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Qualitative contribution of the electronic devices in the various stages of the 2013 census of Senegal

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PLAN

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Introduction

Round 2020 of census main objectives was to inform as many Sustainable Development Goals (SDGs).

Census provides the denominator for 96 of the 230 indicators of SDGs and several indicators of the African Union's Agenda 2063.

After Cabo Verde in 2010, Senegal in 2013 use the electronic devices for his census.

Changes are operate in every stage of the census in conclusion are noted main benefits.

1. Manual of procedures and organisation chart

A procedures manual was developed, which served as a guide

for coordination and for the eight census sections including the technology infrastructure section.

2. Acquisitions

A budget and timeline based on procurement have been developed.

Thus, during the preparatory phase, acquisition activities related to the use of information technology in the context of procurement are :

a. *Computer hardware specifications (PDA : personal digital assistant, computers etc.);*
b. *Specifications of the data transmission and processing system;*
c. *Software specifications.*

3. Recruitment

The recruitment process for collection staff has been completely decentralised.

The NSO predefined criteria : ability to handle the PDA, l, tablet PCs, etc.

The Information and Technology (IT) section has provided a data entry model to collect the necessary information from the application files.

4. Training of agents

Theoretical and practical training is done in a cascade on three levels:

✓*training of Regional Technical Coordinators and Heads of Regional Office of Statistic and Demography.*

✓*departmental coordinators and supervisors provided by the Regional Technical Coordinators.*

✓*enumerators and controllers, was held just before the start of data collection. It was carried out by the supervisors in their supervision area.*

5. Dematerialization of administrative and logistical activities

A database combining the list of field personnel and equipment deployed in the field was developed in three stages:

a) **The staff database**: developed from a hierarchical organization of census at the regional level.

b) **The equipment database**: each type of equipment is registered separately.

c) **Links are created at each hierarchical level between the personnel and equipment base.**

Data are linked at the time of team building and material distribution.

From this database, a certain number of documents are else automatically generated : *contracts, service certificates made and discharges of receipt of the material.*

Clearances are issued by the ICT (Information and Communication Technology) Coordinators and certificates of service issued by Supervisors from an interface.

Digital payments were made in a decentralized manner by an agreement with Postal National Office.

6. Design of collecting tools and IT applications

To harmonize the understanding of collection tools (questionnaires and applications) and operational monitoring ; manuals and sheets were developed for : *Enumerator, Controller and Supervisors.*

For these different staff, a manual for computer applications is also developed.

The applications developed:

a. *collection applications (pilot enumeration, enumeration, Post-Censal Survey : PCS, collection and PCS reconciliation);*
b. *control application;*
c. *census data transfer application; it consists of two sub-applications used by Supervisors: Supervisor application and departmental application;*
d. *web tracking application;*
e. *PCS matching application;*
f. *Other applications (recruitment, payment, material management, etc.).*

7. Mapping

It began with the evaluation of the cartographic database, the needs for support, in particular ICT, and Geographic Information System (GIS) capacity building for staff, and then recruitment and training activities for field staff are implemented.

In addition to teams of field cartographers, there is a management team, a technical unit and a digitization unit.

To carry out the mapping, it was deployed in the field: teams, supervisors, regional supervision and national management.

The technical unit was responsible for receiving the boards from the field, checking that all the documents accompanying the boards were complete.

The digitization unit then proceeded to digitize the Enumeration Areas (Eas), prepare the EAs cards, control cards and supervision cards and print them. The list of finalized concessions was then submitted to the ITS for loading into the PDAs.

8. The IT Infrastructure

Based on the choice of the Mobile Collection Facility, it was necessary to set up an IT infrastructure to support census data collection activities.

The system implemented required the recruitment of IT specialists responsible for all applications related to the collection, monitoring, transferring and processing of data resulting from the collection. The recruited team consists of a technical architect, developers and a database administrator.

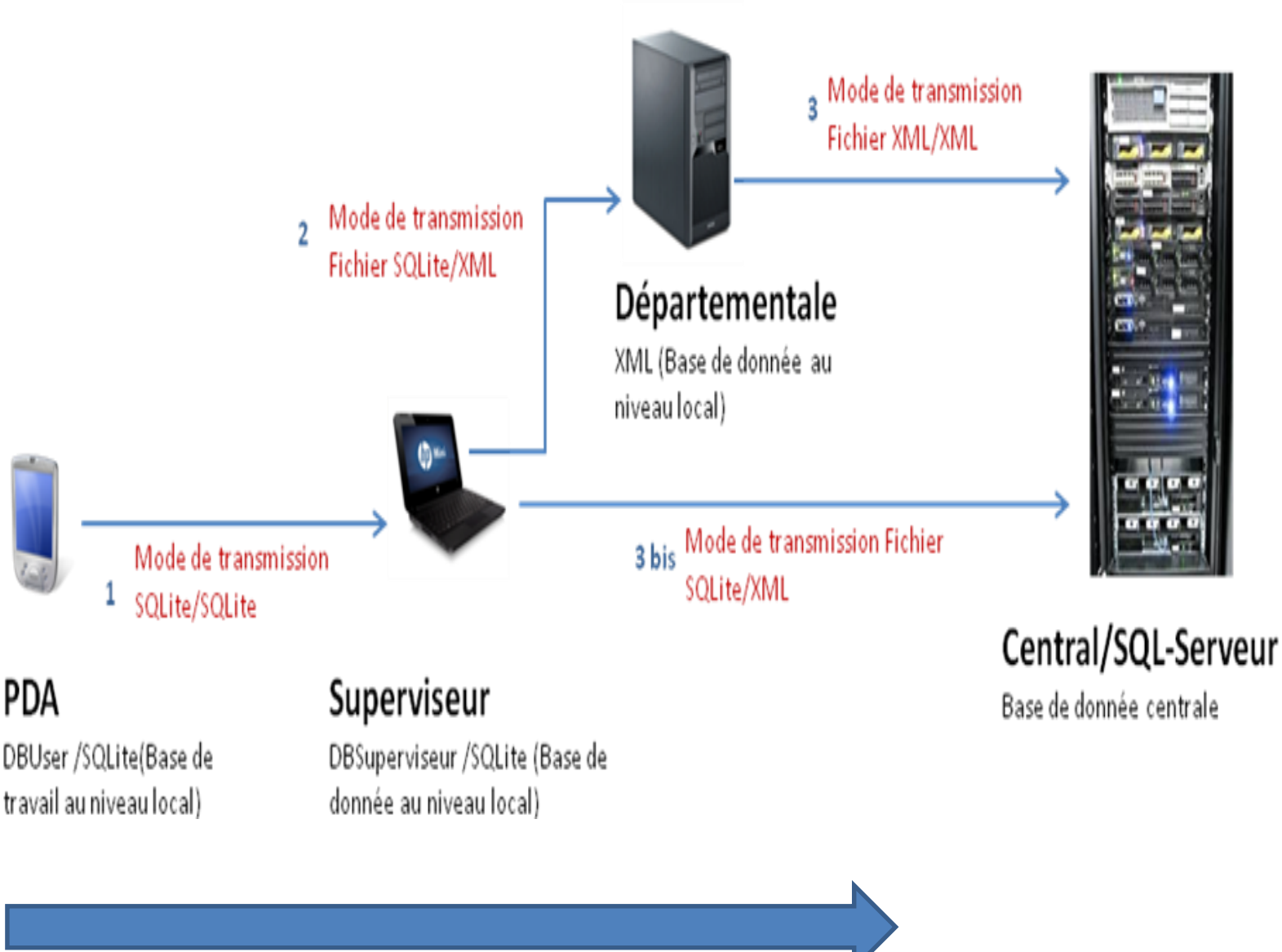
This section is responsible for coordinating and implementing the census IT operations. It was responsible for :

a. *Defining the IT architecture;*
b. *Provision of IT equipment (Computer hardware and software) in accordance with the chosen organisational system;*
c. *making the technical specifications for the acquisition of PDAs;*

a. *Development of applications with qualified developers;*
b. *testing applications;*
c. *defining a maintenance plan;*
d. *managing computer equipment;*
e. *helping with the output of results.*
f. *Monitor activities in real time from headquarters;*
g. *Implementation of an integrated information system (management of collected data, HR, payment management, material management).*
h. *Etc.*

Based on the IT architecture implemented, three levels of responsibility were retained as presented by the Figure : Data transmission diagram

Figure: Data collection & transmission diagram



9. Pilot Census

It made possible the test of content of the questionnaire and other collection instruments, but also the training of agents, the degree of understanding of the questions by the households surveyed and the estimated duration of the interviews.

For this census, an important part of the Pilot Survey is the preparation of the PDAs (loading the questionnaire into the PDAs) and their use in the collection, in particular the degree of control of the tool by interviewers.

A pre-pilot test, a pilot census and a post-pilot test were carried out. Applications have been updated and new applications such as the extensive EA sweep by a team of enumerators and the support of one enumerator by another.

The implementation of this activity made it possible to assess the quality of the entire pre-established organization and make the necessary adjustments.

10. COMMUNICATION AND AWARENESS RAISING

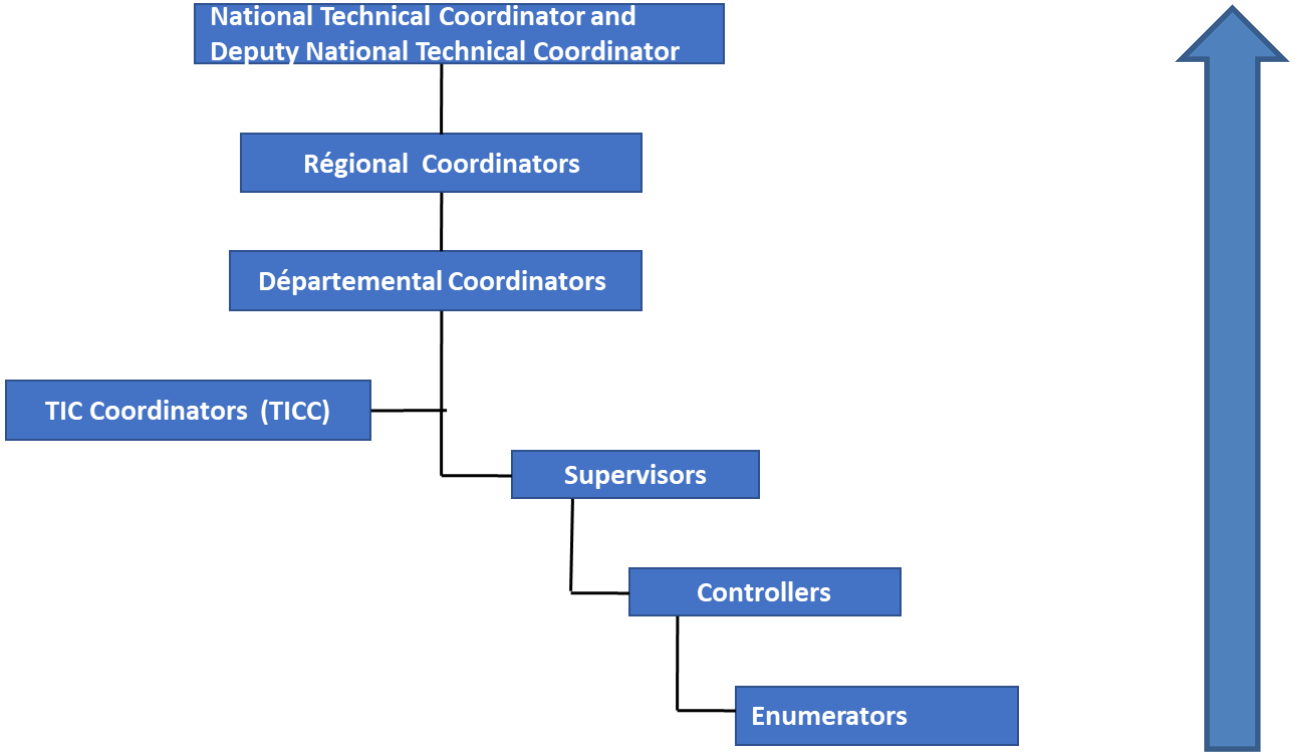
A Communication Plan was drawn up. It has three main activities:

1. *implementation of the global communication plan (media and non-media);*
2. *realization and production of communication supports;*
3. *development of the Web Portal and Intranet. that facilitates the coordination work between the different project teams and assessment of the quality of the data collected.*

To ensure the completeness of the collection, *a toll-free number* has been made available to the population to allow people who have not been enumerated to register.

11. Enumeration

The operational system is similar to the administrative division of the country. The following figure shows the hierarchy of the intervention items (bottom to up):



The 2013 census organization chart is marked by the integration of a new category of field staff - *ICT coordinators.*

The ICT Coordinators were responsible for assisting Enumerators and supervisors in collecting and reporting data to headquarters. The ICT Coodinators were responsible for:

a. *Load management and PDA updates;*
b. *Management and maintenance of IT equipment (PDA, ultraportable, departmental computer (data base), switch, solar charger, etc.);*
c. *Installation and use of the supervisor's application;*
d. *The installation and use of the departmental application;*
e. *Monitoring of all data transfers to the central level;*
f. *The various practical tips for those involved in the collection system.*

The monitoring team's

Throughout the data collection, their activity includes two (2) main components:

1. *Monitoring the evolution of collection;*
2. *Data plausibility check.*

12. The Post-Censal Survey (PCS)

The collection principles for the Coverage Survey are identical to those of the census, which allows comparability of data from the same geographical units from both operations.

The main objective of the Coverage Survey is to measure coverage errors and the quality of the information collected during the enumeration in order to allow for better correction.

Matching census and PCS data is part of post-census activities. This is an important step in assessing census data, particularly completeness. It is done in two phases:

- automatic matching using a computer algorithm and a distance-based method (first and last name) to compare individuals;
- and a manual pairing on the residues of the automatic pairing: a computer application is developed to facilitate the work of the pairing agents.

With automatic matching, more than 45% of individuals are matched.

At the end of manual matching, 72% of individuals, 82% of households and 95% of concessions were matched.

- **Field monitoring visits** are carried out to clarify and correct inconsistencies discovered at the time of matching.

Matching and processing of the PCS data made it possible to assess the coverage rate and quality of the census data.

13. Processing, storage , archiving and dissemination of census data

For data dissemination the technical team has developed:

- *Digital media for data dissemination;*
- *Accessible dashboards, portals and GIS platforms for the storage, analysis and presentation of spatial and non-spatial information.*

The technical team also documented and archived data and micro-data:

- *Documentation of the process;*
- *Archiving data on a dedicated platform.*

CONCLUSION

The use of ICTs in censuses has brought many benefits to the population and housing census in terms of quality, efficiency and effectiveness. Main advantages :

a. *Automatically check the consistency of several variables;**
b. *Make automatic jumps from some questions to others;**
c. *Correct information during the interview;**
d. *Answer all mandatory questions;*
e. *Monitor the data collection process in real time;**
f. *Redeploy agents to the areas at the time of collection;*
g. *Eliminate the data entry step of questionnaires,**
h. *Drastically reduce the printing of questionnaires and other documents**
i. *Make an electronic archiving of all documentation;*
j. *Avoid space constraints for the physical archiving of other documents*
k. *Drastically reduce logistics for transporting tools to the field;**
l. *Reduction of production times and dissemination of results;*

The other advantage of using technology support is the automation of certain activities such as recruitment of field staff, deployment and management of field staff, contracts, payment, etc.

Thus, the choice of a census with electronic device is currently recognized as a good option.

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