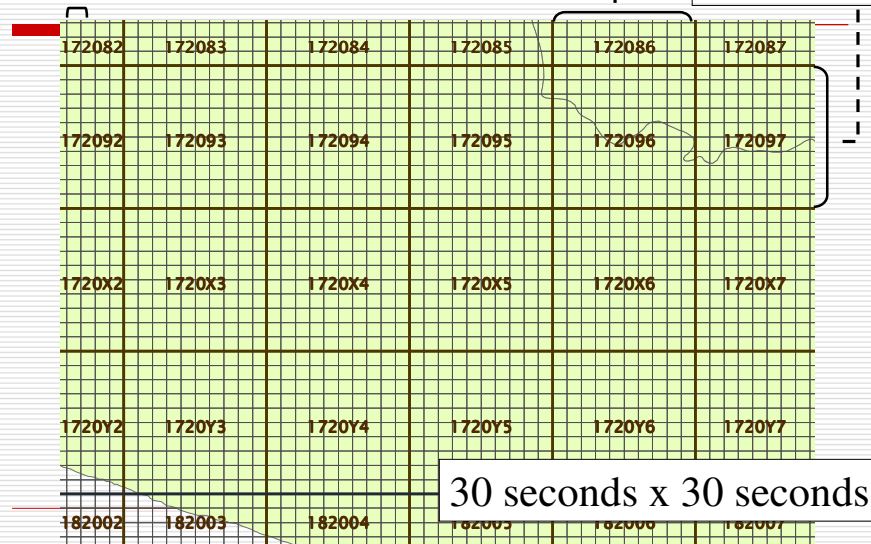
30 seconds x 30 seconds (1 km)



Tertiary Grid Square

30 Seconds : Around 10km

5 Minutes/10



Grid Square Coding System (3)

□ Primary Grid Square Code : yyxx

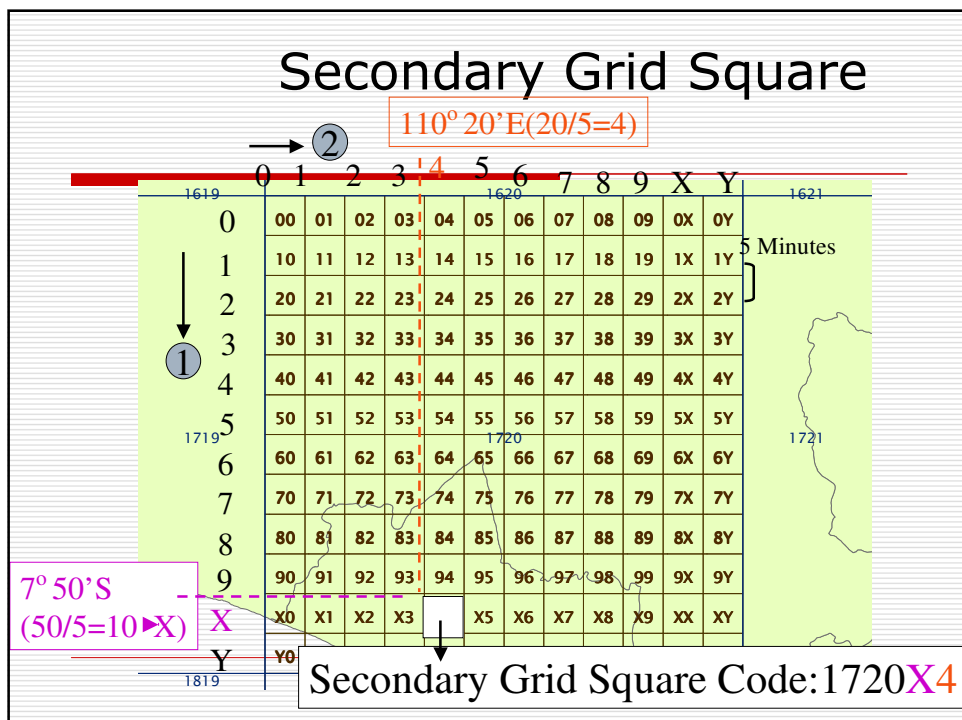
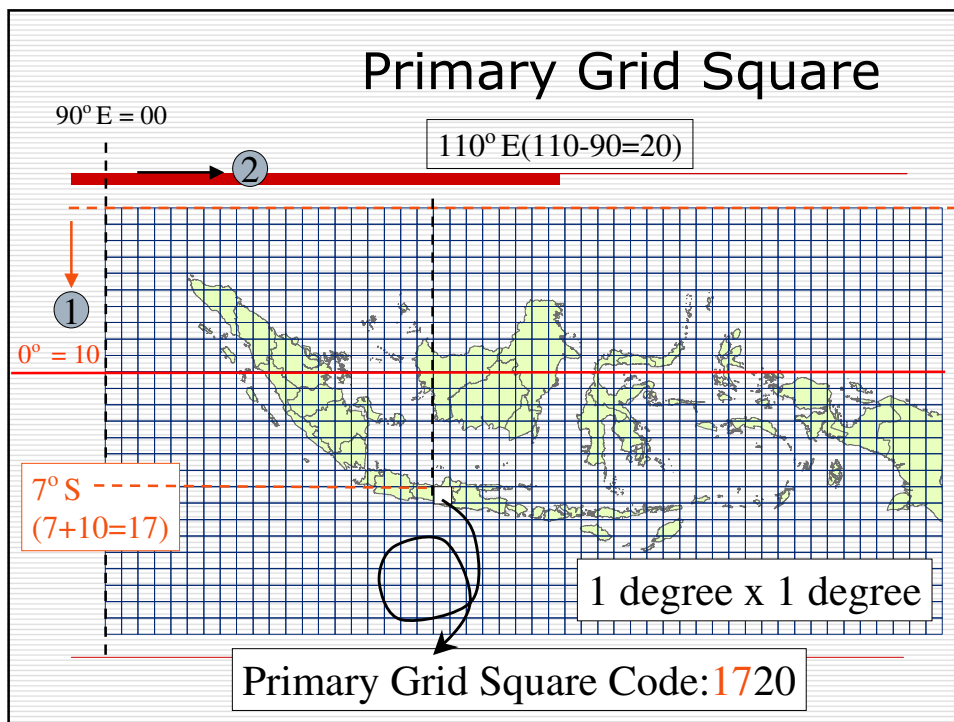
yy Degree Latitude	yy = $\begin{cases} N & (\text{Latitude}-10)x(-1) \\ S & \text{Latitude}+1 \end{cases}$	xx = Longitude-90
xx Degree Longitude		

□ Secondary Grid Square Code : yyxxab

A Minutes Latitude	a = Integer (A / 5)
B Minutes Longitude	b = Integer (B / 5)

□ Tertiary Grid Square Code : yyxxabcd

A Minutes C Seconds Latitude	c = $((A - \text{Integer}(A / 5)) + C) / 30$
B Minutes D Seconds Longitude	b = $((B - \text{Integer}(B / 5)) + D) / 30$



Tertiary Grid Square

$110^{\circ} 24' E (24' / 5' = 4 \dots 4' \quad 4' \times 60 / 30'' = 8)$

The diagram illustrates the process of deriving a Secondary Grid Square Code from a Tertiary Grid Square Code. The Tertiary Grid Square is a 10x10 grid of 100 squares, numbered 00 to 99. The grid is divided into four quadrants by a vertical dashed line and a horizontal dashed line. The quadrants are labeled 172093, 172094, 172095, and 172096. The grid is also divided into four quadrants by a vertical dashed line and a horizontal dashed line. The quadrants are labeled 172093, 172094, 172095, and 172096.

The Tertiary Grid Square Code is 172093. The Secondary Grid Square Code is 1720X478.

The calculation for the Secondary Grid Square Code is as follows:

$$\begin{aligned}
 &7^{\circ} 53' 30'' S \\
 &(53' 30'' / 5' = 10 \dots 3' 30'' \\
 &(3' \times 60 + 30'') / 30'' = 7)
 \end{aligned}$$

The Secondary Grid Square Code is 1720X478.

- ❑ Matching Census Blocks (CBs) with grid squares

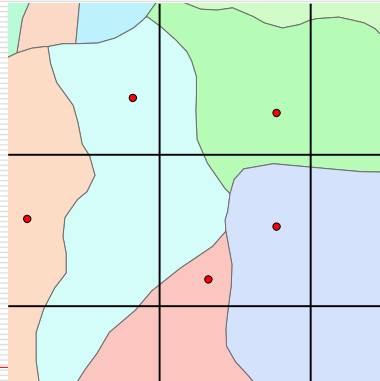
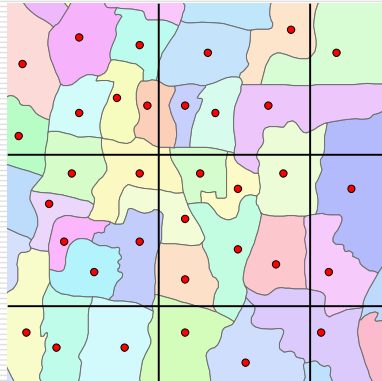
- Center point method
- Allocation of data according to area space of Census Blocks concerned

- 15

Allocating the Census Blocks to a Grid Square

Grid Squares are larger than Census Blocks.

Census Blocks are larger than Grid Squares.



• Centroid point

Grid Square Code: yyyxab									
	0	1	2	3	4	5	6	7	8
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	169	100	60	106	60	165	222	77	106
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Contents of Grid Square Statistics (small area statistics)

17 tables so far produced for CBs

Population by Sex

Population by Age in Single Year, and Sex

**Population by Age in Five-Year Groups,
and Sex**

**Population 10 Years of Age and Over by
Marital Status, and Sex**

- **Population by Relationship to Head of
Household, Sex**
 - **Population by Religion, and Sex**
 - **Population by Citizenship, and Sex**
 - **Population by Ethnicity, and Sex**
-

- **Population by Life Time Migration Status, Sex**
-

- **Population 5 Years of Age and Over by Educational Attainment, and Sex**

- **Women by Age in Five-Year Groups, and Number of Children Ever Born**

- **Women by Age in Five-Year Groups, and Number of Children Still Living**
-

- **Population 15 Years of Age and Over by Type of Ever Married Women by Age in Five-Year Groups, and Number of Children Ever Born**
-

- **Ever Married Women by Age in Five-Year Groups, and Number of Children Still Living**

- **Activity During the Previous Week, and Sex**

- **Population 15 Years of Age and Over who Worked During the Previous Week by Main Industry, and Sex**
-

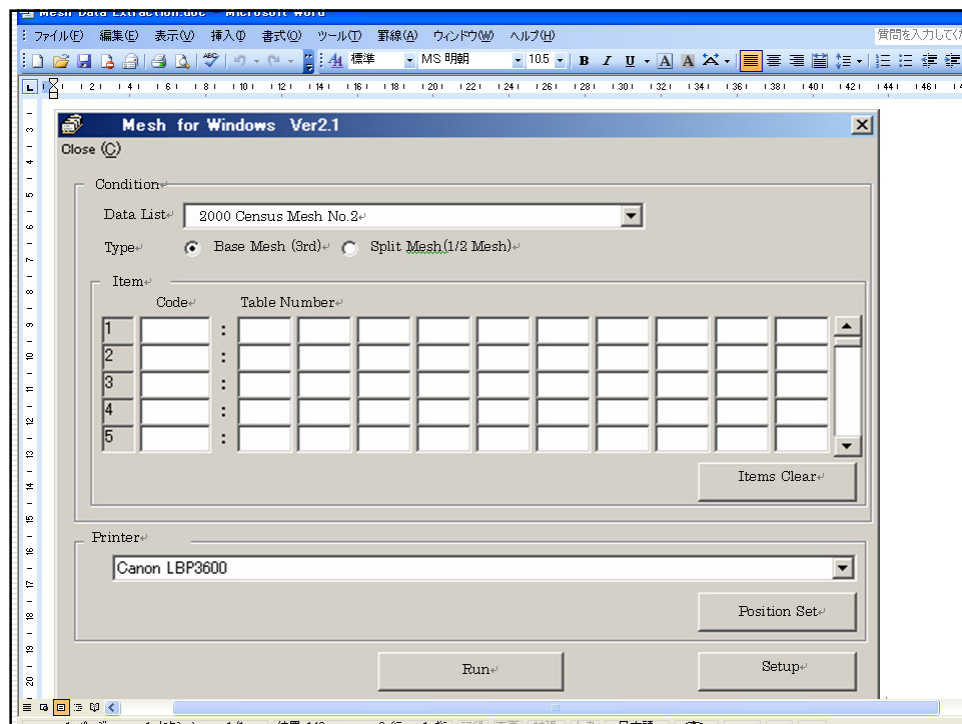
- **Population 15 Years of Age and Over who Worked During the Previous Week by ~~Employment Status, and Sex~~**
 - **Ever Married Women by Age in Five-Year Groups, and Number of Children Ever Born**
 - **Ever Married Women by Age in Five-Year Groups, and Number of Children Still Living**
 - **Population 15 Years of Age and Over by Type of Activity During the Previous Week, and Sex**
-

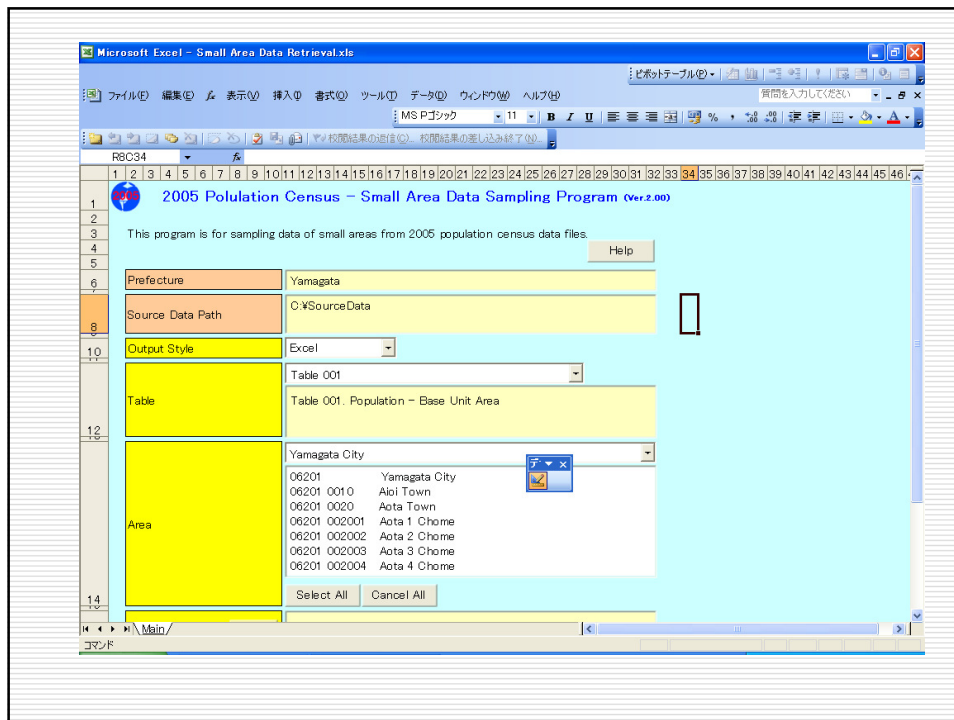
- **Population 15 Years of Age and Over ~~who Worked During the Previous Week~~ by Main Industry, and Sex**
- **Population 15 Years of Age and Over who Worked During the Previous Week by Employment Status, and Sex**

17 tables in total

Electronic Media for Disseminating Statistical Data

- Internet
- CD-R and MO
- FD
- MT
- Data retrieval on demand





Challenges/Considerations (1)

- ☐ To mark Center Points (CPs) for the whole territory (?)
- ☐ Technical experiment and proposal by this Project to be followed by BPS counterparts
- ☐ Processing and provision of Grid Square data from CB data using CPs by BPS

Challenges/Considerations (2)

- ☐ Boundaries be digitized for CBs for the 2010 Census.
- ☐ Boundaries of Desas etc. be checked and updated.
- ☐ CPs be marked from the beginning of the Census.
- ☐ Standardization of data files to be integrated to Small-area data bases.

Thank you for Attention