



**INSTITUTO NACIONAL  
DE ESTADÍSTICA Y GEOGRAFÍA**

**2020**

**Population and Housing  
Census Planning**

**Innovations in the  
use of Technology**

**Mexico**

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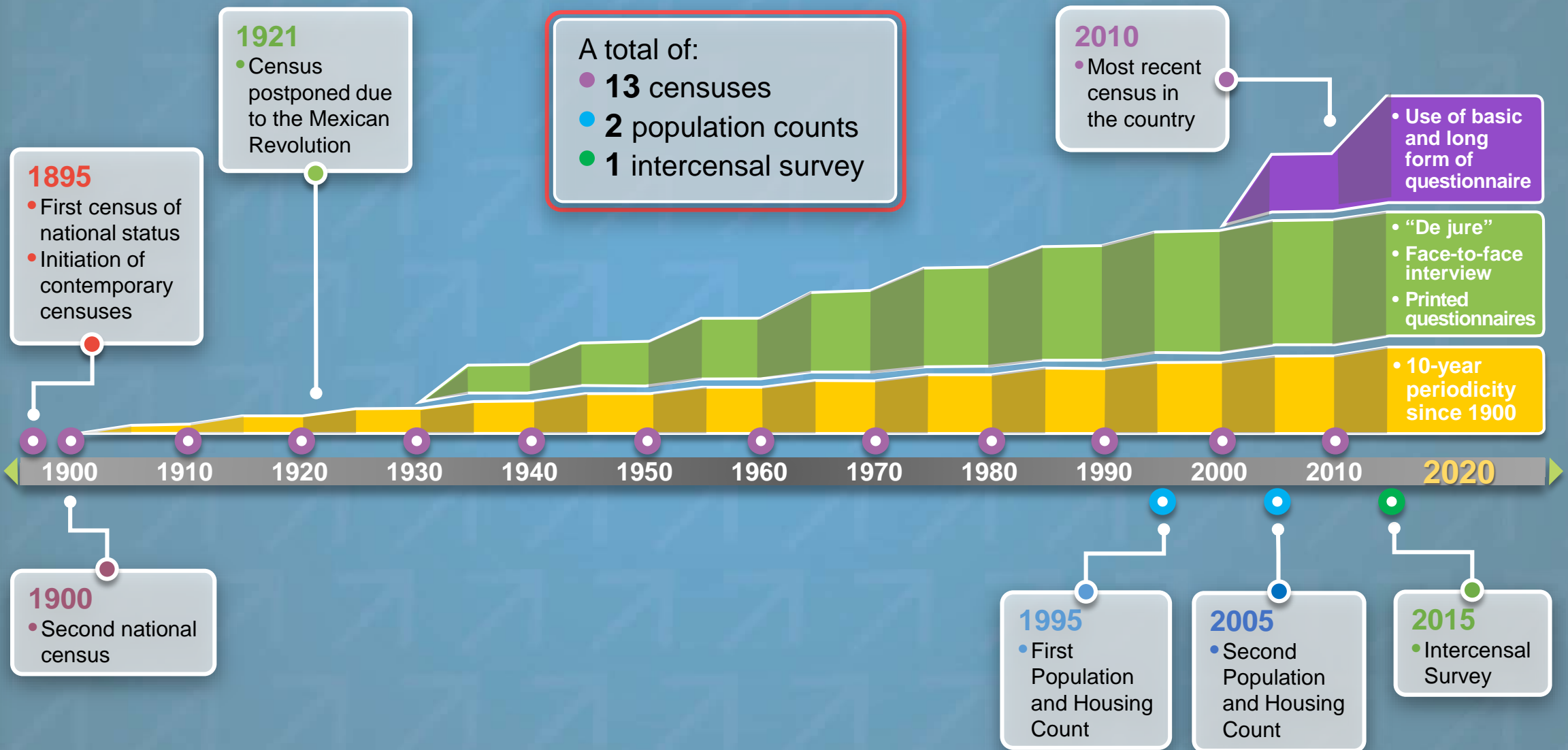
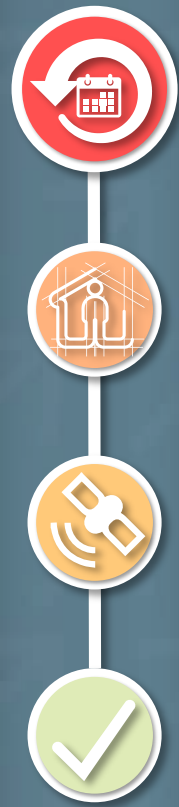


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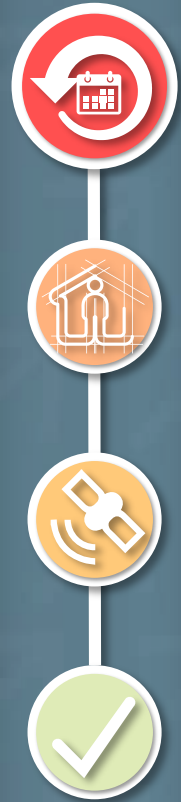
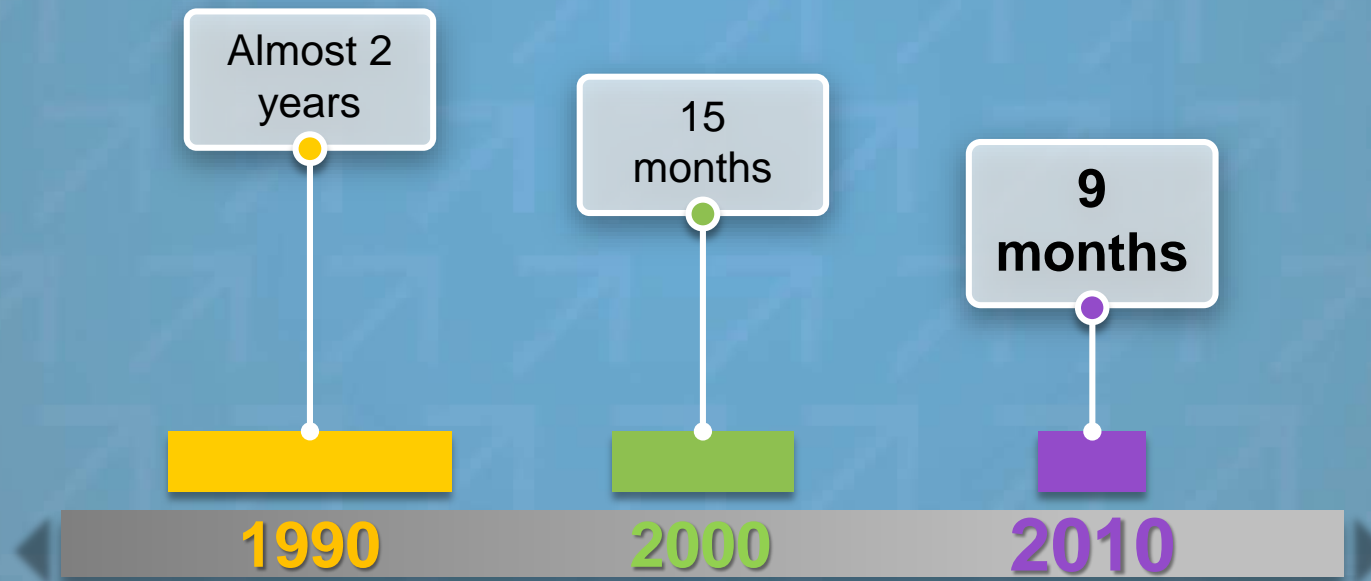
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# Background of Censuses in Mexico



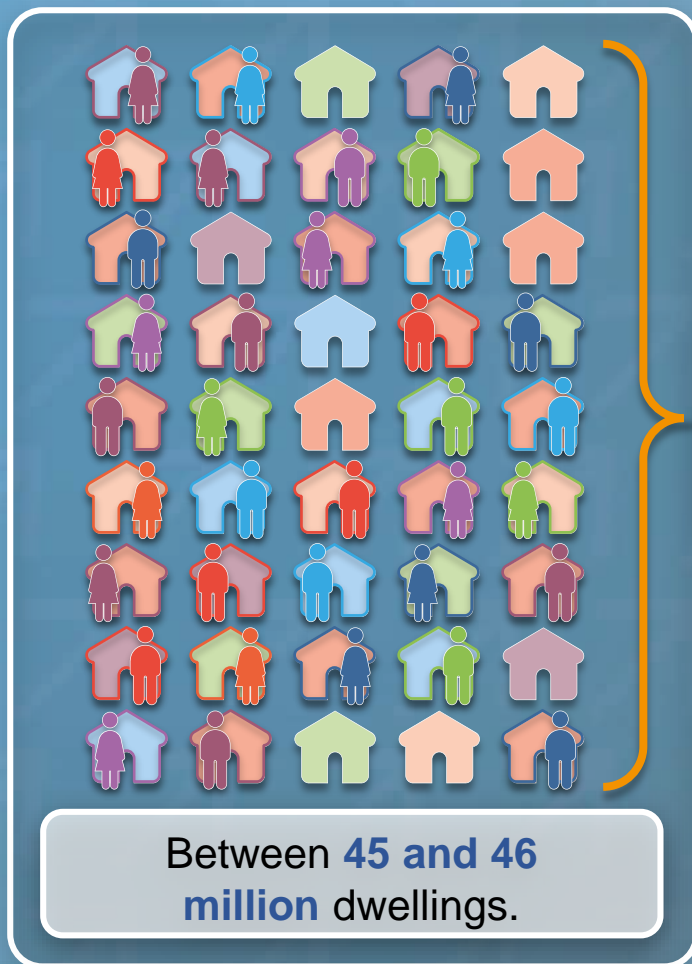
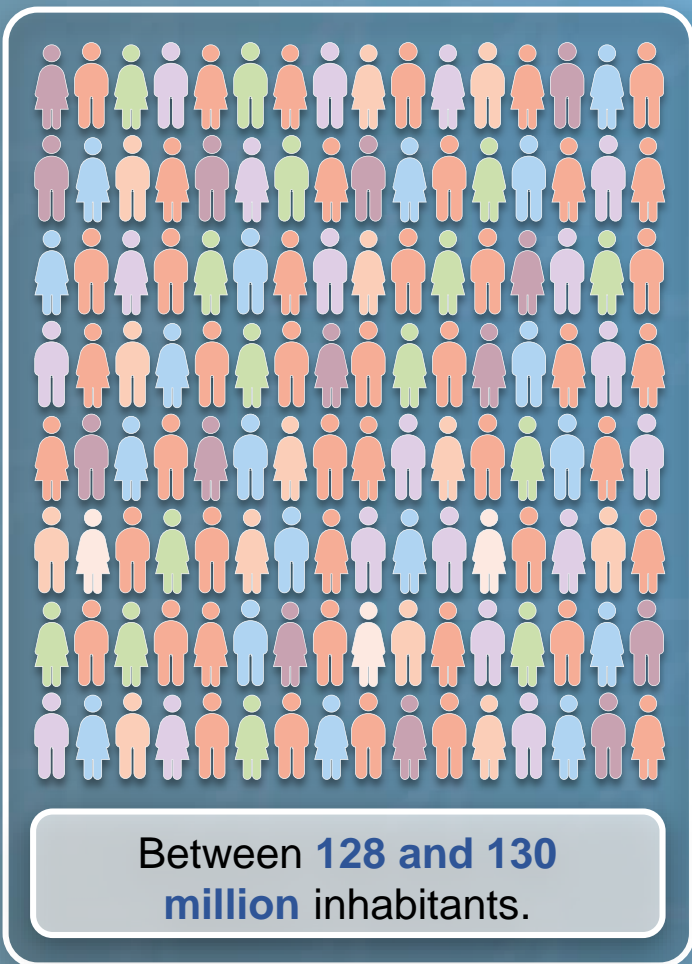
# Background of Censuses in Mexico

- The use of technology has allowed to speed up processes and to reduce the **time of results delivery**.
- For example:



# Planning the 2020 Census

- INEGI will carry out the 2020 Population and Housing Census. For that year it estimates to find:



Of which **35 million** are expected to be **inhabited**.





# Planning the 2020 Census

- Thus, the census operation will look to:



✓ Enumerate **the population and existing dwellings** in the country.



✓ Deepen the knowledge of **priority topics** with the application of a long questionnaire (sample).



✓ Obtain information of **optimum quality**.



✓ Deliver results **timely**.

- To achieve this, several technological innovations will be implemented, such as using mobile devices to collect data.
- This represents an important challenge for INEGI, given the size of staff structures and the rapid changes in technologies.



# Planning the 2020 Census

- For the planning of this event, INEGI will evaluate:

✓ The **methodological, conceptual and technical contributions** of previous statistical projects, mainly the **2010 Population and Housing Census**.



✓ The **experiences** obtained from the Census of Schools, Teachers and Students of Basic and Special Education 2013 (CEMABE), in matters of the **use of technology for data collection**.

- It will also consider the Principles and Recommendations for the 2020 Census Round, issued by the United Nations.



# Planning the 2020 Census

## Methodology

- The project is planned to be developed under the following methodological basis:



### Type of census:

- De jure



### Observation units:

- Residents of the national territory and private and collective dwellings



### Questionnaires:

- Short form
- Long form
- Social Assistance Accommodations



### Proxy respondent

- The head of the household, either woman or man, his or her partner or a resident of 18 years of age or older.



### Data collection period

- March 2020



### Special field operations

- Population in collective dwellings
- Foreign service Personnel
- Personalities
- Homeless population





# Planning the 2020 Census

## Methodology

- Additionally, the field operation will collect information of:



- Each of the localities **under 5 000 inhabitants**, applying about 100 questions to an appropriate informant.



- The characteristics of the urban environment of each of the blocks of localities of **5 000 inhabitants or more**.



# Planning the 2020 Census

## Methodology

- Regarding data collection methods, the following strategies will be implemented:



- **Internet self-enumeration.**



- **Telephone-assisted** interview.



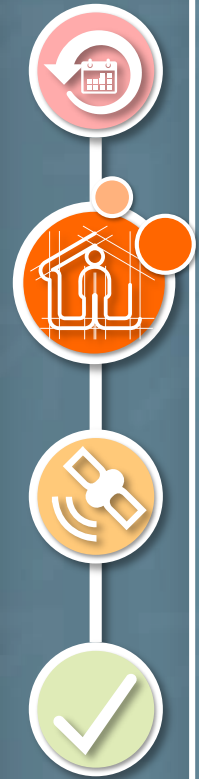
# Planning the 2020 Census

## Organization

- INEGI has a permanent structure in charge of the design and management of statistical information projects. The central structure is responsible of defining the operation strategies, coordinated and executed through the territorial structure, composed by:



- For the Census, temporary staff is hired in each CE and offices are established at municipal level.
- It is estimated that the operation structure will be of approximately **200 thousand people.**



# Planning the 2020 Census

## Organization

- Main activities established in the program:

### 2017

- Approach of census scenarios.
- Public consultation for questionnaires content and methodology.
- Definition of the census project.
- Tests of operational procedures.

### 2018

- Planning and execution of thematic tests.
- Definition of the conceptual framework and data collection instruments.
- Pilot census.
- Bidding for the purchase of mobile devices for data collection.

### 2019

- Statistical design of the census sample.
- Cartographical update in rural Basic Geostatistical areas.
- Statistical design of post-enumeration survey.
- Recruitment and selection of personnel.
- Training of operational staff.
- Beginning of communication campaign.

### 2020


- Data collection of urban environment characteristics and localities under 5 000 inhabitants.
- Launching of the Census.
- Post-enumeration operation.
- Information processing.
- Generation of results and figures release.
- Publication of results.





# Planning the 2020 Census

## Computer Assisted Personal Interviewing (CAPI)



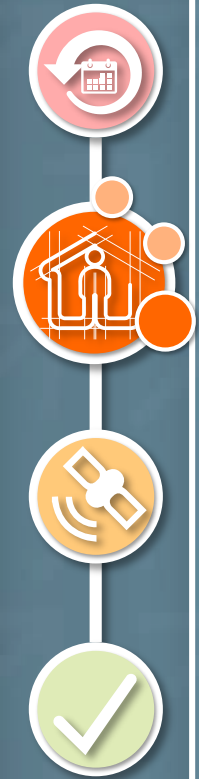
### Advantages

- Reduction in data collection times.
- Faster publication of results.
- Elimination of paper work.
- Implementation of certain data integrity controls.
- Online monitoring.
- Elimination of the traditional capture structure.



### Disadvantages

- High investment in mobile computing devices (MCD).
- Short life of MCD, as well as rapid changes in technologies.
- Exposure to robberies in high-risk places.
- Sensitivity to extreme weather conditions.
- Risk of technical failures.
- Requirement of additional information security measures.





# Planning the 2020 Census

## Computer Assisted Personal Interviewing (CAPI)

### Characteristics of computer equipment

#### Equipment used in previous events:

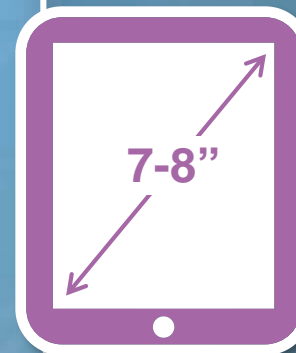


- Mini laptops with technical characteristics sufficient for their use in the field.
- The model has a solid and scarcely showy case, therefore unattractive for robbery.

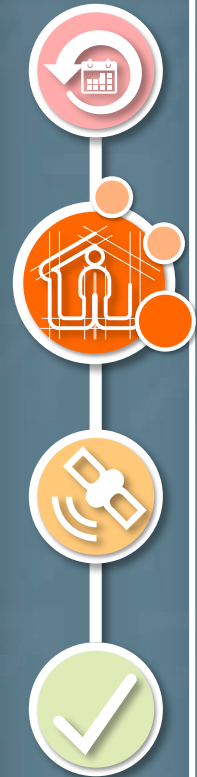
- While these have been useful in previous operations, INEGI has decided to look for cheaper and lighter equipment.



#### Equipment planned to be used for the 2020 Census:



- Tablets whose suitable characteristics will be determined from the results of technical and operational tests.



# Planning the 2020 Census

## Computer Assisted Personal Interviewing (CAPI)

### Subsequent use of the MCDs

- Technological changes, as well as the useful life and storage costs of equipment, make the use of the about 200 thousand MCDs impossible even in the next intercensal event.

### Possible solutions and alternatives

#### Bring Your Own Device (BYOD)



- ✓ Solves the problem of subsequent use.
- ✗ Technical complications from wide diversity of equipment.
- ✗ Information security implications arise.

#### Other projects and agreements



- ✓ Around 20% of MCDs will be used in other INEGI projects.
- ✓ Agreements with other government agencies will be sought.

#### CAPI + PAPI



Pen And Paper Interviewing in special cases:

- High risk areas.
- Equipment failure.
- Battery exhaustion.

# Planning the 2020 Census

## Self-enumeration alternatives

### Secondary collection strategies



Computer Assisted Telephone Interviewing (CATI)



Computer Assisted Web Interviewing (CAWI)



### In the following cases



Delivery of invitation if by the 3<sup>rd</sup> visit the interview has not been achieved.

If the informant makes the express request for self-enumeration.



Initial strategy in blocks with more than 75% of dwellings with Internet connection.

Zones with restricted access.



- INEGI is currently working on the appropriate operating procedures and tests to keep data collection times and coverage unaffected.
- The strategy will be tested in October 2017, also the application will be compatible with multiple devices.



# Georeferencing Statistical Information

## National Geostatistical Framework (MGN)

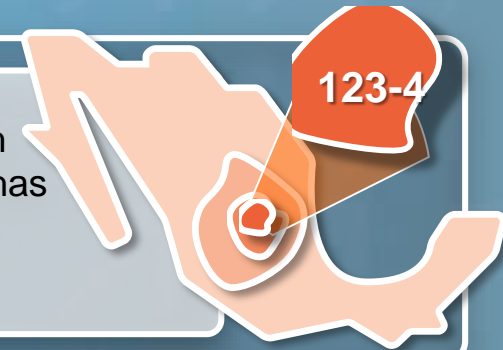
- Designed and created by INEGI in 1978, this framework georeferences statistical information of censuses and surveys.



- It is periodical updating guarantees the coverage and correct geographic reference of information, plus it has evolved to digital versions available for free online.



- In this system, each geostatistical area has a unique key in the national territory.



- Once data collection is achieved, it is used to publish results and geostatistical systems such as SCINCE\* and the National Housing Inventory.



\* 2010 System for the Consultation of Census Information.





# Georeferencing Statistical Information

## Use of QR Codes

### Lessons learned from the 2015 Intercensal Survey

- They allowed questionnaires control:
  - ✓ From reception and distribution in the field,
  - ✓ to their delivery to data capture centers,
  - ✓ to their storage in regional or state warehouses.



- They enabled linking each questionnaire to the dwellings in the building list, making it possible to monitor them in every stage, and to ensure the correct association of information and geographical areas.



### Plans for the 2020 Population and Housing Census

- Paper questionnaires (for exception cases) will have QR codes, which will be read through the camera of mobile devices for questionnaire control.



- Labels to be placed in dwellings will also have QR codes, to assign a unique key to each dwelling in the country, and therefore to allow unequivocal identification during verification and post-enumeration.



- Self-enumeration notices will have QR codes containing the URL to the census web system, as well as the user and password linked to the dwelling.





# Georeferencing Statistical Information

## Use of Global Positioning System (GPS)

### Dwellings location

- Using the GPS in MCDs, INEGI will register coordinates of dwellings during field operations.



- To overcome precision problems, Tests will be conducted during 2017, anticipating the correction of points to at least the correct block.

### Operations monitoring



- To monitor enumeration by verifying interviews are conducted in the assigned work areas.



# Georeferencing Statistical Information

## Geographic Information Systems



- To be a government entity responsible of both the official statistical and geographical activities, gives INEGI the advantage of being able to not only generate products that integrate statistical data and their geographical reference, but with the use of technological innovations, to also include advanced tools for consultation and analysis.

### 2010 System for the Consultation of Census Information (SCINCE)



- It allows to associate statistical information with its geographic space.
- It offers a series of sociodemographic indicators with disaggregation up to block level.

### 2016 National Housing Inventory



- GIS that integrates statistical information with a territorial vision, on dwellings, population and urban environment.
- It constructs indicators that characterize the dwellings and the population at different geographical levels.



# Conclusions

- INEGI has traditionally sought the incorporation of technological innovations to statistical project processes, to make them more efficient and improve data quality.
- For the 2020 Census, the use of mobile devices for data collection is one of the most important technological innovations planned.
- Tests will be taken to optimize the benefits of the innovations in terms of information production: reliability, opportunity and cost reduction.
- INEGI seeks the modernization of its processes, promoting actions that, complementary to the 2020 Census, contribute to the use of administrative records for statistical production.



# Thank you for your attention!



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