



The implementation of new methods for population censuses in Latin America

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The goals of a census

- Provide official population : state, regions, municipalities... :
 - to share public funds on the population basis
 - Seats at parliament
- Describe characteristics of population and dwellings :
 - Sex, age
 - Employment
 - Migrations
 - Place of work, commuters
 - Households
 -
 - >>> ***at any geographical level***
- Sample base for household surveys



Demographic situation of Latin America and Western Europe

	Population (millions)	Average growth rate 2000-2005	% of urban population	Density
Latin America	551	1.5	76.5	24
Brazil	186	1.4	81.7	22
Mexico	106	1.4	77.2	54
Western Europe	190	0.2	73.2	166
France	63	0.6	76.7	112

Demographic situation of Latin America

- Percentage of population living in 2000 in localities with 100 000 or more inhabitants :
 - Argentina : 62.3%
 - Bolivia : 45.1%
 - Brazil : 49.6%
 - Chile : 63.6%
 - Mexico : 47.3%
 - Paraguay : 35.4%
 - Peru : 45.9% (*)
 - Uruguay : 50.3% (*)
 - ...

Source : ECLAC, Statistical yearbook 2004

(*) 1990

(France : 15%)



Example 1 : Brasil

Distribution of the Municipalities by population numbers, 2000

Classes	Número de Municípios	%	População	%
Até 2.000	105	1,91	172.392	0,10
2.001 a 3.000	394	7,15	996.191	0,59
3.001 a 5.000	829	15,05	3.313.577	1,95
5.001 a 10.000	1.309	23,77	9.351.732	5,51
10.001 a 20.000	1.381	25,08	19.603.512	11,55
20.001 a 50.000	964	17,50	28.832.600	16,98
50.001 a 100.000	301	5,47	20.928.128	12,33
100.001 e mais	224	4,07	86.601.038	51,00
Total	5.507	100,00	169.799.170	100,00

Source : IBGE



Example 2 : Colombia

Municipalities of Colombia , per size, 2005		
Population	Number	%
<8 000	732	66,7
Entre 8 000 y <20 000	197	17,9
Entre 20 000 y <35 000	65	5,9
Entre 35 000 y <50 000	23	2,1
Entre 50 000 y <100 000	41	3,7
> 100 000	40	3,7
Total	1 098	100

Source : DANE

The situation in Latin America

- Mainly decennial census,
 - Registers in certain countries, but often problem of quality
 - Sometimes intercensal headcounts (very costly)
- Increasing demand :
 - Rapid changes in population and urbanization
 - At a local scale : decentralisation, more power to local authorities
 - Users ask for more frequently refreshed information
- Concerns about cost and quality of the operation
- Some projects or think tanks for redesign the census :
 - Brazil : 5 groups working on the different dimensions of the project (geographic base, conceptual design, sampling...)
 - Mexico : censos alternativos (surveys + register)
 - Peru : new rolling census
 - ...?



General census

- **Main features :**
 - Exhaustiveness
 - Simultaneity
 - Every ten years or about
- **Advantages :**
 - Coherence of the data : photo of the population and dwellings
 - Data for any geographical level available
 - Mobilisation of the population and the teams
- **Drawbacks :**
 - Sample for some variables
 - Refreshed only every 10 years
 - Problem of quality due to the importance of the operation and the lack of capitalized experience
 - Risk for boycott
 - Cost of intercensal headcounts



New methods ?

- **Get free of the dogmas of :**
 - Exhaustiveness :
 - Use sample
 - Simultaneity :
 - Collect information at different time and combine it
- **And many combinations are available :**
 - Sample/exhaustive surveys
 - Register/administrative sources
 - Multi annual combination
 - ...

>>> ROLLING CENSUS ?



What is a rolling census ?



Rolling census

- **Principles :**

- Ideas of Kish (1980, 1990...)
- Combination of data collected at different periods
- Cumulative survey covering a whole country over a period of time rather than a particular day :
 - Produces annual and multi-year estimates
 - Produces information for all areas
 - updated every year
- Exhaustive enumeration or sample



Rolling census experiences

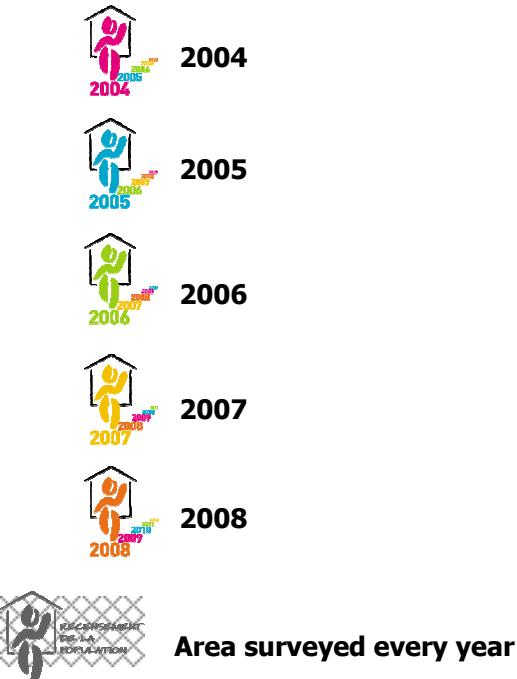
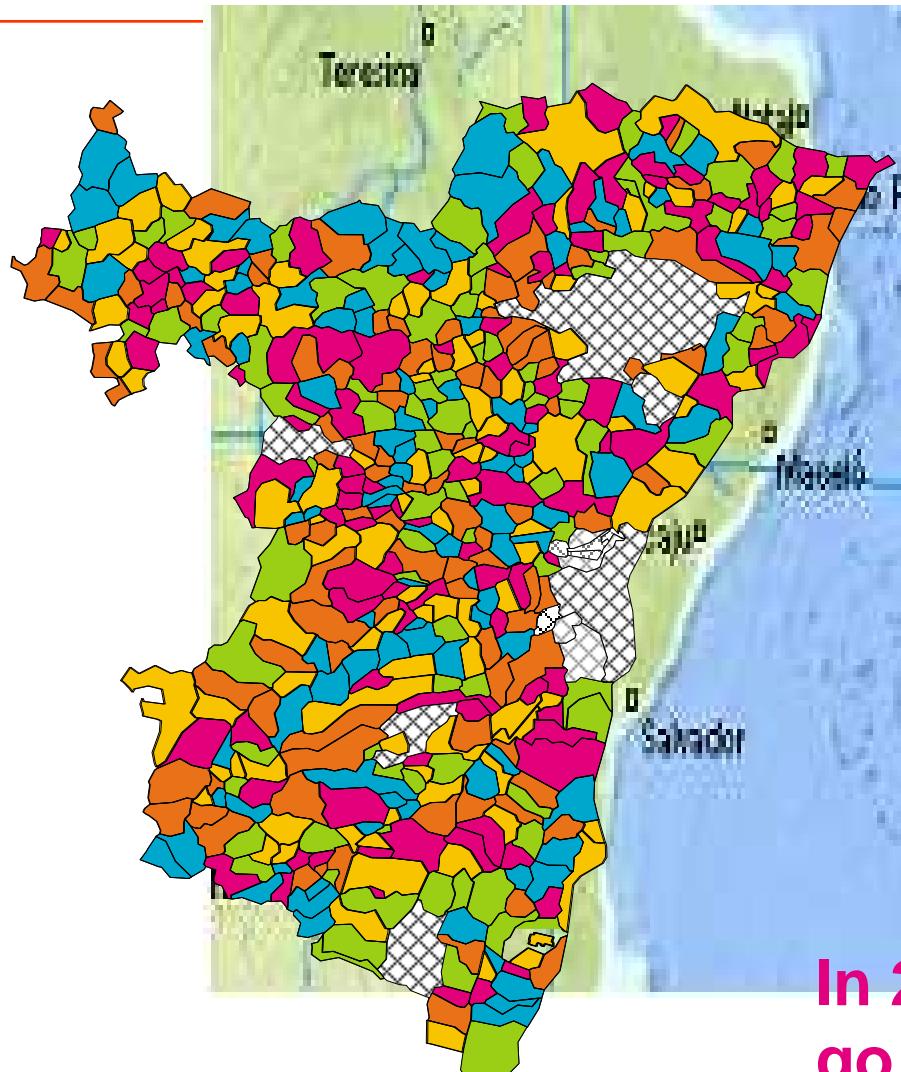
- American Community survey :
 - Implement a national sample of 3 million addresses
 - Profiles every year for communities of 65,000 or more, beginning in 2004 and each year thereafter
 - 3 to 5 year cumulations for communities of less than 65,000 population
- French rolling census :
 - 8,5 million people enumerated every year (14%)
 - Communes under 10,000 inh. wholly enumerated every 5 years
 - Communes over 10,000 inh. : sample of addresses (8% of dwellings) every year > 40% over 5 years
 - Produces yearly national and regional data
 - Produces yearly population for every communes (36,500)
 - 5 years cumulations for other areas



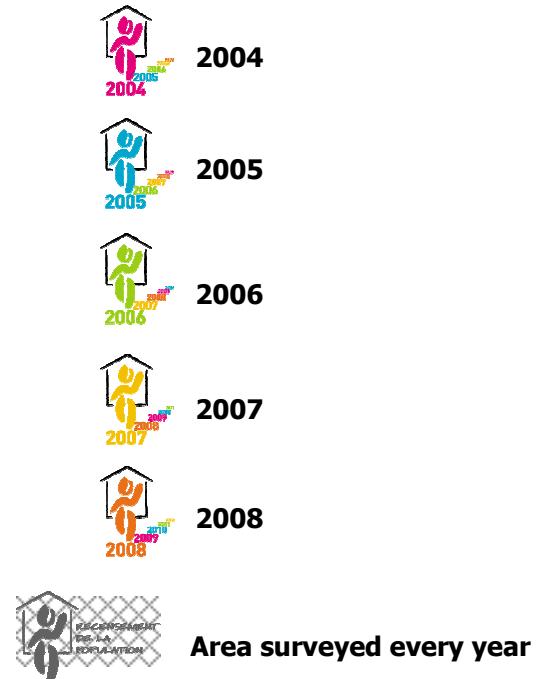
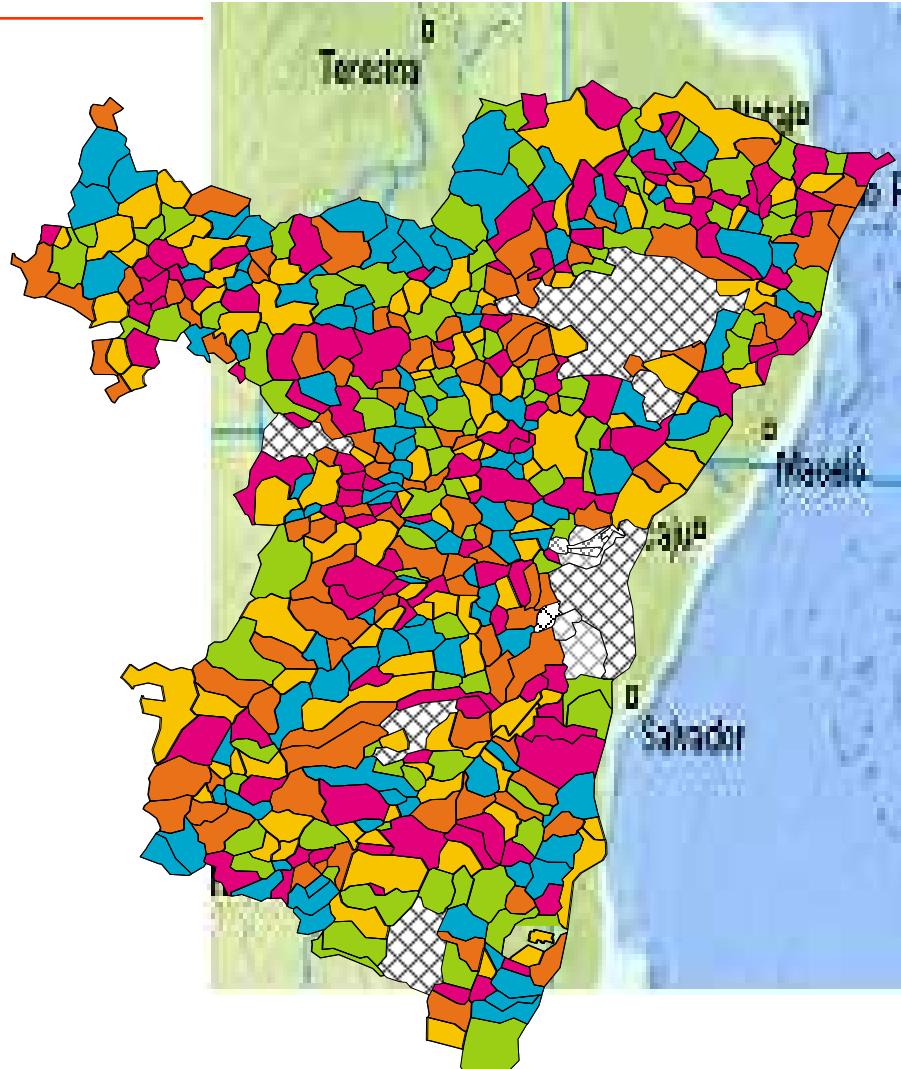
Rolling sample...



Rolling sample : a year for every area



Rolling sample : 5 years accumulation



Rolling sample : buildings

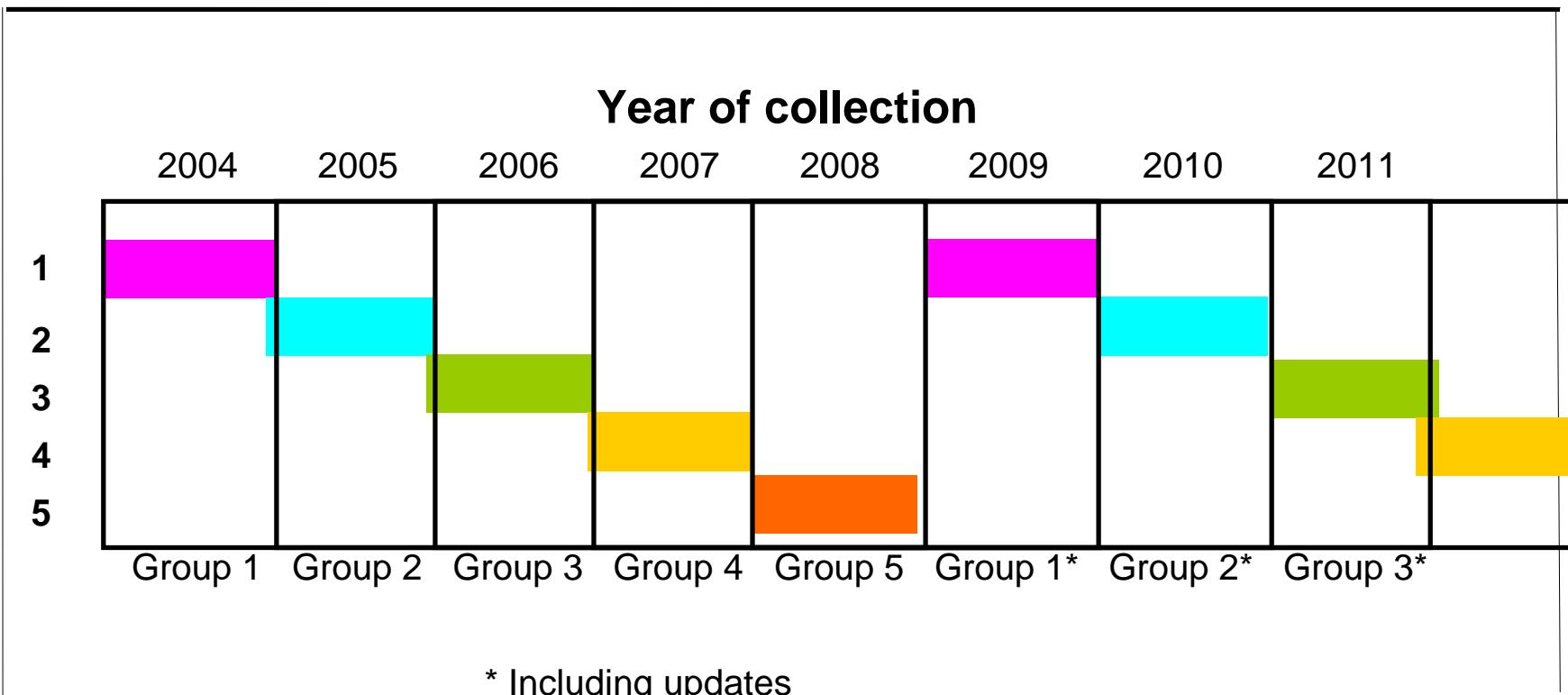


Rolling census

- The annual sample may be used for estimates at :
 - Regional level
 - City level
 - ...
- The combination of last « cycle » used for estimates at any other geographical levels



Cumulating information



Rolling samples : two approaches

- Things are not changing too much during the period : as if you take a picture with a long exposure time. A certain fuzziness is acceptable
 - If the period is long, for example 5 years, you may consider you estimate the middle year to consider a shorter period (2 years) between observation and estimation
- Things may change over the period :
 - you may collect relevant information for each period and combination gives a stronger estimate for an average mobile mean.
 - Otherwise, possible use of small area method (*with complementary sources or not*)



Rolling samples : flow data

- Example of migration :
 - Decennial census :
 - Estimated by $\text{Pop}_{N+10} - \text{Pop}_N - \text{Births} + \text{Deaths}$
 - Affected by differences of quality of the two censuses
 - Matrix of flows zone A <> zone B with the question « Where did you live x years ago »
 - Rolling census :
 - Estimation of the annual migration balance (country, states...) with the annual sample and the question « Where did you live 1 year ago »
 - Compare estimated population to **5** years ago : less problems of quality differences.
 - Matrix of flows :
 - possible for large scale levels with the annual sample
 - Proxy with combined 5 years data for other levels



How to implement a rolling census ?



1 : Canvass needs of the users

- Important to really know in deep user's needs and prioritize them, because there is always a compromise to do :
 - Who are they ?
 - Administrations, local authorities, researchers, firms...
 - Use of data :
 - Official population for public fund distribution
 - **More recent** description of the situation of a city, of districts for amenities (school, public transportation...)
 - Measure **evolutions** : socio-demographic evolution
 - At what level :
 - Country
 - States, Region, municipalities...
 - Urban areas, districts...
 - Non standard zones
 - What frequency :
 - Annual
 - Quinquennial
 - ...



2 : Determine main geographical levels

- Determine the main levels :
 - For official population outputs
 - For other characteristics
- For example :
 - Country, State, Municipalities

=> And build the sample framework in order to be representative at this level each time



3 : Determine periodicity

- Updating periodicity may be different among the different geographical levels :
 - Annual for the state, regions
 - Quinquennial for municipalities
 - ...
- Transversal / longitudinal analysis :
 - Annual update gives the opportunity to always get the most recent data
 - Doesn't give evolution (sample precision)



4 : Existence of other sources ?

- Register :
 - In some countries it may exist a population register :
 - Evaluate its quality : undercount...and overcount. Depends on the use of register for civil life
- Administrative sources :
 - Tax files : people, dwellings...
 - Health files
 - Municipalities files : school, waste collection...
 - Evaluate their quality and update

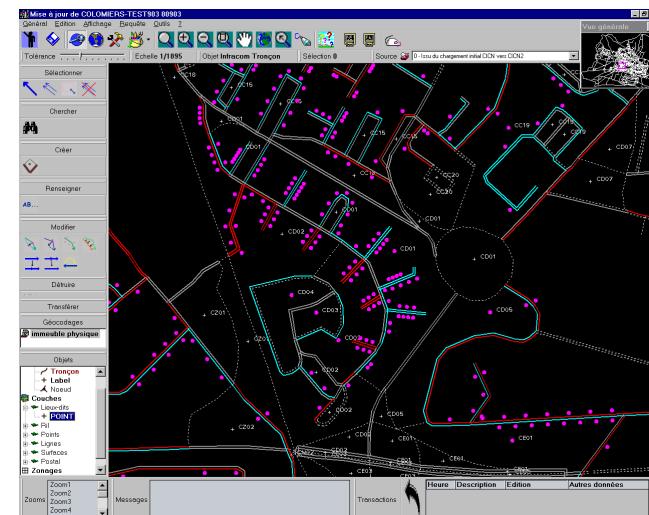
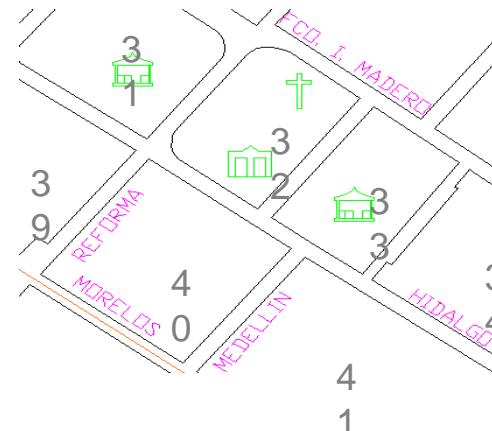


5 : geographical information

- Inventory of blocks :
 - More easy to build and maintain
 - Generally the basis for censuses
 - Depends on the streets framework
 - >>> But less precise

- Inventory of address (RIL, MAF...) :
 - Much more expensive to build
 - And to update
 - Depends on the streets framework
 - Needs a local organization
 - >>> More precise

>>> important for sample framework
may be different in the country



6 : Budget consideration

- General censuses cost a big amount of money...
 - but every 10 years
 - Difficult to obtain....and difficult to refuse, sometimes postponement
- Rolling censuses cost less ...
 - But every year, ie government commitment needed (*see further legal aspects*)
 - Possible to save money on certain items :
 - Softwares
 - Data capture, because of investment amortization
 - Better estimation of the volumes to be printed (forms...)
 - Organization
 - ...not for TV ads campaign



7 : Legal basis

- Permanent operation, avoid interruption, requires a strong legal basis :
 - To give safety to the process : authorization, budget
 - To make the operation compulsory
- Fix the rules to the determination of official population number :
 - Allow estimation
 - Avoid contesting on the figures
 - Avoid contesting about differences in methods among municipalities
 - But let to the INS the possibility to improve estimation methods



8 : Organization and human resources

- Central team :
 - Preparation, data collection and data processing...at the same time !
 >>> Devote one team to data collection, one to exploitation

- Local scale :
 - Involvement of municipalities ?
 - Local team of the institute of statistics : field network
 - Enumerators / Interviewers :
 - Regular team, more professionnal
 - What status ?



9 : quality management framework

- Preparation :
 - Organization
 - training
 - Delivery : forms, communication...
- Data collection :
 - avoid double counting : information, controls
 - Exhaustiveness of data collection
- Data processing :
 - Control of time limit
 - Quality of data capture
- Data quality :
 - process to verify the plausibility of data
- Dissemination :
 - Publication
 - website



10 : Communication

- To convince the users :
 - Examine how the new operation improve the satisfaction of the needs of each category of users
 - Build examples
 - Reassure about small areas information, and prove the limits of some utilizations of exhaustive census at very small level
- To convince politicians :
 - Updating population figures
 - Decentralization, local authorities needs for information
 - Cost effectiveness
- During the field operation :
 - Different from a general census : not all the population is concerned
 - Every year : risk of disinterest
 - Double counting, multiple residence
 - New form of communication, based on the main characteristics :
 - Modern operation
 - Usefulness
 - Easiness
 - Local communication / national



11 : Take your breathe...

...AND RUSH !!!

