2023 Population and Housing Census

You Count, Be Counted

DQM | DATA QUALITY MANAGEMENT

DATA QUALITY MANAGERS

Training Manual

2023 POPULATION AND HOUSING CENSUS

MANUAL FOR DATA QUALITY MANAGERS

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The National Population Commission conducted the last Census in 2006 (17years ago). The 2006 Census was the first Population and Housing Census in Nigeria. The Nation is therefore making history by joining the league of Countries conducting fully digital Population and Housing Census in the '2020' round of Census.

The 2023 Population and Housing Census will therefore fulfill a constitutionally -mandated count of every person living in Nigeria. Census is the largest peacetime mobilization undertaken by the Federal Government, culminating in data vital to Nigeria's social, political, and economic systems. Census data also forms the statistical backbone of efforts to understand the consequences of policy decisions on communities. The Federal Government, policymakers, civil rights advocates, international organizations and others rely on this census data to develop and implement equitable policies and practices that are of benefit to the populace.

The success of Census largely depends on the quality of training, workflow, efficient field operations and commitment of Staff, as well as mechanisms for effective on-field Data Quality Management and editing. The Data Quality Managers are assigned with the task of ensuring that the census data collection process is smooth and the census data is correct, complete and consistent with the principles of the census. They provide the technical backstop on the functionality of the Personal Digital Assistant (PDA), coordinate all digital mapping activities in the state and also ensure the reliability of all data collected from the field.

Data Quality Managers will profile all field functionaries and Devices, assign Enumeration areas to functionaries an, ensure data collected from the field are validated and evaluated and also monitor the dashboard for data collection progress and total coverage. The Enumeration Areas flagged during data validation will be communicated to supervisors through the Quality Assurance Assistants for ground-truthing as applicable. The house listing data will be profiled as a baseline data for the enumeration exercise. During the Enumeration, the DQM monitors the Enumeration dashboard for coverage and will also work closely with the Quality Assurance assistants and other Monitors to select EAs strategically and randomly for quality checks.

1.2 Data Quality Management

Data quality Management is the process of ensuring that all components of a system run smoothly and efficiently 'end to end' with reference to accuracy, completeness, consistency, integrity and timeliness.

To this end the quality of the Census data will be managed relative to all components, composition and process of the Census activities, Personnel engagement and material deployment.

A Data Quality Management Strategy that involves the five pillars of data quality is developed for the Census to cover:

a. Personnel functionality
b. Census Components Profiling
c. Definition of Key Performance indicators of the Census process and activities
d. Reporting and monitoring Census process for effectiveness and quality
e. Intervention and Remedial actions towards repair and observed low quality.

1.3 Data Quality Management Structure/Workflow

Data Quality Managers are expected to ensure total area coverage, validate data collected and monitor other indicators for accuracy and consistency. The DQM ensures that all issues with data quality are communicated to the respective DQA and Supervisors who will, in turn, communicate the same to the Enumerator for appropriate corrections to be made. The Enumerator is expected to correct the errors and re-sync the data to the Cloud. This iterative process of data validation and error feedback to the Enumerators would continue from building and household listing to enumeration until the end of the field data collection. It is expected that most of the errors would have been corrected at this stage of data processing and thus ensure output of data that measures up to international quality and integrity

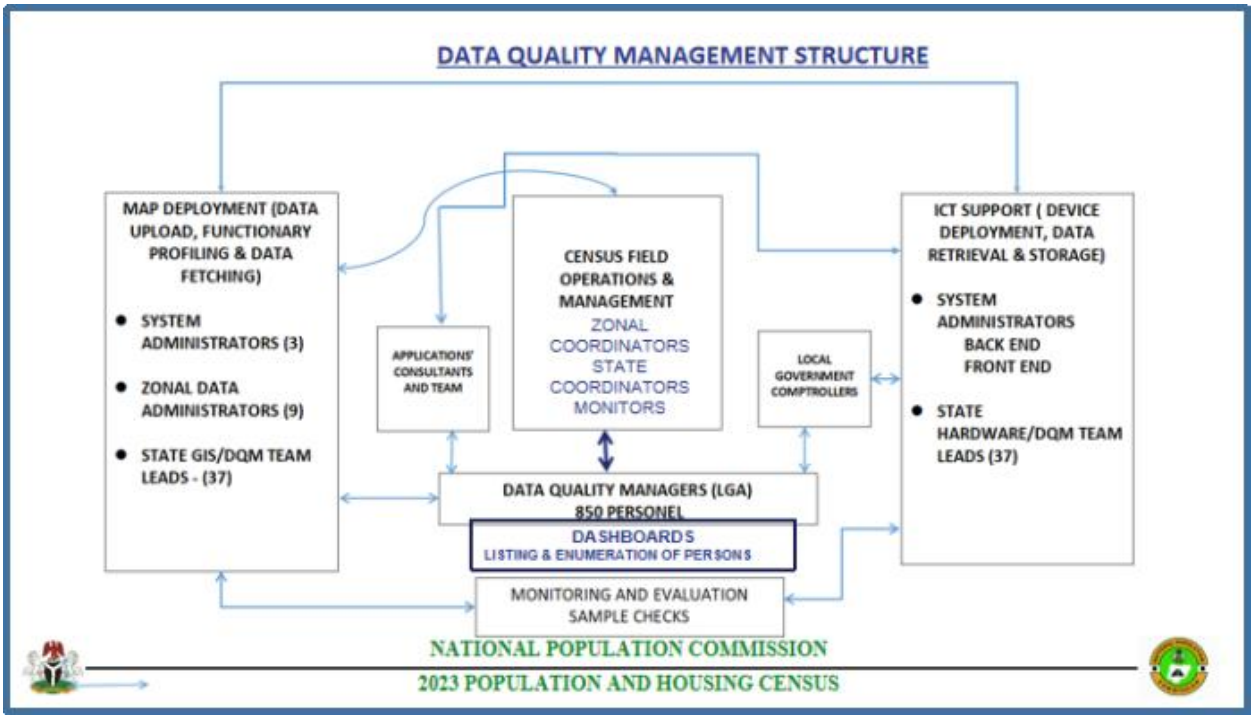


Figure 1: Data Quality Management Structure

The National Population Commission Data quality management team monitors the Census operations in an hierarchical structure as it deals with the Spatial and Statistical data collection and storage.

1. Pre-Field:
    a. Map deployment, upload functionary Deployment and data fetching. This is done through National (System Administrators), Zonal, State and the Focal Data Quality Managers.
    b. Device Deployment: Through ICT Support.
2. Field:
    a. Census Field Operations and Management: The DQM works with the Census management team to ensure Data quality
    b. The Monitoring and evaluation team works with the DQM to mitigate envisaged problems
    c. The DQM at the LGA and Focal Area level monitors Data collection, synchronization to the servers, progress and coverage through dashboards during building numbering and Household listing as well as during enumeration of persons

3. Post-Field: The DQM ensures total coverage from the micro EA level i.e all buildings are verified, all households are listed and all persons within each household listed are enumerated duly. He/She also ensures all materials are retrieved, data backed up and reports generated to that effect.

1.3.1 **Functions** and Responsibilities of Data Quality Management Team

The functions and responsibilities of members of the Data Quality Management Team includes;

National DQM Coordinator

i. Coordinates the activities of the National Data Quality core team.
ii. Trains and deploy DQMs to the field
iii. Update or communicate with the management on the progress of Census Data Quality Management.
iv. Liaise with Zonal Data Quality Managers (ZDQMs) on workflow and other DQM Activities.
v. Send regular reports to the Census Management Technical Team
vi. Ensure all logistics to be used by the ZDQM, SDQM (State Data Quality Managers) and FDQM (Focal Data Quality Managers) are delivered timely to all States and LGAs.

Zonal Data Quality Managers (ZDQMs)

i. Furnishes the State DQM with the Cartographic frame of the State.
ii. Ensure the quality and upload of all spatial data (Maps) within the zone.
iii. Ensure all devices and materials distributed to the zone arrive in each state and LGA on time.
iv. Ensures the functionalities of all devices.
v. Collate and compile profiling records across the zone.
vi. Coordinate the activities of state DQM across the zone.
vii. Collate all reports and deliverable from all state leads in the zone and as at when due.
viii. Responsible for technical troubleshooting of all issues related to the spatial data/frame in the zone, i.e., building overlap, boundary adjustment etc.

ix. Intermediary between NCDQM and State DQM.

x. For all technical cases of emergency, the zonal DQM is the first point of call for the state DQM.

xi. Coordinate all levels of DQM, QAA and Supervisors' specialized training within his/her zone.

xii. Disseminate training slide/materials to all states within his/her zone.

State Data Quality Managers (SDQMs)

i. Content edits/checks
ii. Work scope and complete coverage
iii. Tablet provisioning-Spatial Data, Applications and Mobile data
iv. EA profiling & device deployment
v. Hardware Management
vi. Software/ applications management
vii. Data transfer, safety and security (internet connectivity, timely syncing of data, validation of synced data)
viii. Device damage or loss (Disaster recovery)
ix. Enumeration tracking Dashboard management
x. Compiling of Validation Report for the State
xi. Retrieval of tablets (and other returnable materials)
xii. Field data management

Focal Data Quality Managers (FDQMs)

i. Tablet Provisioning-Spatial Data, Applications and Mobile data.
ii. EA profiling & device deployment.
iii. Hardware Management.
iv. Software/applications management.
v. Data transfer, safety and security (internet connectivity, timely syncing of data, validation of synced data).
vi. Device damage or loss (Disaster recovery).
vii. Enumeration tracking Dashboard management.

viii. Validation of building numbering and household listing data.

ix. Enumeration closure and clearance of functionaries.

x. Retrieval of tablets (and other returnable materials).

xi. Field data management.

xii. Ensure work scope and complete coverage in assigned EAs.

xiii. Liaise with M&E Officers on sample checks

1.3.2. DQM OPERATIONAL ROLES IN SUMMARY

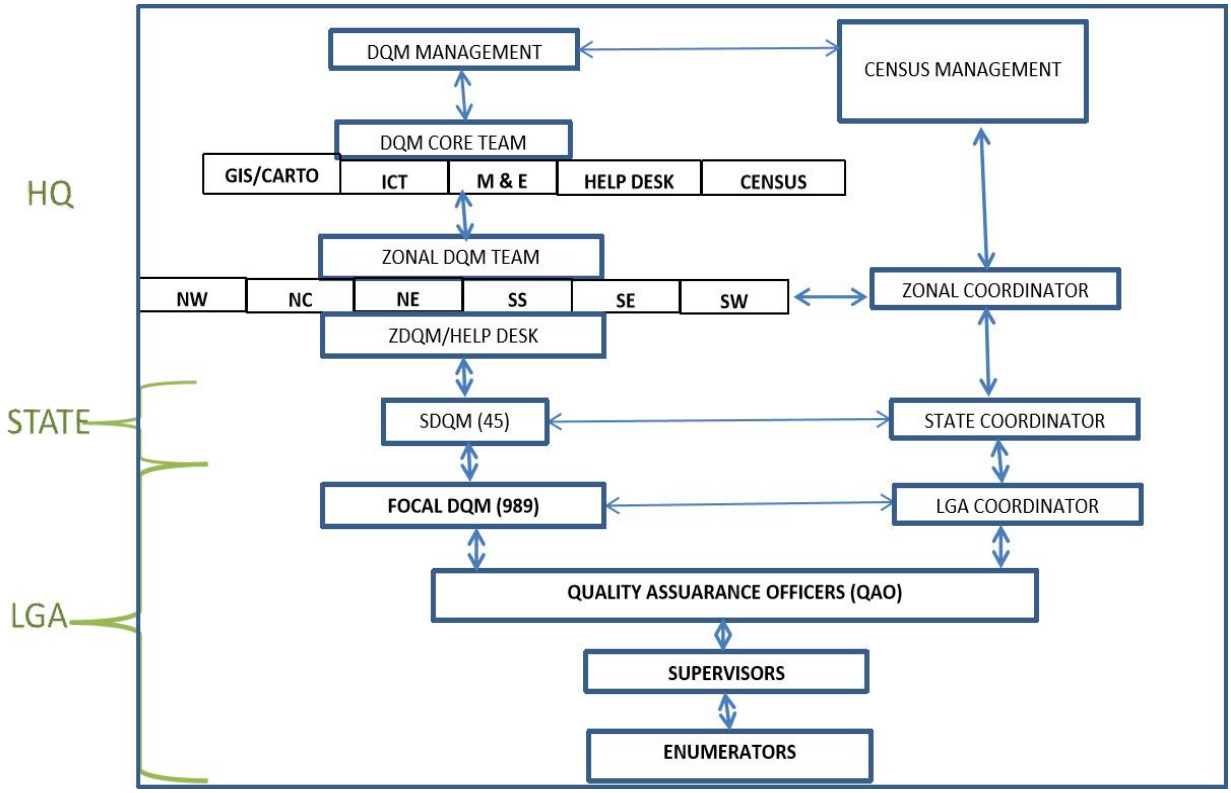
DQM PERSONNEL	ROLES
DQM MANAGEMENT	**DATA QUALITY & TECHNICAL POLICY FORMULATION**
DQM CORE TEAM	**DQM POLICY FORMULATION, EXECUTION & ADMINISTRATION MAP DEPLOYMENT, DEVICE DEPLOYMENT, HQ DASH BOARD MONITORING & SYSTEMATIC SELECTION FOR QUALITY CHECK, NATIONAL DQM HELP DESK.**
ZONAL DQM TEAM	**ZONAL MAP DEPLOYMENT, ZONAL DEVICE DEPLOMENT & TRACKING, ZONAL DASH BOARD MONITORING, DAILY REPORT GENERATION & COLLATION, SYSTEMATIC QUALITY CHECK DESIGN & ZONAL DQM HELP DESK**
STATE DQM	**STATE MAP DEPLOYMENT, STATE DEVICE DEPLOMENT & TRACKING, STATE DASH BOARD MONITORING, DAILY REPORT GENERATION & COLLATION & SYSTEMATIC QUALITY CHECK**

FOCAL DQM	**PROFILING, EA ASSIGNMENT, TABLET PROVISIONING, TROUBLESHOOTING, DATA VALIDATION, GROUND TRUTHING REPORT VALIDATION, DATA PASS TO ENUMERATION DASHBOARD, COVERAGE MONITORING, DAILY REPORT GENERATION, SYSTEMATIC FIELD CHECK AND CORRECTION INCIDENCE, MATERIAL RETRIEVAL SIGN OFF, COVERAGE SIGN OFF & FUNCTIONARY CLEARANCE**

QAO	**A**DMINISTRATIVE/TECHNICAL SUPERVISION AND COMMUNITY ENTRANCE COVERAGE MONITORING SYSTEMATIC FIELD CHECK GROUNDTRUTHING OF FLAGGED EAs DAILY REPORT GENERATION DEVICE TROUBLESHOOTING MATERIAL COLLECTION FROM DQM AMD LGA COORDINATOR FOR DESGNATED ARE A OF COVERAGE. MATERIAL DISTRIBUTION TO SUPERVISORS WITHIN DESIGNATED AREA OF COVERA GE MATERIAL RETRIEVAL AND SIGN OFF ON SUPERVISORS AFTER ENSURING TOTAL CO VERAGE**.**

1.3.3.DQM FIELD OPERATIONS

FIELD FUNCTIONARIES	ROLES
SUPERVISORS	ADMINISTRATIVE SUPERVISION AND COMMUNITY ENTRANCE MATERIAL DISTRIBUTION & RETRIEVAL COVERAGE MONITORING GROUNDTRUTHING WITH QAO DAILY REPORT GENERATION SYSTEMATIC SPOT CHECK
ENUMERATORS	LISTING AND ENUMERATION



1.3.4 Guiding rules for a Data Quality Manager

A Data Quality Manager:

1. **Secrecy:** Shall be **under oath** of secrecy and, therefore, is not expected to share any part or whole data with unauthorized persons at any level. He or She is **not permitted** to provide any data to anybody outside the authorized PHC management team;
2. **Diligence:** Shall NOT leave his/her area of assignment without prior permission from his/her immediate supervisor. Your engagement as a DQM is full time. Abandoning your post before completion of fieldwork will amount to gross irresponsibility and misconduct and will make you liable to be exempted from future participation.
3. **Timeliness:**
4. **Respectfulness (Mutual Conduct)**

1.3.5 Offenses and Penalties for a Data Quality Manager

Under section (20) of the National Population Commission Act CAP N67, Laws of the Federation of Nigeria, 2004:

(1) Any person, being a person employed for any of the purposes of this Act, who without lawful authority, publishes or communicates to any person, otherwise than in the ordinary course of his duties, any information acquired by him in the course of his duties, is guilty of an offense under this section and liable on conviction to a fine of ten thousand naira or to imprisonment for a term of three years or to both such fine and imprisonment.

(2) Any person, being in possession of any information which to his knowledge has been disclosed in contravention of this Act, or who publishes or communicates such information to any person, is guilty of an offense under this section and liable on conviction to a fine of ten thousand naira or imprisonment for a term of three years or to both such fine and imprisonment.

(3) Any person who, in the execution of any other purpose or duty under this Act, fails to comply with or contravenes any other term or condition of his oath, is guilty of an offense under this section and liable on conviction to a fine of ten thousand naira or to imprisonment for a term of three years or to both such fine and imprisonment.

Under section (23) of the National Population Commission Act CAP N67, Laws of the Federation of Nigeria, 2004:

Any person who willfully and without lawful authority destroys, defaces or mutilates any form, notice or other document containing information obtained in pursuance of the provisions of this Act or destroys, obliterates, alters or damages any sticker containing the number of the house pasted on the premises for the purposes of the census or other surveys, is guilty of an offense under this section and liable on conviction to a fine of ten thousand naira or to imprisonment for a term of three years or to both such fine and imprisonment.

Under section (5) of the Cybercrimes (Prohibition, Prevention, etc.) Act, 2015

(1) Any person who, with intent, commits any offense punishable under this Act against any critical national information infrastructure, designated pursuant to section 3 of this Act, shall be

liable on conviction to imprisonment for a term of not more than 10 years without an option of fine.

Under section (6) of the Cybercrimes (Prohibition, Prevention, etc.) Act, 2015

(1) Any person, who without authorization, intentionally accesses in whole or in part, a computer system or network for fraudulent purposes and obtain data that are vital to national security, commits an offense and shall be liable on conviction to imprisonment for a term of not more than 5 years or to a fine of not more than N5,000,000.00 or to both fine and imprisonment.

(2) Where the offense provided in subsection (1) of this section is committed with the intent of obtaining computer data, securing access to any program, commercial or industrial secrets or classified information, the punishment shall be imprisonment for a term of not more than 7 years or a fine of not more than N7, 000,000.00 or to both such fine and imprisonment.

(3) Any person who, with the intent to commit an offense under this section, uses any device to avoid detection or otherwise prevent identification or attribution with the act or omission, commits an offense and shall be liable on conviction to Unlawful access to a computer. imprisonment for a term of not more than 7 years or to a fine of not more than N7,000,000.00 or to both such fine and imprisonment.

(4) Any person or organization who knowingly and intentionally traffics in any password or similar information through which a computer may be accessed without lawful authority, if such trafficking affects public, private and or individual interest within or outside the federation of Nigeria, commits an offense and shall be liable on conviction to a fine of not more than N7, 000,000.00 or imprisonment for a term of not more than 3 years or both such fine and imprisonment.

1.3.6 Requests for Data by Unauthorized Persons outside the 2021 PHC Management

Being under oath of secrecy, you are not authorized to share any information to unauthorized persons as a Data Quality Manager except the Census Management Team via the approved communication channel.

"*I am not permitted to share / divulge any information with anybody except authorized persons who are part of the Census administration".*

CHAPTER TWO: CENSUS CONCEPTS AND DEFINITIONS

2.0. Introduction: The Data Quality Manager in the Year 2023 Population and Housing Census plays a dual role of a Technical Trainer and Quality Manager. It is therefore very important that the DQM should understand the basic Concepts and definitions of the Census process as well as the CAPI operations**.**

2.1 Population and Housing Census

"A population census is the total process of collecting, compiling, evaluating, analyzing and publishing or otherwise disseminating demographic, economic and social data at the smallest geographical level appropriate pertaining, at a specified time, to all persons in a country or in a well-delimited part of a country. A housing census is the total process of collecting, compiling, evaluating, analyzing and publishing or otherwise disseminating statistical data relating to the number and condition of housing units and facilities as available to the households pertaining, at a specified time, to all living quarters and occupants thereof in a country or in a well delimited part of a country."

By definition therefore, the essential features of a population and housing census require that each individual person and each building is enumerated separately and only once. The census operation is confined to a well-defined territory and reference period.

2.2 Census Reference Period

A census night is the night immediately before the first day of enumeration. It is the night set for enumeration of the homeless persons. The census reference period is the time from the zero hour (00:00) of the first enumeration day to the midnight (24:00hrs) of the last enumeration day. The time of visit by an enumerator for an interview must therefore be within the zero hour of the first day (…… , 2023) to the midnight of the last day (……. , 2023) assigned for the census enumeration. This means that:

'Children born up to the time the enumerator comes to the household are to be enumerated, but children born after the enumerator has completed the household, even if the birth occurred within the census enumeration period, should not be enumerated.

Similarly, persons who died within census enumeration period, but before the enumerator come to the household are not to be included, and any death that occurred after the enumerator has completed the household is not to be erased even if it occurred within the census enumeration period but after the visit of the enumerator.

2.3 Locality

Figure 2.1: Locality Satellite Image Map

The UN recommends that for census purposes, a locality should be defined as a distinct population cluster (also designated as inhabited place, populated center, settlement and so forth) in which the inhabitants live in neighboring sets of living quarters, has a name or a locally recognized status.

It thus includes fishing camps, hamlets, mining camps, ranches, farms, markets, towns, villages, cities and many other population clusters that meet the criteria specified above.

Note: Wards, quarters or housing estates within a town or city should not be regarded as a locality. Fragmentation of Localities may hinder the rapid development of an LGA as major developmental intervention programmes by Government/NGO work along the path of population. More Localities does not translate to higher population for the LGA.W

It is a geographical phenomenon that localities or settlements urbanize over time and merge with one another. For instance, a settlement with a name and a traditional ruler may exist at a

fairly short distance from another bigger settlement some time ago, with the passage of time, the bigger settlement may expand and finally subsume the nearby settlement and the smaller one is now merged with or enclosed within the bigger settlements. Both the big and the smaller settlements should retain their distinct identities (e.g., name etc.) as localities.
In another instance, some new towns are either created by the government or may have started spontaneously and have developed into settlements over time, this should also be regarded as localities.

However, it should be noted that in big cities and towns where expansion has taken place naturally over a period of time, no subsection or wards within such cities should be regarded as a locality.

The following types of localities are identified for the purpose of census enumeration:
a. **Sub-primary locality:** A sub-primary locality is a settlement which does not independently exist on its own in terms of ruler-ship, social, political and economic activities. There is always a substantial distance separating it from the parent settlement. For avoidance of doubt the activities for which they depend on the bigger settlement should be specified.
b. **Primary locality:** This is a locality that has been in existence and known by one distinct name and the inhabitants consider themselves as a unit. For example, Orile Agege in Agege, Fegge in Onitsha, Kurna-Kwaciri in Fagge, Wuse in Abuja etc.
c. **Secondary locality:** A secondary locality is a settlement with two or more contiguous primary localities within an LGA, Example, Agege comprises Orile Agege, Tabon-tabon etc. Onitsha comprises Fegge, Odoakpu, Woliwo etc, Fagge expanded to cover Sabon Gari, Rigiyar Lemu, etc.
d. **Tertiary locality:** A tertiary locality is a settlement comprising two or more secondary or primary localities that has expanded across two or more LGAs.
Each of the categories have been clearly identified and geocoded, during the EAD.

2.4 Building

A building is any freestanding structure comprising one or more rooms, covered by a roof or not and may or may not be enclosed within external or dividing walls. A building may be used

for residential, commercial, or industrial purposes. It can therefore be a factory, shop, dwelling apartment, garage etc. A building may be used for multiple purposes.

Figure 2.2: Typical Buildings used for both Residential and Commercial Purposes.

Sometimes Terrace/Chain Buildings are found along a street. This is a row of buildings/houses that are joined to each other. "Row of terraced houses (with at least 3 attached or connected dwellings each with separate access to the outside) should be identified separately" (UN Principles and Recommendations on Population and Housing Censuses.)

2.5 Type of Structure

There are different types of buildings Structure for the purpose of census. These are:

1. Bungalow (Detached): A building without an upper floor and is not attached in any way to another building.

2. One-storey (Detached): A building with one upper floor and is not attached in any way to another building.

3. Two-storey (Detached): A building with two upper floors and is not attached in any way to another building.

4. Multiple-storey (Detached): A building with three or more upper floors and is not attached in any way to another building.

5. Bungalow (Semi-detached): A single-family home that shares a single wall with the next building.

Figure 2.3: A Typical example of a detached house (Bungalow)

6. One-storey (Semi-Detached): A building with one upper floor that shares a single wall with the next building.

7. Two-storey (Semi-Detached): A building with two upper floors that shares a single wall with the next building.

8. Multiple-storey (Semi-Detached): A building with three or more upper floors that shares a single wall with the next building.

9. Terrace: A row of buildings/houses that are joined to each other.

Figure 2.5: Terrace/Row Buildings

2.6 Building Use

Buildings have various uses which can be residential only, mixed use, institutional accommodation or non-residential. These four broad categories have been divided into buildings of possible uses.

2.7 Compound

A compound is a building or group of buildings usually enclosed or not by a wall and having one or more structural units with a common entrance. In some parts of Nigeria, housing units or structures are traditionally located within a compound. Examples of compounds and adopted documentation reference are illustrated below:

If a building and a boy's quarter are enclosed within an external wall or fence each structure should be assigned a number. If a group of huts fenced/not fenced round with a common entrance are in a compound, the structures should be numbered separately and use of each building clearly stated. See figure 2.7

Figure 2.7: Typical Compounds

Clustered buildings within a fenced or an unfenced compound but with different ownerships (e.g., a fenced or unfenced Estate) should be treated as individual buildings.

2.8 Household

A Household consists of a person or group of persons living together usually under the same roof or in the same building or compound, who share the same source of food and recognize themselves as a social unit with a head of household. They may or may not be related by blood.

The criteria for categorizing a household are:

i. Living under same roof/compound
ii. Seeing themselves as a unit
iii. Sharing of same catering arrangement
iv. Recognizing one adult member as head
v. May or may not be related by blood

A Regular household usually recognizes one of its members as the head; shares a common catering arrangement and members conduct themselves as a social unit.

A one-person household consists of a single individual, man or woman. A multi-person household consists of two or more members. An example of a regular household can be a man and his wife, with or without children, relations and house-helps if they follow the above criteria. All members of a household are not necessarily related by blood or marriage because sometimes house helps and visitors can be a part of the household. Similarly, not all those related by blood and living in the same building or house or compound are necessarily members of the same household if they do not recognize one of them as the head or do not eat from a common pot.

A man may have more than one wife, with some of the wives living in different buildings (or outside) the same compound. Where they live in the same compound and prepare their food/meals separately, but recognize the man as the head of household, they are treated as one household. In a situation where one (or some) of the wives do not live with the man in the same building/compound, both should be treated as different households.

Two or more people (related or not related to each other) sharing a room or apartment are regarded as a household if they share catering arrangement and one of them is recognized as a head of household. If they feed separately or each of them recognizes himself as independent head of household, then each of them is a separate household in spite of the fact that they sleep and live inside the same room.

Married children with their spouses and children, living in the same household with their parents, but having separate catering arrangements are separate households. Also, two brothers who live in the same house with their wives and children may form separate households, depending on their catering arrangements and agreement on one head. (In other words, they are separate households if they do not share common catering and they do not recognize one of them as the

head). A household is not necessarily the same as a family. A family compound may, for example, contain family members of different households; a father's household may be next to that of uncles or brothers or even the children. Depending on the composition, a household can be greater or lesser than what constitutes a family.

2.9 Head of Household

The head of household is a member of a household whom the other members of the household recognize as such. S/he is usually an adult and is the one who usually bears the major responsibility of maintaining the household and takes decisions on its behalf. They can be male or female.

2.10 Enumeration

Enumeration is the process of interviewing all the members of a given population and collecting socio-demographics and other information about each person.

2.11 Enumeration Area

An Enumeration Area (EA) is an area carved out of a bigger locality or a group of localities with well-defined and identifiable boundaries. It is an area a team of enumerators is expected to cover during the census. The essence of carving out these units is to avoid any omission or duplication of count of people and households during enumeration. An EA that is made up of more than one locality is referred to as multi-locality EA. Locality that consists of more than one EA is known as a multi-EA locality while a locality having just a single EA is regarded as a single EA locality.

2.12 Supervisory Area

A supervisory area (SA) is made up of 3-6 contiguous EAs.

2.13 Special Population

These are the homeless household, homeless persons, nomadic households, transient persons, migrant fishermen, migrant farmers, mobile hunters, refugees and the internally displaced persons who are enumerated on census night.

2.14 Special Enumeration Area

A special EA is one delineated as such when due to certain circumstances, the stipulated parameters for delineation cannot be achieved. e.g., when challenges like having to traverse over a long distance between settlements to achieve the population threshold makes the EA larger than what the enumerators can feasibly cover within a reasonable Census period. In such a case, once a population threshold of 250 is achieved, the EA should be delineated and documented as Special EA.

2.15 Questionnaire (Form)

A questionnaire (form) is a survey document, which contains a series of questions with open spaces for entering responses. It is the form used to collect and enter detailed and summary information about people and buildings. The Census 2023 will be conducted with electronic questionnaire.

2.16 De-Facto Census

A de-facto census is a population census in which people seen are enumerated according to where they stayed/slept on the night preceding the day of the enumerator's visit. The 2023 Census is a de facto census. In other words, people not seen are not enumerated and those seen are enumerated in their respective households.

2.17 Post Enumeration Survey (PES)

This is a sample survey carried on a fraction of the population after the census had taken place to measure the quality of the full main census. For the purpose of the 2022 Population and Housing Census, it will be conducted a few weeks after the main census enumeration in selected EAs. In addition to questions used in the main census, there are certain additional questions

2.18 Census Entity Coding

It is a numeric system of labeling Census areas or entities. The codes are used in Enumeration Area Demarcation (EAD) exercise to systematically and uniquely identify the States, LGAs, Localities, Supervisory Areas and Enumeration Areas (EA), Buildings, Household and Persons. **DQMs are expected to have a vivid understanding of these codes and identities for ease of Data tagging to the different Census entities.**

S/No	Census Entity	No of Digits	Coding	Remark
1	Geo- Political Zone	1	1-6	There are six geo-political zones in Nigeria
2	State	2	01-37	There are 37 States in Nigeria
3	Local Government Areas (LGA)	3	001-774	There are 774 LGAs in Nigeria
4	**Supervisory Areas** Code	4	0001 -NNNN	All Supervisory areas are numbered serially from 0001 to the last SA within an LGA
	ID	10	0000000001 -	Geo-political zone code (1) + State code (2) +LGA code (3) + SA code (6) = 12
5	**Enumeration Area** Code	7	0000100 - nnnnnnn	All EAs are numbered serially from 0000100 to the last EA within the LGA. However, the last 2digits is used to identify EAs with more than one locality. Any EA code that ends with '00' is carved out of a multi-EA locality or it is a single locality EA. But when an EA code ends with a whole no

				e.g., 0000102 it is a multi-locality EA. The EA in this example is the 2nd locality within a multi locality EA
	EA ID	13	0000000000100-nnnnnnnnnnnnn	Geo-political zone code (1) + State code (2) +LGA code (3) + EA code (7) = 13
6	**Building** Code	3	001 - nnn	Coded serially from the first building to the last building within an EA
	Building ID	16	0000000000000000 - nnnnnnnnnnnnnnn	Geo-political zone code (1) + State code (2) +LGA code (3) + EA code (7) + Bldg. Code (3) = 16
7	**Household** Code	2	01 - nn	Coded serially from the first household to the last household within a building
	Household ID	18		Geo-political zone code (1) + State code (2) +LGA code (3) + EA code (7)+ Bldg Code (3) + HH code (2) = 18
	Persons Code	2	01 -nn	Coded serially from ist persons to the last one within a household
	Persons ID	20	00000000000000000000 - nnnnnnnnnnnnnnnnnnn	Geo-political zone code (1) + State code (2) +LGA code (3) + EA code (7)+ Bldg Code

				(3) + HH code (2)+ Persons code = 20
8	**Locality**	6	001000 - nnnnnn	Coded serially from the first locality to the last locality within the LGA. The first 3digits is the Primary Locality serial number and the last 3digits is the serial number of subprimary localitiy/ies within the Primary Locality. When the last 3digits are 000 then the locality is a Primary stand alone. When it has 001 or any whole number, eg 001033 it means it is a Subprimary locality to another locality e.g the first locality in the LGA of the example above
	Code			
	Locality ID	12	000000001000 - nnnnnnnnnnnn	Geo-political zone code (1) + State code (2) +LGA code (3) + Locality code (6) = 12

CHAPTER THREE: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEM (GIS) AND COMPUTER ASSISTED PERSONAL INTERVIEW (CAPI) OPERATIONS

3.0. Introduction: A DQM will make use of GIS operations to view spatial data and integrate spatial and attribute data during the Census Process. He/She will also during the training of functionaries be the Technical trainer and instructor on CAPI operations. It is therefore important that every DQM should be able to work in a GIS environment and understands the Computer Assisted Interview operations and also help with trouble shooting on the Devices during Census field work.

3.1. Geographic Information System (GIS)

This can be defined as an organized system of **computer hardware, software, procedures and personnel** designed to support the **capture, management, manipulation, analysis and display** of spatially referenced data to solve planning and management problems. In a nutshell, GIS is an automated information system that is able to compile, store, retrieve, analyze, and display mapped data, which are spatially referenced to the Earth.

3.1.2 Components of Geographic Information System (GIS)

A working GIS integrates five key components: hardware, software, data, people, and methods.

⇒ **Hardware**

This is one of the physical requirements of GIS, it is a computer system which the GIS operates on. Today, GIS software runs on a wide range of hardware types, from centralized computer systems, desktop computers, Laptops, Palmtops, and PDAs used in stand-alone and portable devices or networked configurations.

During the Census 2023, the DQM will use Laptops, PDAs and GIS Enterprise infrastructure.

⇒ **Software**

GIS software provides the scope of functionality for accessing, storing, transferring, processing and displaying Geographic information. Examples of GIS software are ArcGIS, QGIS, GrassGIS, etc.

The DQM will be exposed to:

⇒ ArcGIS interface

⇒ Spatial and Enumeration Dash boards

⇒ A Graphical User Interface (GUI) for easy access to tools

Software can be divided further into:

⇒ **Operating Systems:** The software infrastructure and common services, which communicate between hardware and applications. Examples are Microsoft Windows, Linux, Android, iOS.

⇒ **Applications:** These are Software developed to improve user productivity, solve a problem, or provide entertainment. Examples are Microsoft Office, ArcGIS, CSEntry, CensusPad, SPSS etc. The main software for GIS operations is ArcGIS.

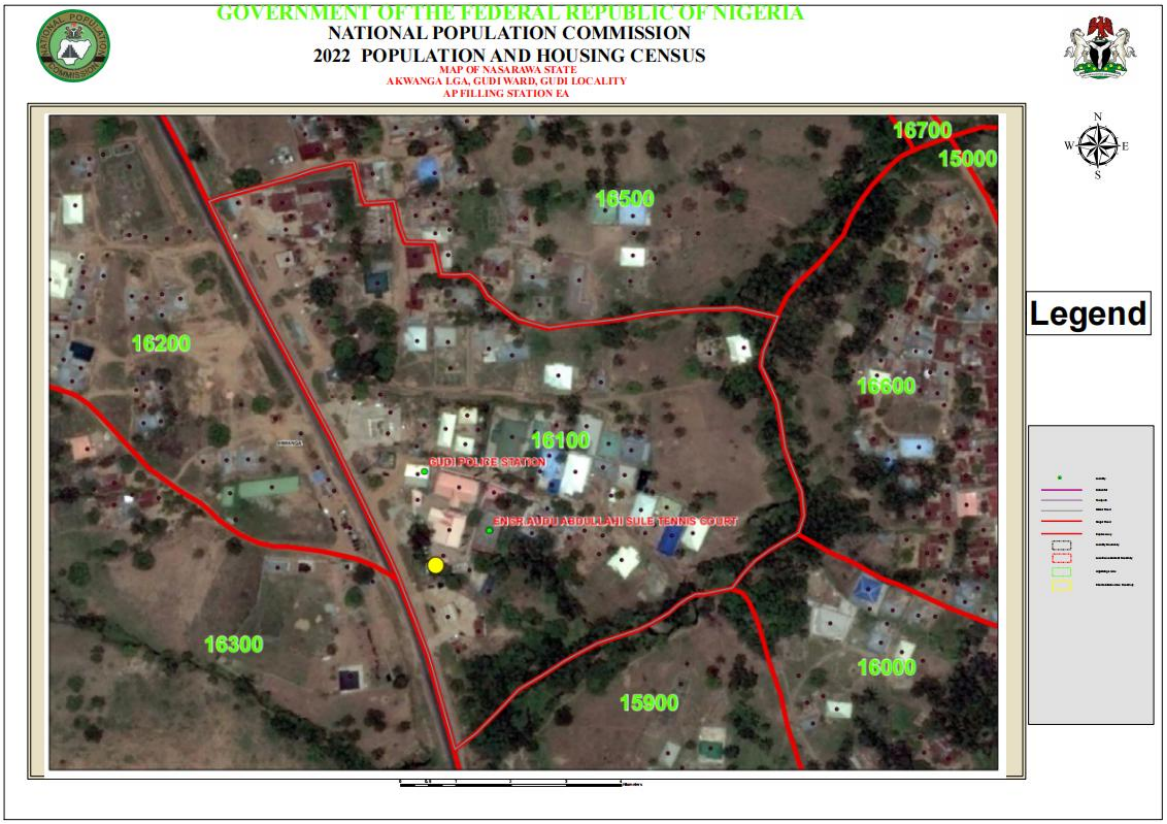
⇒ **Data**

The most critical component of GIS is the data – Geographic data and related tabular data. The DQM will be have access to different levels of the Census Entity data base already stored in a logical structure. There are two major components of data in GIS. Spatial and Attribute Data.

⇒ **Spatial data:** Spatial data consists of observations with geographic locations. It identifies features and its relative positions on the Earth's surface as well as how we represent our observations on the map, i.e. 'What is Where? E.g., 'Where is the unique location of Building no 1, Street A or locality Z. There are two spatial data type representations. These are vector and raster formats. Both vector and raster data formats have spatial referencing systems. These are latitudes and longitudes that pinpoint exact and unique positions of features on the Earth.

- **Vector Spatial Data format**: is a representation of the world using points, lines and polygons. The three basic symbol representations of vector data format are points, lines and polygons (areas). E.g., Points to represent buildings, Lines represent roads and polygons represents EA boundaries.
- **Raster Spatial Data format:** Raster data is a representation of the world as a surface divided into a regular grid of cells called pixels organized into rows and columns where each cell contains a value representing information. This is useful for storing data that varies continuously, as in an aerial photograph, a satellite image, a surface of chemical concentrations, or an elevation surface.

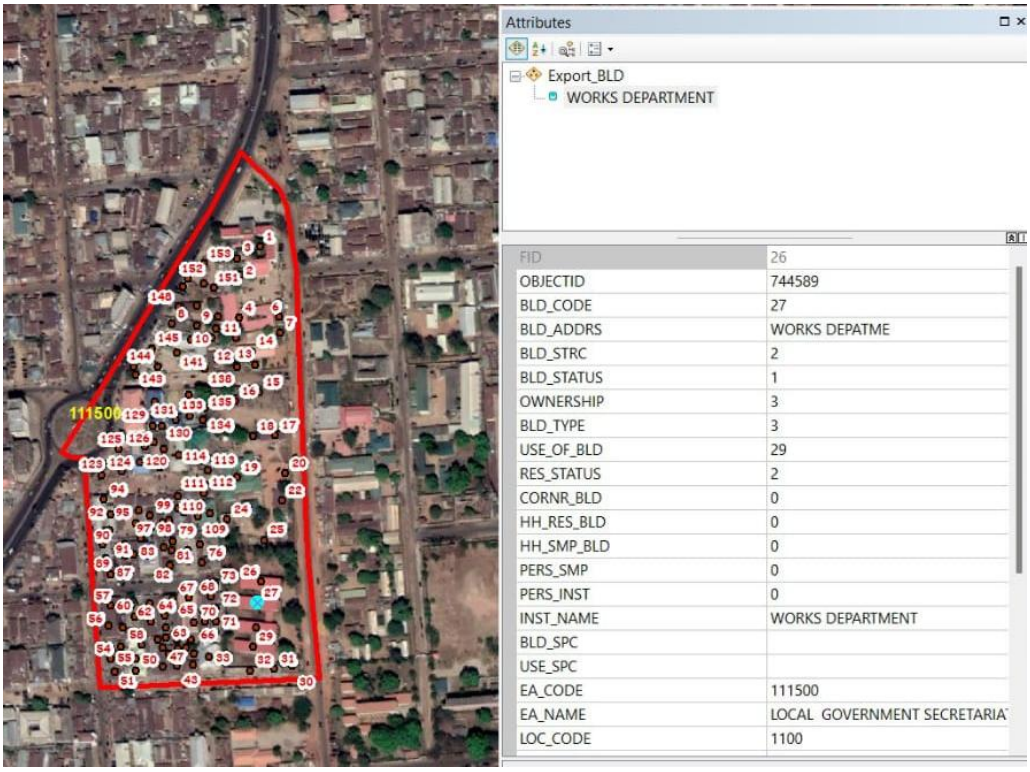
Example of Raster and Vector: EA map with Satellite Image back drop (Raster) EA boundary (Polygon), Point of Interest (points) & Roads (Lines)



It should be noted that both vector and raster data consist of "latitudes and longitudes", the difference is in the way they are displayed. Latitudes and Longitudes in Vector data are displayed in the form of lines, points, etc. Latitudes and Longitudes in Raster data are displayed in the form of closed shapes where each pixel has a particular latitude and longitude associated with it.

⇒ **Attribute Data:** This is information appended in tabular format about spatial data. It is the what, why, how and Where of Spatial data. It can be stored as Character (e.g. Street name, building owner, condition of a road etc. This is in text format) or as numbers (e.g., total no of households in a building, total no of persons in household etc. This allows calculations since it is stored in numeric value) or date and time (e.g. Year of construction of a building, date and time demarcation was carried out, etc.)

Example of Attribute data of Spatial Data



⇒ **Personnel**

GIS technology is of limited value without the personnel who manage the system and develop plans for applying it to real-world problems. GIS 'People Components range from technical specialists who design and maintain the system to those who use it to perform their everyday work or make decisions using GIS to solve planning and management problems at data collection, Processing and display levels. Data quality managers, Supervisors, Demarcators and other Officers who use PDA (Personal Digital Assistant) in the Census process falls into this category as a component of GIS.

⇒ **Methods**

Successful GIS projects operate according to well-designed plan(s) and business rules. These are models and operating practices unique to each organization. There are different process, procedures and models that have been designed for the Census process data quality management. E.g., Validation tool

3.2. CAPI OPERATIONS

The National Population Commission will deploy Electronic Data Collection Technology for the 2023 Population and Housing Census. By this method, Enumerators will use PDAs (Personal Digital Assistants) to collect information from respondents on a de- facto basis.

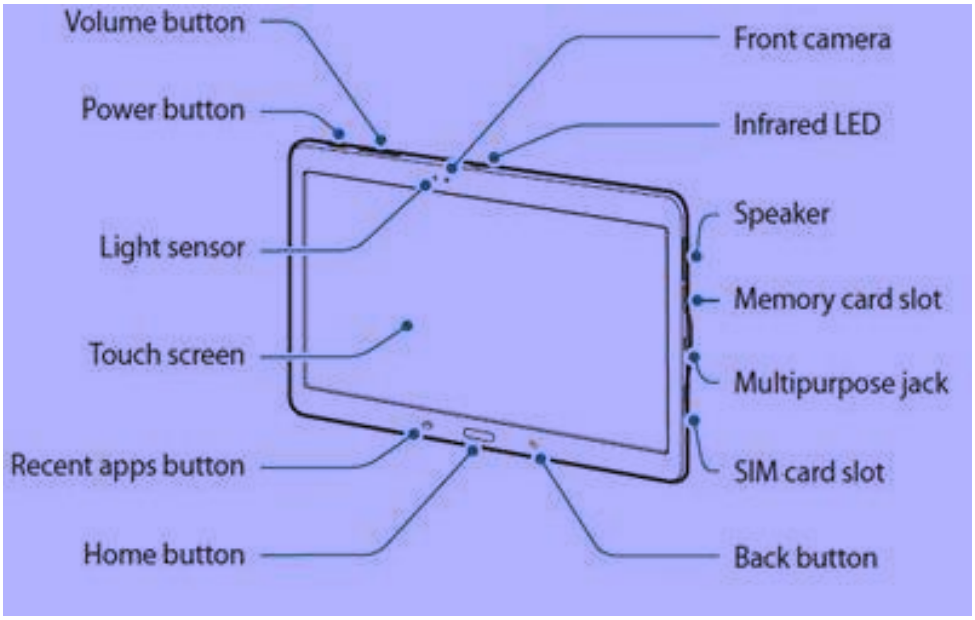
The 2023 Census would be the first-time census information is being collected with the use of Personal Digital Assistant (PDA). Computer-Assisted Personal Interviewing (CAPI) This is Data Collection system (through PDAs) which will be used by all functionaries involved in this exercise.

Computer-Assisted Personal Interviewing (CAPI) is a face-to-face data collection method in which the interviewer uses a tablet, mobile phone or a computer to record answers given during the interview.

The DQMs are the technical personnel who will train and relate with the enumerators on all CAPI operations so he/she must be savvy in CAPI operations and troubleshooting.

The components of the Tablet (CAPI)

⇒ Hardware:



⇒ **Software:**

- **Operating System: The operating system (OS) for the Census CAPI is Android**
- **Applications include:**
  - **Hybridization of CSEntry and CensusPad.**
  - **VYSOR (Screen monitoring app for training) used by DQM for interactive training.**
    - **VYSOR set up for training. (See Appendices)**

- **Tooldkit: To generate Device ID and provision the tablet with Historical events, manual and other resources for Census.**

⇒ **CAPI trouble Shooting: The DQM is expected to help functionaries working within his/her focal point in any problem as it relates to the CAPI. To this end the following trouble shooting procedure is highlighted.**

- **TROUBLESHOOTING**

In this session, we are going to look at the basic techniques of troubleshooting any tablet that will be used for census operations. Troubleshooting simply involves the process of identifying, isolating and resolving software or hardware related fault within a Personal Digital Assistant (PDA). The best way to avoid fault is to take preventive measures in handling PDAs.

Preventive Measures to be Taken While Using the PDA

i. Unauthorized External storage devices are not allowed into the Census Personal Digital Assistant (PDA)
ii. The Census PDA is exclusively reserved for Census activities therefore, do not pimp the PDA (install unapproved memory card, audios or movies, software and mobile applications)
iii. Do not run a program alongside the Census Apps. example running system or program updates when the Census Application is in use.
iv. Do not connect census PDA to internet via unknown Wi-Fi (free or paid wireless internet access)
v. The PDA will be strictly used for the census operation, videoing and unauthorised snapping of pictures with the PDA is prohibited.
vi. Application crash issues should be reported if more than one Enumerator is experiencing the same issue at a particular time.
vii. Do not allow your battery to drain completely, use a power Bank(backup).
viii. Keep the PDA away from liquid substances like water, tea and drinks of any sort.
ix. Always leave the PDA in its pouch to protect the screen when accidentally dropped.
x. Do not attempt to fix or take the PDA away from the field for repair without the notice or permission of the DQM because of the sensitivity of the Census Data.
xi. Do not use an incompatible power adapter(charger) in the census PDA.
xii. Do not PANIC when your PDA develops fault

PDA not Turning On Causes:

i. Stuck in power off mode: When you turn off your tablet at some point and tried to turn it back on, your tablet may have lagged and frozen in the power-off or sleep mode.
ii. Battery out of charge: Your PDA may be out of charge and you did not realize it or in some cases the power rating display misread the level of charge your PDA has.

Solutions:

i. Connect your PDA to the charger for 10 minutes and try powering on to solve the problem.
ii. Do a force starting by pressing a volume down button and power button at the same time for 10 Seconds.
iii. Check out the charging port, the PDA, the charger head and the USB cable.

PDA not Completing Booting Process

i. This is when a PDA is stuck on the start-up screen or restarts continuously without a complete booting process.

Causes:

i. This problem can be caused by temporary system software malfunction.
ii. Unfinished system software update

Solutions:

i. Restart the PDA and repeat the system software update to the end.
ii. Booting in safe mode: it involves powering the device off and then powering it on by holding the power button and a set of other keys depending on the make of the tablet.

PDA Not Charging

Causes:

i. Faulty USB port
ii. Damaged USB cable
iii. Damaged or incompatible power adapter(charger)

Solutions:

i. Change the USB cable.
ii. Check and replace power Adapter
iii. Try another power source.

Unresponsive Touch Screen Causes:

i. Physical damage of touch screen
ii. Dust or improper calibration
iii. Touch screen responding incorrectly. For example – you are typing 'q', but you get 'w'.
iv. Touch screen lags/freezes/hangs.
v. Part of the screen doesn't work.

Solutions:

i. Wipe the screen with a soft microfiber cloth. Clean off any dirt, dust or fingerprints on the screen.
ii. Replacing the screen Touch calibration.
iii. Remove the plastic touch screen protector sheet. Some protector sheets are too thick and prevent the touch screen from responding to your tap.
iv. Dry your hands thoroughly. The touch screen will not respond if your fingers are wet.

PDA soaked by rain or fell into water

i. Do not turn it on if it is off or use it in any way.
ii. Do not press on any buttons or keys.
iii. Do not shake, tap or bang the tablet.

iv. Do not disassemble the PDA, else it could void the warranty, the device comes with a Liquid Damage Indicator (LDI), this could be triggered when you open the PDA.
v. Do not try to blow on it. This could send water into other internal parts of the tablet, which haven't been reached yet, causing more damage in the process.

Solutions:

i. Turn it off as soon as possible and keep it in an upright position.
ii. Remove the protective casing if you have one around it.
iii. If the water damage is more extensive, you can use a vacuum or hand dryer to carefully suck out water stuck within the cracks that are harder to get at.
iv. Bury it in a Ziplock bag full of uncooked rice. This may seem odd to you, but rice is great at absorbing liquid and is actually a common practice for drying smartphones and tablets. It's been tested and proven.

PDA Not Connecting to the Internet

Download of EA by the enumerators and submission of house numbering and house listing as well as enumeration data requires network connectivity. Enumerator's tablet has been equipped with SIM cards, which will provide mobile data connection. As the enumerator moves around his/her EA, the mobile-data signal can change. In fact, he/she may observe the status bar icon change from 4G to 3G to even 2G or — worse — nothing, depending on the strength and availability of the mobile data service. These are some of the troubleshooting tips that the enumerator should carry out.

Causes:

i. Limited or No internet connectivity from the Internet Service Provider (ISP)
ii. No network coverage or low signal strength.
iii. Data connection not turned on.
iv. No active data subscription

Solutions

i. Restart your device. It might sound simple, but sometimes that's all it takes to fix a bad connection.
ii. If restarting doesn't work, switch between Wi-Fi and mobile data.
iii. Check that mobile data is turned on and you have a data connection.
iv. Turn flight mode on and off.

CHAPTER 4: CENSUS MAPS AND OTHER RESOURCES

4.1. Importance of Maps as basic tool for the 2023 Census

The Digital map products of the 2023 Enumeration Area demarcation are the baseline data for the 2023 Population and Housing Census. The EAD divides the Country into concise units of areas that can be covered by a unit of Enumerators within the specified time for the Census exercise. The EA maps are the basis of work assignment, total coverage measurement and units of Data dissemination. The DQM dashboards also have both statistical and map view.Therefore, the DQM is expected to understand the map components of the Census.

4.2. Elements of Census Maps

⇒ **Map:** A Map is a representation of either the entire earth surface or its part in reduced form, showing Natural and Man-made features existing on it. A map may be described as a carefully, systematically designed visual display for recording, calculating, displaying, analyzing and understanding the interrelationship of a given spatial information. A map is drawn to scale. A sketch on the other hand is a non-systematic graphic representation of features. It is usually not drawn to scale. Sketches are useful when maps are not available. A map may be in hard copy or Digital Format.

In hard copy format, the map is printed on a Paper at a specific scale but in Digital format the map is compiled as a virtual image on the PDA and can be zoomed in or out to desired scale as applicable. This is the main advantage of the Digital Map over the hard copy map. The map to be used for this Census is therefore in Digital format. They are represented in Raster (Satellite Imagery) and Vector Format (Line, Points and Polygons).

⇒ **Satellite Imagery:** These are remotely acquired data of parts of the earth surface (ground features) by space borne satellites. They are data based on reflected or emitted electromagnetic radiation collected from orbit that can be used to create photograph-like representations. For the Census, the Satellite imagery is loaded as backdrop of the EA boundaries and buildings. ***It is therefore very important that every DQM should know how to interpret the Satellite Imagery.***

The importance of the use of Satellite Imagery in Census are hereby highlighted:

i. It rules out the need for reconnaissance surveys of the EA boundary as it provides an overview of the entire area it covers.

ii. It aids total coverage, ruling out cases of 'no man's land' as all buildings and other features serving as the EA boundary can be clearly identified.

iii. Map features are represented as they appear on ground helping non-map experts to easily identify features unlike Vector Maps where features are represented with symbols.

iv. The Satellite Imagery is used as a backdrop of the EA boundary and other Census features for this Census.

Satellite Image Interpretation: Satellite Image interpretation involves visually identifying features on the satellite image correctly as it is physically on the ground. It is important for Enumerators and other Census functionaries to have a basic knowledge of how to recognize features represented on the Satellite imagery, which is the backdrop to the Census map.

All Census Map users should understand basically that the Satellite image is an overview of all features. They appear as you will see them imagining you are in an aircraft. Therefore, the building view is the rooftop. same thing with the trees, roads and other features.

⇒ **Basic image interpretation principle include**:

Colour or Tone: Old buildings with rusty corrugated roofs will have dull brownish color while newly constructed buildings with new roofs will have brighter color depending on the roof type. New excavations will have a bright appearance etc. Tarred roads will have Grey color and Vegetation green. Swampy areas with overgrown Vegetation will have a darker greenish color etc.

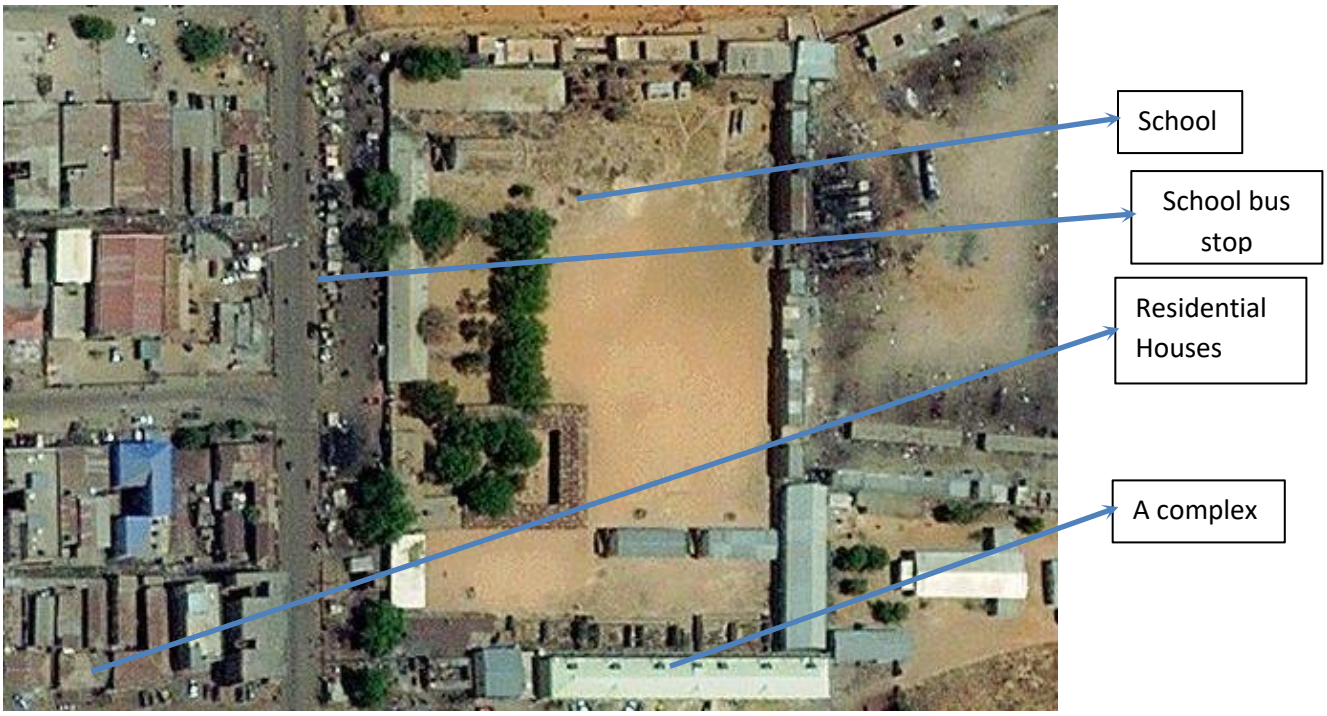
Fig 4:1 Imagery showing Color or Tone Interpretation

Shape: Tarred roads appear with straight edges while footpaths and un-tarred roads have rough edges. All features will have their overview shape on the Satellite image. E.g: a house with a courtyard, a Swimming pool, a school building arrangement and a Stadium. This can easily be recognized by their appearance on the Satellite Imagery. Also, note that all Natural features such as Forest, streams & Rivers, Hamlet's boundaries will have irregular edges/shapes while man made features such as Buildings, Roads, Cultivated Lands, Stadium, Swimming pool, etc. have regular edges/shapes.

Fig 4:2 Imagery showing Shape Interpretation

Association: An identified feature can help to interpret other naturally associated features. E.g., the presence of a hub of vehicles points to a Motor or Car Park. Presence of boats in the imagery gives an idea of a harbor. A road crossing a river means there is a bridge. A wide playground with organized buildings depicts a school etc. See Fig: 4:3

Fig: 4:3 Satellite imagery showing Interpretation by Association and size



Size: Size of objects in an image is a function of scale. It is important to assess the size of a target relative to other objects in a scene, as well as the absolute size, to aid in the interpretation of that target. A quick approximation of target size can direct interpretation to an appropriate result more quickly. For example, if an interpreter had to distinguish an estate, and had identified an area with a number of buildings in it, large buildings such as factories or warehouses would suggest commercial property, whereas small buildings would indicate residential use.

⇒ **Vector Maps:** This is the use of Point, Lines and Polygons to represent Physical or Imaginary Census Entities in the Enumeration Geo-Database. The Lines, Polygons and Points are tied to the Satellite imagery as an Overlay.

Representations

- Boundaries & Features that span over Space: (State, LGA, Ward, SA &EA, Water bodies, Crisis Areas etc.) - Polygon
- Line Features (Roads, Foot Paths, Rivers, etc.) - Line
- Building and other related features: (Buildings, Important features, Corner Buildings etc.) Points.
- The Key to Interpret the Vector Maps symbol and Color are on the Maps.
- The Vector Map is superimposed on the Satellite Imagery as a Single Digital Map for this Census exercise.

4.3 Types of Maps for the Census

⇒ Local Government Area EA Maps: (LGA Maps): This is the administrative map for each LGA. It is the seamless array of all the EAs for the entire LGA covering every inch of land without overlap or gaps. It is to aid planning for Census to allocate both human and material resources on LGA basis as well as monitoring of Enumeration progress during head count. The Feature layers on this map include:

i. Satellite Imagery: Back drop of all Physical features and Census Entities.
ii. Enumeration Area boundary with displayed ID at specific zoom level
iii. Supervisory Area boundary with Displayed ID at specific Zoom level
iv. INEC Registration Area/Ward with displayed ID at specific level
v. Important features such as Schools, Hospitals, Petrol Stations etc. to aid location identification
vi. Drainage (Rivers, Water bodies, Canals etc.)
vii. Roads well annotated.
viii. Buildings: All buildings identified during the Demarcation exercise.

⇒ **Supervisory Area (SA) Maps:** This is the Supervisors' Administrative Map covering a specific area with a number of EAs allocated to a supervisor for monitoring. It will have the total number of EAs within the SA clearly identified with their boundaries and IDs displayed on the map.

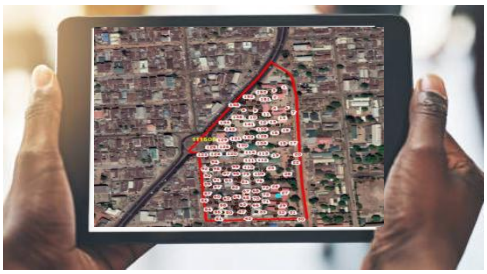
The SA map is a 'Zoom in' from the LGA map. This will aid the Supervisor in seeing the neighboring SAs/EAs as well as aid each Enumerator within his/her Supervisory area to identify his/her boundary of Enumeration. It will have all the Feature Layers of EA, SA boundaries, important features, Drainage, Roads, footpaths and all Buildings within the EA. All the features are well annotated or coded where applicable. All LGA and Ward boundaries are also shown where applicable.

⇒ **Enumeration Area (EA) Map:**

The EA Map is a 'Zoom' in of the SA map and therefore the Enumerator can easily identify the neighboring EAs to avoid moving out of his/her EA during enumeration.

This is the Map covering the area assigned to each Enumerator for the Census exercise. It shows the coverage of the EA with the EA boundary clearly delineated and the EA ID displayed on the EA polygon. It shows all buildings within the EA as a point resting on the Building's Satellite imagery feature.

Fig 4:4 EA map on the Tablet

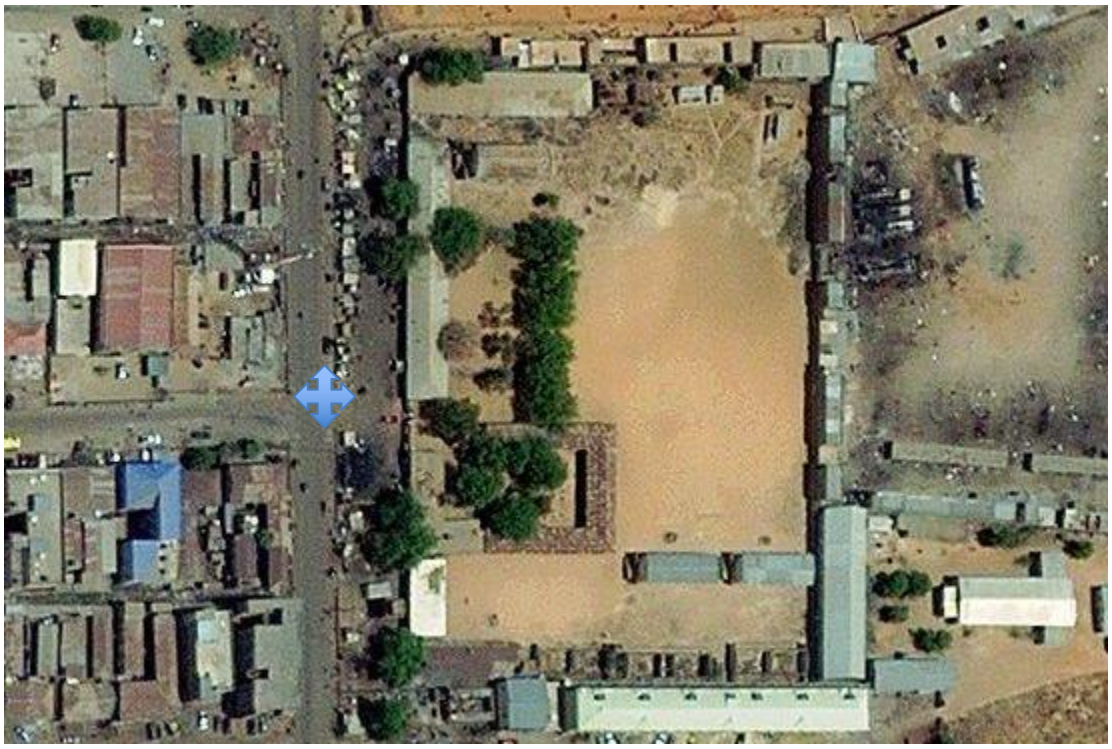


A building code will also appear by the side of this point in numeric no e.g., 1, 2…n. where n is the last code of the building within the EA and means the total number of buildings within the EA.

4.4. Map Orientation

The orientation of a map is the relationship between the directions on the map and the corresponding compass (North, East, West or South) directions on ground. It is important to understand Map orientation because aligning a map to features on ground is dependent on which direction is faced. For an Enumerator to conclude that a feature identified on the map is on the right or left side on ground is dependent on the direction he/she is facing. The north of a georeferenced map is always at the top of the Map. Therefore, Enumerators should align their maps 'fetched' on the PDA with features that they can identify on the ground. E.g., See Fig 4:5

Fig: 4:5 Illustration of Map Orientation



Aligning the above imagery, if the Enumerator is standing at the junction

By  **with the blue roof at his left- back and the school at his right hand, then he/she ensures the road by the T-junction will be on the left passing in front of the blue roof house.**

4.5. Navigation

The Digital Map on the Census -Pad application shall be used to identify and navigate to the Enumerators' area of assignment. The Digital Map for this Population and Housing Census is running on a customized application 'Pad System' which has the capability to help Enumerators identify their area of assignment easily and also has the tool to direct the Enumerator to the area of assignment. This will follow these steps, which will be treated in detail when taking the training on the PAD.

Steps:

1. Load the Map with reference to LGA and Ward.
2. Identify assigned EA with reference to the ID

3. Identify roads or other important features around the EA.
4. Get guidance from local guides or locals on how to get to any of the important features or roads identified.
5. Tap on the 'locate me feature' on the application. This automatically pinpoints where you are in relation to the EA.
6. Identify the starting point on the EA (This is building number 1)
7. Try to locate the building 1 on ground by aligning your map to ground features.
8. Use the locate me feature again to be sure you are by the building identified. (Other details on how to commence enumeration will be explained in the PAD application manual).

4.5 Map Updating

This is the process of adding information about new features that are not found or named on the map such as new buildings, Floating Population etc. and also deleting the ones that are no longer in existence. This will be done during the Building and Household Listing. All New buildings and other target population areas shall be added to the Database (See Census PAD manual) and all non-existing features shall be annotated as such).

4.6. Digital Maps for Population and Housing Census

Products from the Enumeration Area Demarcation for the Population and Housing Census are:

1. Enumeration Area Geo-database with the following feature Classes:
    a. Enumeration Area
    b. Supervisory Area
    c. Local Government Area
    d. States
    e. Locality
    f. Ward/RA
    g. Buildings
    h. Roads
    i. Drainages

2. A National Frame table of all EAs carved with each EA having its own unique identity

3. Locality List on LGA basis.

4. Hard to Count' EAs identification Map and Table/LGA basis.

5. LGA EA Administrative Maps

6. Hybrid Enumeration Areas. (HEA)

4.7. Historical Events: This is a Census resource to help in determining respondents age, where it is not known. It is a catalogue of events and dates of historical and notable events which has taken place in each LGA and have been collected by the Planning and Research Department for this purpose. It will be provided in both hard and soft Copy.

CHAPTER 5

DATA QUALITY MANAGEMENT: PROCESS AND PROCEDURE

5.1 Introduction: The Data Quality Management Unit is established to technically manage the Census process and procedure from 'end to end' (Map and Device deployment) to end (Data Synchronization to the server) with the focus of ensuring Data Quality.

The Activity of the DQM is treated in this chapter.

Fig 5:1 - DQM Workflow

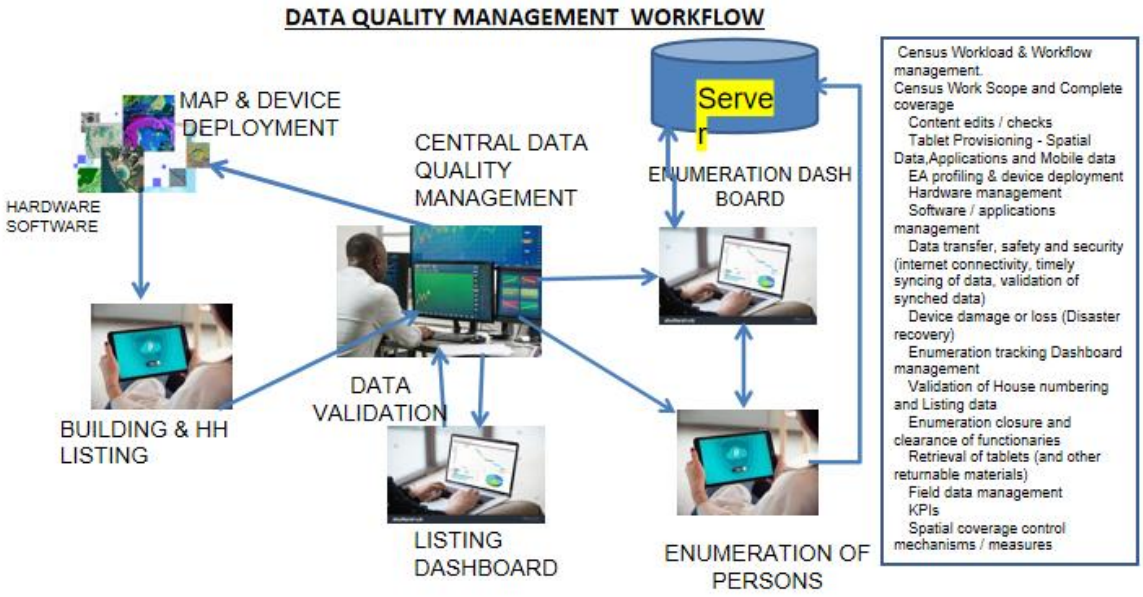
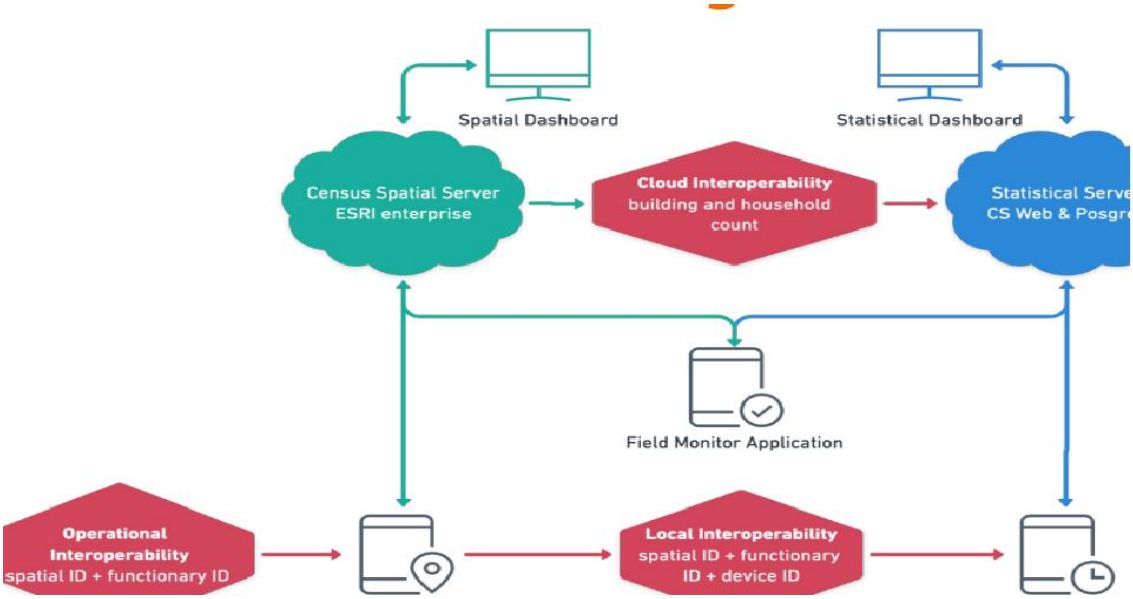


Fig 5:2 - Data collection application and Interoperability



The DQM team will monitor and manage the data collection system and corresponding interoperability for accuracy, consistency, and timeliness Pre-Field, Field and Post - Field

1. PRE - FIELD

a) Training: The Data Quality Managers shall be responsible for the training of

i. Data Quality Assurance Assistants (DQAA)

ii. Supervisors

iii. Enumerators

The following topics shall be handled by the DQM:

⇒ CAPI operations

⇒ Census Maps and interpretation

⇒ Data collection process with practical hands - on with the Data collection applications: CensusPad_CSEntry

⇒ Specialized training for QAA and Supervisors on Geo-Monitoring Applications and field operations.

⇒ The Group Listing Methodology.

⇒ Tools that will be used during the training include

- Training slides.
- The Manual
- Compiled DQM frequently Asked Questions (FAQ)
- Visor application for on screen training. (See Appendix 3)

b) Training field practical planning and operations: The FDQM in conjunction with the Focal Census Coordinator shall organize the Field practical sessions during the training. The SDQM and ZDQM will monitor the States and Zones respectively during the field practical. The practical session will include:

i. Profiling of all enumerators

ii. Assignment of practical operational EAs

iii. Field and dashboard monitoring

iv. Report generation on the Field practical covering

1. Functionaries' Knowledge of process and procedures

2. Field operations and communication network

3. System and applications performance.

c) Device Provisioning and tagging: The DQM will take delivery of the total no of Device for his/her area of assignment. Take note that total no of Device should cover total no of EAs, SAs and QAAs. A percentage of the total shall also be given as reserve. The Device/PDA shall be provisioned with:

i. Sim Card

ii. Data Collection Application

iii. Tool Kit

iv. Historical Events

The tool kit shall automatically tag the Device with a unique device Id.

d) Functionaries' Profiling: The DQM shall also profile all Functionaries: Enumerators, Supervisors and QAA by collecting their details which should include their telephone nos from the Focal Coordinator and assign EAs, SAs and QAAAs to the Enumerators, Supervisors and the Quality Assurance assistants respectively. This Profile shall be uploaded to the Cloud.

2. FIELD WORK:

a) Building numbering and household listing: Hybrid software application (CensusPad_CSEntry) has been developed purposely for Building numbering, household listing and enumeration.

For the 2023 Population and Housing Census exercise, Nigeria will conduct its first Digital Census making use of two applications which will work hand in hand in a hybrid system for data collection. These two applications include:

- CensusPad (Mapping and Household Listing)
- CSentry (Enumeration of Persons)

DQM process during this phase include:

- Fetching of area of assignment: All functionaries shall 'fetch' area of assignment by imputing their phone nos into the Data collection application. The methodology for Building numbering and Household listing is Group Listing. The Group listing methodology is one which the Supervisor and all Enumerators assigned to the Supervisory Area, number all buildings and list the households within the residential area as a group. See Appendix for detail. However, DQMs should ensure that all maps of the EAs are fetched before functionaries move to their areas of assignment. The DQM monitoring and evaluation personnel will do a cursory check on this process and give reports.

- Building numbering and Household listing: During the Building numbering and Household Listing, the DQM monitors the Spatial Dash board at different level for:

  - **Work Start** by making sure that at least one EA from each SA is registered for update on the dashboard within 3 hours after listing starts. If a SA is noticed not to have started work, the

DQM is expected to put a call through to the DQAA who in turn will ascertain the problem from the SA and report back to the DQM

- **Listing progress:** The DQM is expected to aggregate the progress of listing on EA basis and generate a report for his/her focal area periodically according to management policy. This aggregation will form the basis for Help Desk report generation for the management.
- **Validation:** When Listing is completed in an EA by the team of Enumerators, the Validation report will be generated by the DQM and ensures that the status for each EA is communicated to the DQAA and other stake-holders on the communication line accordingly. He/she ensures that flagged EAs are groundtruthed, certified and passed before the scheduled time for Enumeration.
- Listed Data passed to Enumeration Dashboard as baseline data for Enumeration: The DQM ensures that the listed data has been passed on to the enumeration dashboard by checking the accuracy of the baseline data on the Enumeration dashboard before enumeration commences.

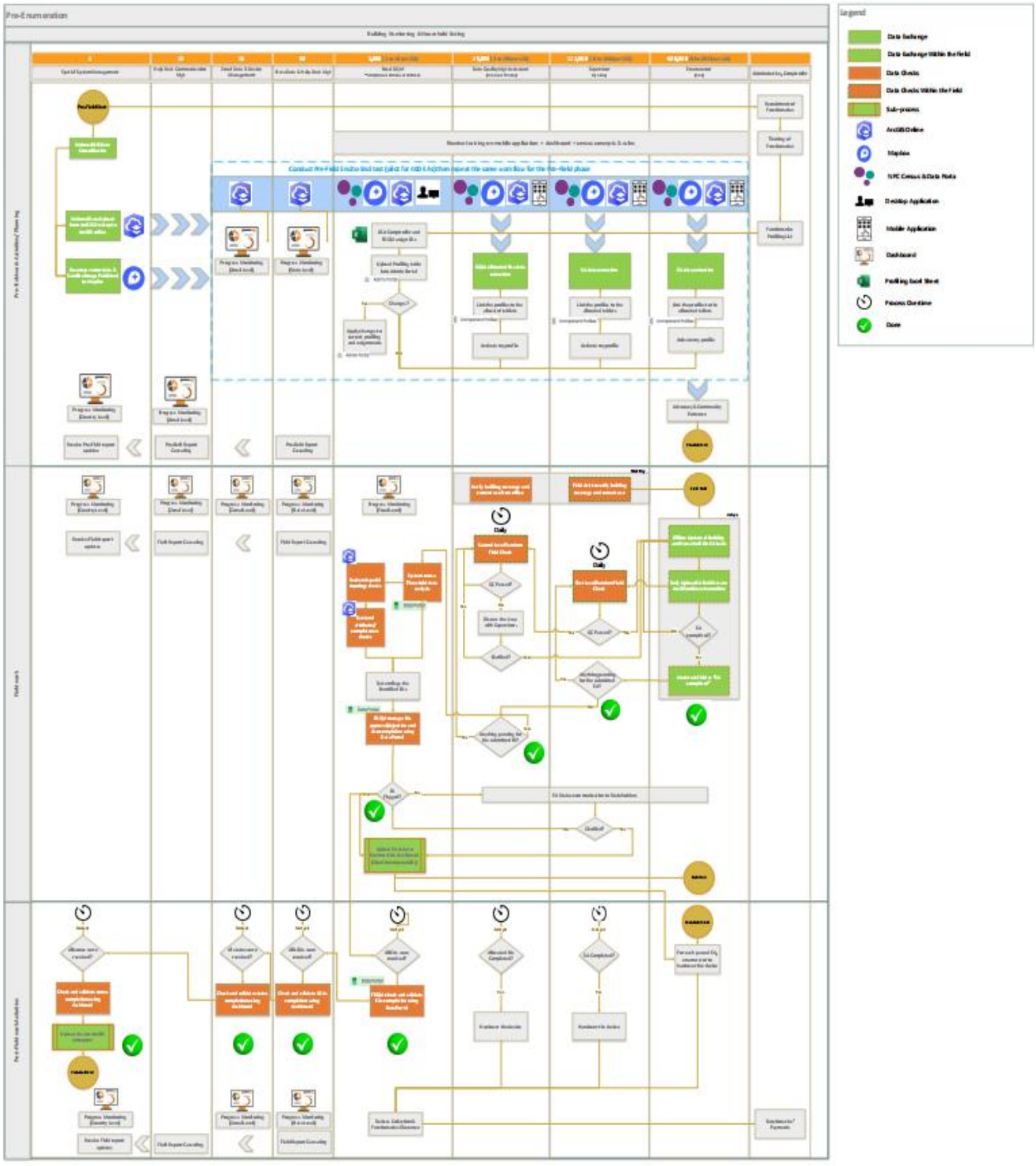
- Enumeration of Persons. The Data collection application switches from the Spatial Centric CensusPad to CSEntry to start Enumeration of persons on the Enumerators tablets. (Details will be handled during the hands on session) During the Enumeration of persons, the DQM:
  - Monitors the Enumeration Statistical dashboard for:
    - Enumeration Progress on the basis of each Enumeration Entity focusing on the DQM focal area. (Focal Area, LGA, State or zone)
    - Household completion based on the total no of households in each EA and other Census entities
    - Total Coverage of Listed area and data
    - Running error check to validate samples of the data sets.

3. POST FIELD WORK: After the completion of fieldwork, FDQM will
   i. Clear field functionaries.
   ii. Compile and forward list of cleared teams/enumerators for payment
   iii. Produce clearance reports in the required formats

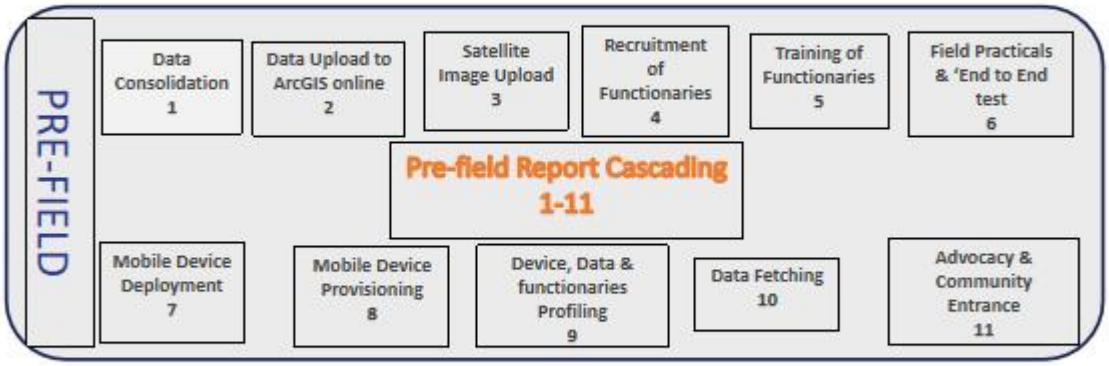
A Focal Data Quality Managers work will be deemed complete when all teams (enumerators in an SA) have been cleared. It is after this that a FDQM can then be cleared by the SDQM. SDQM will be cleared by ZDQM when all field functionaries have been cleared and all devices retrieved and backed up. ZDQM shall give report on each Zone and will then be cleared by the National Coordinator who will generate a full report of the Census Process and procedure to be presented to the Census management team.

Note that ZDQM will give zonal reports every day at the Census Situation room throughout the Census period ‘End to End’.

DQM GENEAL WORK FLOW AND TASKS

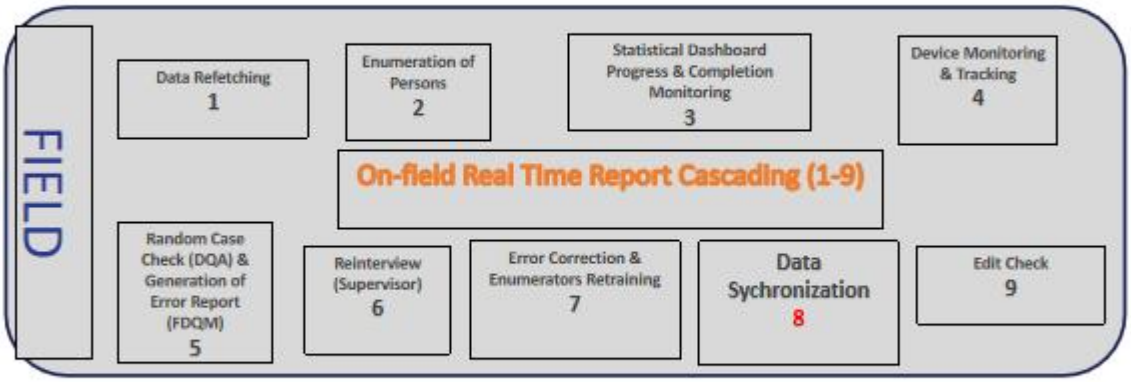


Pre- Field



FIELD : Building Numbering and HH Listing

Field: Enumeration of Persons



POST FIELD

2023 Population and Housing Census: *You Count, Be Counted*

Chapter 6
Dashboards Monitoring and Key Performance Indicators (KPIs)

6.1. Introduction: The DQM will be using two main dashboards at the different levels of the DQM structure and the phases of the project.

6.1. Spatial Dashboard: Uploading of Functionaries profiles, Generation of Pre Field reports, Building numbering and Household Listing progress, coverage and completion monitoring and Data validation monitoring.

6.2. Enumeration Dashboard: Enumeration of Persons progress, coverage and completion monitoring and edit checks

6.1.1. Spatial Dashboard: Requirements and KPIS

Phase
Pre-Field work/ Planning
Fieldworks
Post-Fieldworks

Users/ Stakeholders
Spatial System Management
Help Desk Communication Mgt
Zonal Data & Device Management
State Data & Help Desk Mgt
Focal DQM

Level of Aggregation
EA
LGA
State
Zone

Visualization

Chart
Column
Pie
Line

Map
Yes
No

a. National Dashboard (Spatial System Managers)

KPIs	Level of Aggregation	Phase	Visualization	
Planned functionaries vs current functionaries for each of the followings (Enumerators, Supervisors, DQAA)	Zone	Pre-Field work/ Planning	Column	No
Planned tablets to be received vs current tablets received	Zone	Pre-Field work/ Planning	Column	No
Current assigned EAs vs total number of EA	Zone	Pre-Field work/ Planning	Column	Yes
Tablets ready vs total planned tablets	Zone	Pre-Field work/ Planning	Column	No
EAs submitted by enumerators vs Total Eas	Zone	Fieldworks	Column	Yes
EAs passed vs rejected from the first level random field check by supervisor	Zone	Fieldworks	Column	No
EAs passed vs rejected from the second level random field check by DQAA	Zone	Fieldworks	column	No
EAs passed vs total planned EAs by FDQM	Zone	Fieldworks	Column	No
EAs flagged vs EAs passed by FDQM	Zone	Fieldworks	Pie	Yes
Country completion	Zone	Post-Fieldworks	Column	Yes

b. Zonal Dashboard (ZDQMs)

KPIs	Level of Aggregation	Phase	Visualization	
Planned functionaries vs current functionaries for each of the followings (Enumerators, Supervisors, DQAA)	State	Pre-Field work/ Planning	Column	No
Planned tablets to be received vs current tablets received	State	Pre-Field work/ Planning	Column	No
Current assigned EAs vs total number of EA	State	Pre-Field work/ Planning	Column	Yes
Tablets ready vs total planned tablets	State	Pre-Field work/ Planning	Column	No
EAs submitted by enumerators vs Total Eas	State	Fieldworks	Column	Yes
EAs passed vs rejected from the first level random field check by supervisor	State	Fieldworks	Column	No
EAs passed vs rejected from the second level random field check by DQAA	State	Fieldworks	column	No
EAs passed vs total planned EAs by FDQM	State	Fieldworks	Column	No
EAs flagged vs EAs passed by FDQM	State	Fieldworks	Pie	Yes
Zone completion	State	Post-Fieldworks	Column	Yes

c. State Dashboard (SDQMs)

KPIs	Level of Aggregation	Phase	Visualization	
Planned functionaries vs current functionaries for each of the followings (Enumerators, Supervisors, DQAA)	LGA	Pre-Field work/ Planning	Column	No
Planned tablets to be received vs current tablets received	LGA	Pre-Field work/ Planning	Column	No
Current assigned EAs vs total number of EA	LGA	Pre-Field work/ Planning	Column	Yes

Tablets ready vs total planned tablets	LGA	Pre-Field work/ Planning	Column	No
EAs submitted by enumerators vs Total Eas	LGA	Fieldworks	Column	Yes
EAs passed vs rejected from the first level random field check by supervisor	LGA	Fieldworks	Column	No
EAs passed vs rejected from the second level random field check by DQAA	LGA	Fieldworks	column	No
EAs passed vs total planned EAs by FDQM	LGA	Fieldworks	Column	No
EAs flagged vs EAs passed by FDQM	LGA	Fieldworks	Pie	Yes
State completion	LGA	Post-Fieldworks	Column	Yes

d. Focal/LGA Dashboard (FDQMs)

KPIs	Level of Aggregation	Phase	Visualization	
Planned functionaries vs current functionaries for each of the followings (Enumerators, Supervisors, DQAA)	EA	Pre-Field work/ Planning	Column	No
Planned functionaries vs current functionaries for each of the followings (Enumerators, Supervisors, DQAA)	State	Pre-Field work/ Planning	Column	No
Planned tablets to be received vs current tablets received by enumerators	EA	Pre-Field work/ Planning	Pie	No
Planned tablets to be received vs current tablets received by supervisor	EA	Pre-Field work/ Planning	Pie	No
Planned tablets to be received vs current tablets received by DQAA	EA	Pre-Field work/ Planning	Pie	No
Planned tablets to be received vs current tablets received	EA	Pre-Field work/ Planning	Column	No

Planned tablets to be received vs current tablets received	State	Pre-Field work/ Planning	Column	No
Current assigned EAs vs total number of EA to be assigned to enumerators	EA	Pre-Field work/ Planning	Pie	Yes
Current assigned EAs vs total number of EA to be assigned to supervisors	EA	Pre-Field work/ Planning	Pie	Yes
Current assigned EAs vs total number of EA to be assigned to DQAA	EA	Pre-Field work/ Planning	Pie	Yes
Current assigned EAs vs total number of EA	EA	Pre-Field work/ Planning	Column	Yes
Current assigned EAs vs total number of EA	State	Pre-Field work/ Planning	Column	Yes
Tablets ready vs total planned tablets for enumerators	EA	Pre-Field work/ Planning	Pie	No
Tablets ready vs total planned tablets for supervisors	EA	Pre-Field work/ Planning	Pie	No
Tablets ready vs total planned tablets for DQAA	EA	Pre-Field work/ Planning	Pie	No
Tablets ready vs total planned tablets	EA	Pre-Field work/ Planning	Column	No
Tablets ready vs total planned tablets	State	Pre-Field work/ Planning	Column	No
EAs submitted by enumerators vs Total Eas	EA	Fieldworks	Column	Yes
EAs submitted by enumerators vs Total Eas	State	Fieldworks	Column	Yes
EAs passed vs rejected from the first level random field check by supervisor	EA	Fieldworks	Column	No
EAs passed vs rejected from the first level random field check by supervisor	State	Fieldworks	Column	No
EAs passed vs rejected from the second level random field check by DQAA	EA	Fieldworks	column	No
EAs passed vs rejected from the second level random field check by DQAA	State	Fieldworks	column	No
EAs passed vs rejected from the first level random field check by supervisor Daily	EA	Fieldworks	Line	No

EAs passed vs rejected from the second level random field check by DQAA Daily	EA	Fieldworks	Line	No
EAs passed vs total planned EAs by FDQM	EA	Fieldworks	Column	No
EAs passed vs total planned EAs by FDQM	State	Fieldworks	Column	No
EAs flagged vs EAs passed by FDQM	EA	Fieldworks	Pie	Yes
EAs flagged vs EAs passed by FDQM	State	Fieldworks	Pie	Yes
LGA completion	EA	Post-Fieldworks	Column	Yes
Zone completion	State	Post-Fieldworks	Column	Yes

DQM shall monitor listing progress, coverage and completion of assigned area. He/She shall generate daily report to the supervising officer along reporting lines from 'bottom to top'.

Fig 5.3 Spatial Dashboard Home page

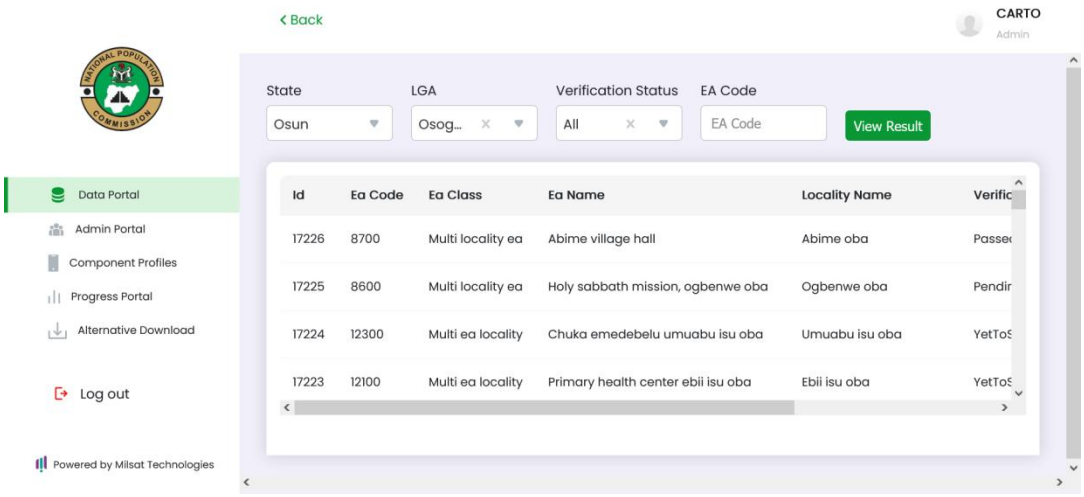
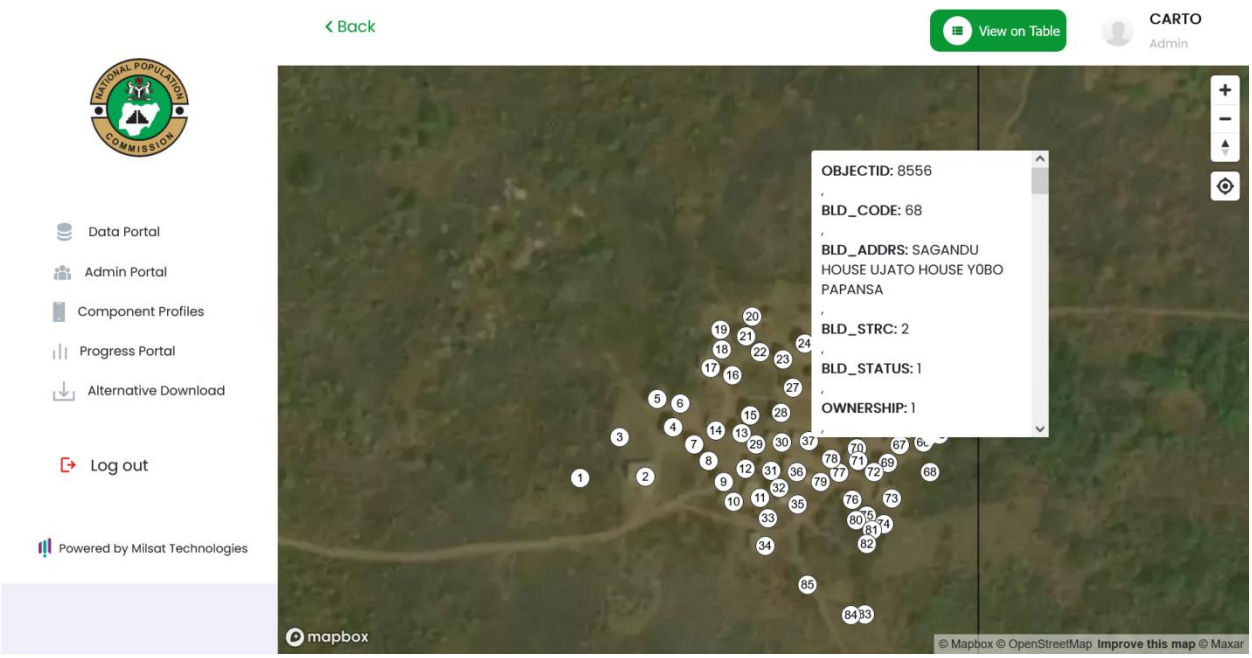


Fig 5:4 Spatial Dashboard Map View



6.1.2. Listing Data Validation: A comparative analysis of data obtained during Enumeration Area Demarcation with the Building numbering and Household listing. The validation is expected to commence after listing and completed before the enumeration. In essence all listed data must be validated before enumeration.

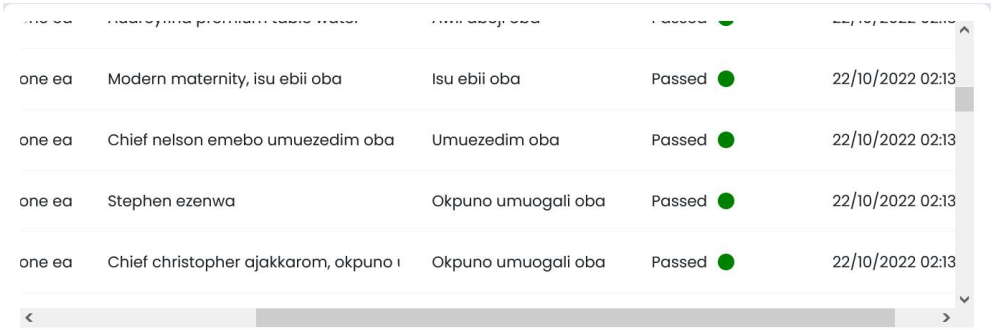
Objective:

i. To ensure enumerators obtain correct data with integrity
ii. To verify and ascertain reality in relation to changes recorded in the EA
iii. To detect and correct errors committed by enumerators
iv. To detect EAs with false entries by enumerators either deliberate/ erroneous

The validation shall be automated or DQM run the validation tool on all completed EAS after synchronization by the Enumerators on the field. Validation result could be:

i. Flagged: An ambiguous entry is discovered or there is an operational or systemic error.
ii. Passed: EA has passed all parameter checks and ready for enumeration

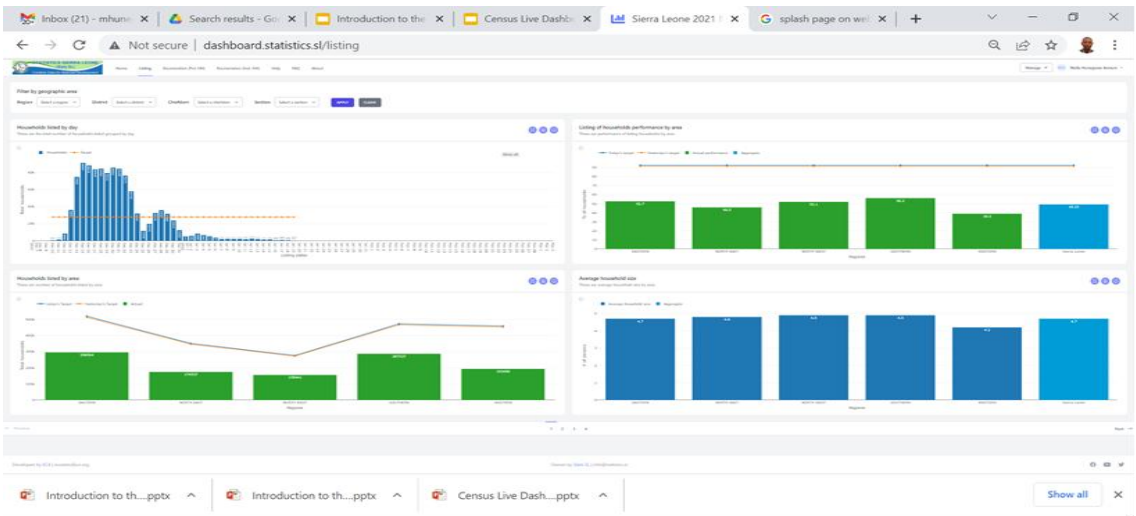
Fig 5:5 Passed EA on Spatial dashboard.



6.1.3.Monitoring and Correction of Ground-truthing of flagged EAs: The DQM shall pass information on all flagged EAs to the QAA who in turn will give such information to the Supervisor. The Supervisor or in company of the QAA and the Enumerator will conduct the check on flagged building/s. The QAA and Supervisor also has an application installed on his/her Tablet to monitor all EAs within his/her respective SA or QAAA for progress, coverage and completion. The SA reports to the QAA on daily basis and the QAA reports to the DQM and the LGA coordinator.

6.2. Enumeration Dashboard: The Enumeration dashboard shall become active immediately after the completion of the Listing phase. The Enumeration Dashboard database shall be provisioned with the Listing data. This shall serve as baseline data for the enumeration data.
The dashboard will aggregate the Enumeration of persons data and measure, rate of completion and progress in percentage of the listed data on a daily basis.
The DQM will monitor:
- Daily Output and percentage of coverage on daily basis and cumulatively
- Perentile coverage/EA and LGA at the different levels of the DQM structure
- Household completion in relation with how many persons are listed in each household
- The Demographic Indicators for probable errror/s. will be viewed both on the Supervisors and DQAA applications. The DQM shall also run a error check script which will generate error reports where applicable. All flagged cases shall be reported to the DQAA, who ground truthed and give a report for the enumerators to make corrections or pass the case as genuine/

Fig 5:8: Enumeration Dashboard Home Page



Note: The DQM should

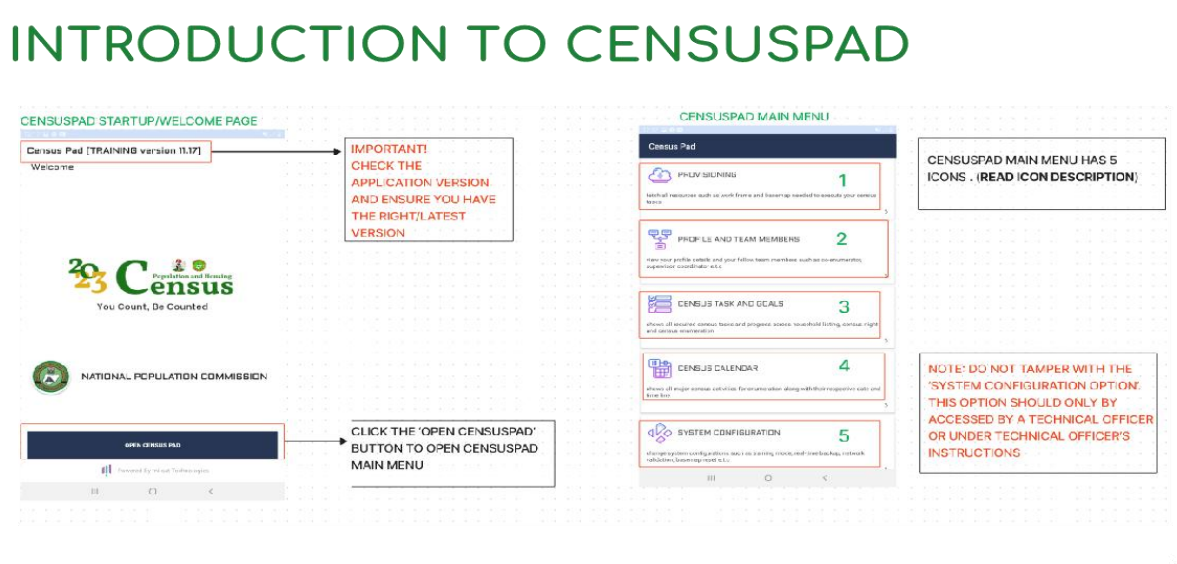
a) Ensure that the dashboard has been provisioned with Listing data as baseline information for monitoring coverage and completion of listed data during the enumeration.
b) Ensure that enumeration has started simultaneously in all EAs assigned
c) Monitor daily progress and generate report on daily and cumulative percentage coverage.
d) Compare Supervisors and Monitors completion report with data synchronized to the server

Chapter 7

Census Data Collection Applications

7. 1. Census Data Collection Application: The Data collection application for the Census 2023 is a hybridization of a homegrown application CensusPad and US Census Bureau CSEntry. The CensusPad is spatial centric and CSEntry is statistical in Nature These two applications have been hybridized to get the best of both.

7.1.1. CensusPad



CensusPad Application

The CensusPad is used by the enumerators to fetch their EA frame, building points, base map and navigate from their focal points to their enumeration area to carry out building numbering & Household listing.. The enumeration areas are geo-fenced to ensure that data capture is done only within their assigned enumeration area.

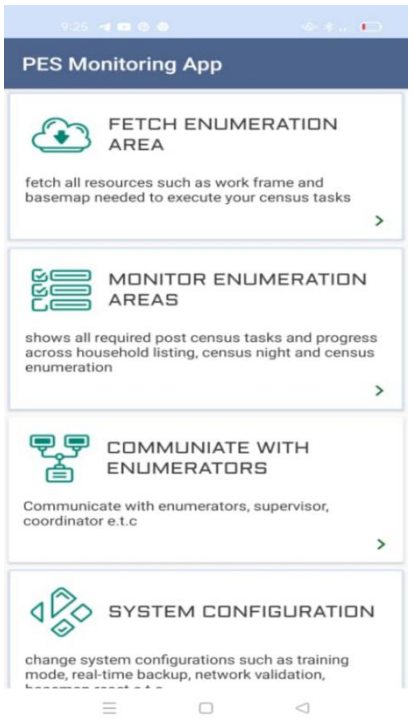
Building numbering and building update on CensusPad involves adding new building points which are recently developed, flagging of buildings that were recently demolished or deserted, identifying homeless regions and key hotspots for Census Night activities.

The census pad is designed to ensure all buildings are visited, numbered and all residential buildings have households listed within them before an enumerator can submit his/her assigned range of buildings within an EA. Validation and approval will only be triggered off when all buildings within an EA has been completely verified..(See appendix for details on Group Listing)

7.1.2. Monitoring Application: The CensusPad has a Monitoring version. Thiswill be used by Supervisors for Edit checks of the Enumerators progressive data collection and by the DQAA to also take a sample of the Supervisors area of assignment under his jurisdiction. Note that:

A Supervisor manages 3-6EAs and a DQAA manages 5Supervisors or 15 -30EAs. These Supervisor and Data Quality Assurance Assistant Area (DQA3) has been mapped out as coincise different field operations area and coded within each LGA or Focal Data Quality Area (FDQA

Monitoring Application for Supervisors and Quality Assurance assistants



The Monitoring Application on PDA shall be used by the Supervisor and QAO. The DQMs are expected to also conduct the training for the Supervisors and DQAAs. (See appendix for the training slides)

7.1.3. Introduction to CS Entry

Cs Pro, a public domain software package, was first released in 2000 and has become the leading software for data entry of paper forms used in large scale surveys and censuses. Cs Pro was developed by

the United States Census Bureau (USCB) and is supported by the bureau and ICF Macro (the organization that implements the Demographic and Health Surveys). Funding for the development and maintenance of Cs Pro is primarily provided by the United States Agency for International Development (USCB 2019).

Cs Entry a form-centric data collection application is the second component of the hybrid program for the 2023 population and housing census in Nigeria. The strength of the Cs Entry system allows for big data collection, processing and application of robust edit specifications. Some features and application of the app include;

1. Enumeration of Persons and Housing Characteristics

2. Demographic & Socio-Economic Characteristics

3.Household Demographic and Social characteristics

4. Marital status

5. Literacy

6. Education

7. Economic characteristics

8. International and internal Migration

9. information and communication technology

10. Difficulty in performing activities

11. Fertility and child survival

12. Mortality

Cs Pro and Cs Entry are widely used in large-scale surveys and censuses around the world, including in developing countries. They are designed to be user-friendly and easy to use, even for those with limited computer experience. The software is also constantly updated and improved to meet the evolving needs of users.

Functions of CS Entry

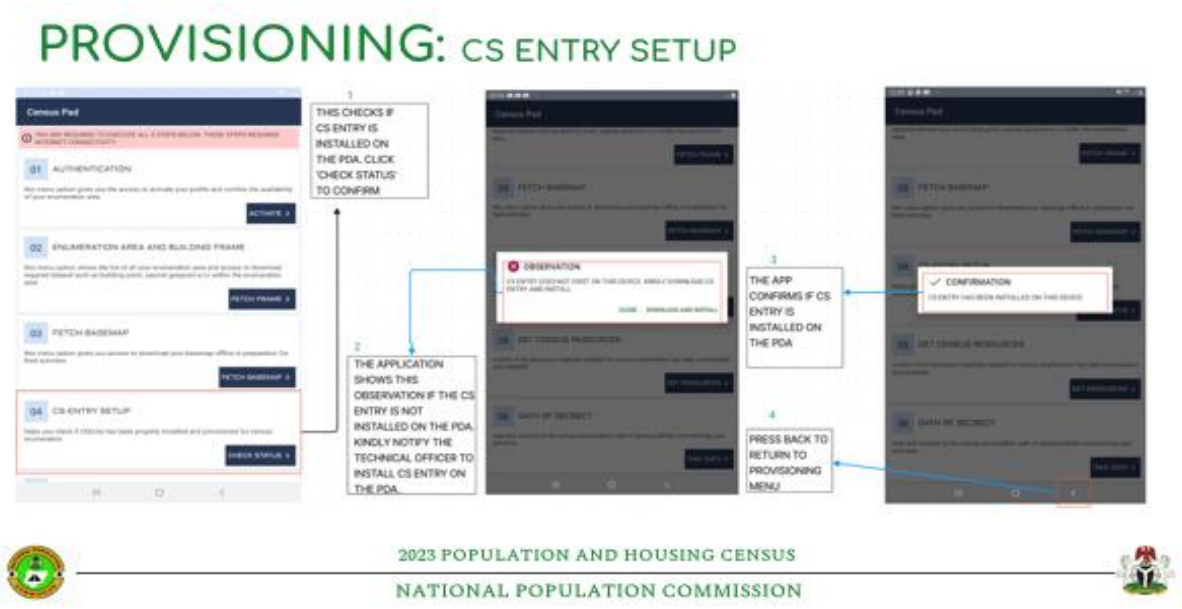
Data entry: Cs Entry allows users to enter data from paper forms into a digital format.

Form design: Cs Entry includes tools for designing and building electronic forms that can be used for data collection.

Data validation: Cs Entry includes a set of edit checks that can be used to ensure the accuracy and consistency of data.

Data export: Cs Entry allows users to export data in a variety of formats, including CSV, Excel, and SPSS.

Data analysis: Cs Entry includes tools for analyzing and visualizing data, including graphs, charts, and maps.



During the Enumeration, DQMs will assist enumerators to provision their tablets with requisite applications and resources.

APPENDICES

Validation Procedures

Login to your CensusPad dashboard and search through your selected LGA to view completed EAS in your LGA.

Click on selected EAs and click to open the EA Information.

Scroll to the page end to view buildings and further click View building table.

On the Building table page, further click download building csv to download your building data.

Save downloaded building CSV data with a desired name.

Download and copy the Toolbox in your drive C as instructed

Open the ArcGIS software and navigate to the custom toolbox via the Arc Catalogue.

Extract the Validation_Report folder and place directly on C drive

Content of Validation Report Folder

Validation_Output_gdb

Validation_Toolbox

Validation_Toolbox manual.

Note: Validation Report folder containing the validation_output gdb and validation toolbox must be placed directly on c-drive and not within a folder.

INPUT

Building Frame (Cartographic Frame)

Enumeration Area (Cartographic Frame)

Downloaded Building data from the CensusPad dashboard (Building table from the field in .csv format)

OUTPUT

Output buildings (goes to a default gdb created in validation_report folder)

Validation_output (goes to a default gdb created in validation_report folder)

Validation output report in excel format (goes to validation_report folder by default.

Note: rename all outputs in a unique way for easy identification and ensure validation report name ends in .xls.

6.2.4 Interpretation of Fields (Validation)

TOT_BLDS: Total Buildings from Demarcation data

NEW_TOT_BLDS: Total Buildings After Building Numbering and Household Listing

TOT_RES: Total Residential Buildings from Demarcation data

NEW_TOT_RES: Total Residential Buildings After Building Numbering and Household Listing

TOT_NONRES: Total Non-Residential Buildings from Demarcation data

NEW_TOT_NONRES: Total Non-Residential Buildings After Updating and Household Listing

TOT_HH: Total Households in Residential Buildings During Demarcation

NEW_TOT_HH: Total Households in Residential Buildings After Updating and Household Listing

PERC_BLD_CHNG: Percentage difference in total buildings

PERC_RES_CHNG: Percentage difference in residential buildings

PERC_NONRES_CHNG: Percentage difference in Non-residential buildings

PERC_HH_CHNG: Percentage difference in household in residential buildings

PERC_CHNG_NONRES_TO_RES: Percentage of buildings from Non-residential status to Residential status

PERC_CHNG_RES_TO_NONRES: Percentage of Buildings from Res to Non-res

KITCHEN: No of kitchens changed to private residence TOILET: No of toilet/bathroom changed to private residence

STORE/SILO: No of store/silo changed to private residence

GARAGE: No of garage changed to private residence

ANIMAL HOUSE: No of animal house changed to private residence

PASSED: EA passed all check and can proceed to Enumeration

FLAGGED: EA did not pass at least one of the parameters and requires extra investigation.

TOT_BLDS: Total Buildings During Demarcation

NEW_TOT_BLDS: Total Buildings After Updating and Household Listing

TOT_RES: Total Residential Buildings During Demarcation

NEW_TOT_RES: Total Residential Buildings After Updating and Household Listing

TOT_NONRES: Total Non-Residential Buildings During Demarcation

NEW_TOT_NONRES: Total Non-Residential Buildings After Updating and Household Listing

TOT_HH: Total Households in Residential Buildings During Demarcation

NEW_TOT_HH: Total Households in Residential Buildings After Updating and Household Listing

PERC_BLD_CHNG: Percentage difference in total buildings

PERC_RES_CHNG: Percentage difference in residential buildings

PERC_NONRES_CHNG: Percentage difference in Non-residential buildings

PERC_HH_CHNG: Percentage difference in household in residential buildings

PERC_CHNG_NONRES_TO_RES: Percentage of buildings from Non-residential status to Residential status

PERC_CHNG_RES_TO_NONRES: Percentage of Buildings from Res to Non-res

KITCHEN: No of kitchens changed to private residence

TOILET: No of toilet/bathroom changed to private residence

STORE/SILO: No of store/silo changed to private residence

GARAGE: No of garage changed to private residence

ANIMAL HOUSE: No of animal house changed to private residence

i. **PASSED:** EA passed all check and can proceed to Enumeration
ii. **FLAGGED**: EA did not pass at least one of the parameters and requires extra investigation.

Main Parameters for Validation Status

TOT_RES_DIFF: Shows significant increase/decrease in residential buildings within EA (through newly added residential buildings/conversion from Res to Non-Res)

PERC_CHNG_NONRES_TO_RES: shows the rate of conversion of buildings from Non-residential to residential

What To Do When an EA Is Flagged?

1. Flagged EAs doesn't mean the EAs are rejected, it simply means the EA is under review by higher authorities.

2. EA ID of affected EAs should be sent out to the Field coordinators for ground truthing in full coverage LGAs and Supervisors in other states.
3. Details of ground truthing should be reported.

1. Census Questionaire for CAPI operations: All DQMS will have electronic copies for Class Practice.

2. Clear Cache:

3. Use of Visor for Class CAPI hands on training session

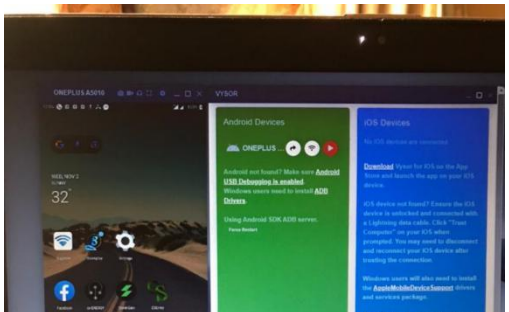
Vysor is a screen mirroring (duplicating your exact display onto another larger screen) application that enables the user to access another gadget remotely through a computer. It is an efficient application that helps to establish remote access to any gadget hassle-free. With this app, users can view contents and make edits on a mobile device using a desktop keyboard or point, click, and scroll using a mouse.

HOW TO SET UP VYSOR

On your computer, go to the Vysor app's official website and tap the Windows version of this program. Then, download the application and install it by following the on-screen instruction. Grant necessary permission during the installation.

Connect the Android phone to the PC using a USB cable and update all the drivers available on the PC. Launch the Vysor app in the computer and ensure it detects the attached Android phone. If you face any issues during the detection process, check whether the Android phone is enabled with ADB in the developer option.

Use the Find Device option in the Vysor app to detect the device and establish a connection with the device. The smartphone screen starts to stream in the Vysor app as soon as the connection is successful.



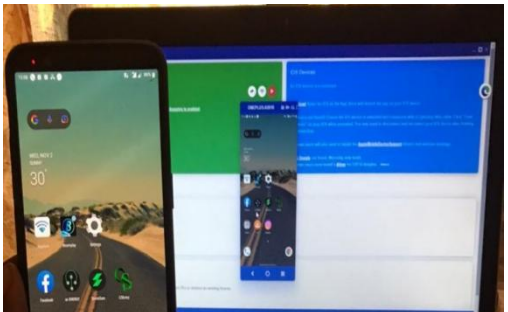


Fig: Visor Display

GROUP LISTING METHODOLOGY

2023 Population and Housing Census
You Count, Be Counted

NATIONAL POPULATION COMMISSION

DATA QUALITY MANAGEMENT TRAINING

INTRODUCTION

The methodology for the building numbering and household listing exercise for the 2023 PHC is Group listing.

This means all enumerators and supervisor within a supervisory area will conduct building numbering as a group and list all households within one EA completely before moving to the next EA within the SA.

GROUP LISTING METHODOLOGY

- The supervisor and all enumerators in an SA all start in one EA as a group
- The supervisor moves with all enumerators from building to building within the first EA to conduct building numbering.
- Supervisor assigns range of buildings to all enumerators as numbering progresses. The supervisor chalks all buildings by writing the Census no assigned to the building on the wall. When he finishes numbering the set of building assigned to the first enumerator he can comence the listing exercise, while the other enumerators continue with the Supervisor to number the buildings and receive their own assigned buildings. All buildings found on ground including new ones not found on the map must be numbered serially through the EA following the EAD serpentine order and assigned accordingly.
- Enumerators proceeds after been assigned a set of buildings, to verify and list housholds in only buildings assigned to them without going beyond the assigned buildings. (The App will not allow enumerator to go beyond assigned range except it is extended before listing comences)
- The same step is repeated for other EAs within the SA.

GROUP LISTING METHODOLOGY

NOTE

Building numbering already takes into consideration, demolished buildings and new buildings

- Only buildings physically present on ground will be numbered.
- New buildings will be assigned numbers based on their location while maintaining the flow of serial numbering. i.e new building between EAD building 1 and 2 is numebered code 2, and building 2 is numbered code 3 and so on.
- Demolished buildings will not be assigned a number. i.e if EAD building 2 is demolished, building 3 is now assigned 2 for Building numbering, however it will be verfied as demolished on the device .
- **Enumerators must not go beyond their assigned building codes. (The App should not allow them**

GROUP LISTING METHODOLOGY

NOTE

- **Numbering must be serial within an EA i.e. if Enumerator 1 is assigned buildings 001-043, Enumerator 2 will start numbering and verification from building 044**
- If a building was ommitted in the process of numbering, this means the building was not numbered or assigned to any enumerator
  - such building should be reported to the supervisor
  - the supervisor then gives the next number to the building and ensure the building is captured by the enumerator assigned the last part of the EA
- In multilocality EAs, supervisor assigns the different localities that makes up the EA to different enumerators.
- Although all EAs will be listed as a group, An EA will be enumerated by One enumerator during the Census.
- All Enumerators must be on ground with the Supervisor during building numbering and assignment and should physically receive and note every building assigned.

NOTE CONT.....

- Although all EAs will be listed as a group, An EA will be enumerated by One enumerator during the Census.
- All Enumerators must be on ground with the Supervisor during building numbering and assignment and should physically receive and note every building assigned.
- IT IS ADVISED THAT THE ENUMERATOR PROFILED TO EACH EA SHOULD BE ASSIGNED THE LAST RANGE OF BUILDINGS. THIS WILL AFFORD HIM OR HER TO HAVE HAD A RECONAISANCE OF THE ENTIRE EA WHICH WILL BE OF ADVANTAGE DURING ENUMERATION

GROUP LISTING SCENARIO

GROUP LISTING SCENARIO(SA WITH 5 EAs)

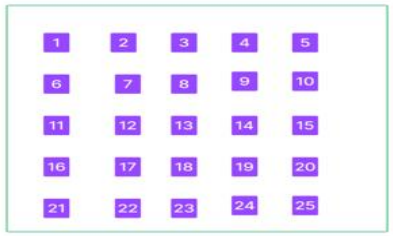
An EA with 25 buildings during EAD to be listed by 5 enumerators. The supervisor assigns 5 buildings to each enumerator tentatively.

1 to 5 for Enumerator 1, 6 to 10 for enumerator 2 and so on

In the course of numbering, if 2 new buildings are found within enumerator 1's range, the supervisor numbers both buildings, then adjust enumerator 1's bld assignment range to 1-7. and then enumerator two's assignment to start from 8.

After numbering enumerator one's assignment area, enumerator one begins building verification and household listing, then supervisor continues with the remaining four enumerators, dropping them one after the other as their assigned area is being numbered.

EXISTING BUILDINGS WITHIN EA



EXISTING BUILDINGS

TENTATIVE WORK ASSIGNMENT
Enumerator 1- BLD 1 TO 5
Enumerator 2- BLD 6 TO 10
Enumerator 3- BLD 11 TO 15
Enumerator 4- BLD 16 TO 20
Enumerator 5- BLD 21 TO 25

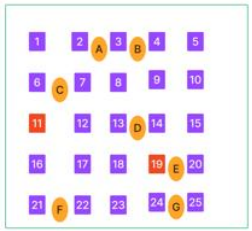
CENSUS BUILDING NUMBERING

NEW BUILDINGS
EXISTING BUILDINGS
DEMOLISHED/NON EXISTING BUILDINGS
OMITTED BUILDINGS
CENSUS BUILDING CODE

- Buildings are numbered serially as they exist on ground, with new buildings being incorporated in the census building code as they are encountered
- Supervisor adjusts enumerator1's assignment to BLD 1 to 7, then enumerator 2's assignment to BLD 8 TO 13 and so on as seen in the image based on new findings as they move as a group through the EA

Number in the shape= EAD building code as shown on map
Number above shape= census building code numbered on the wall

CURRENT STATUS OF THE EA



NEW BUILDINGS
EXISTING BUILDINGS
DEMOLISHED/NON EXISTING BUILDINGS

- **New buildings found during building numbering**
- **Some buildings have been demolished in the EA**

BUILDING VERIFICATION AND HOUSEHOLD LISTING

ENUMERATOR 1
ENUMERATOR 2
ENUMERATOR 3
ENUMERATOR 4
ENUMERATOR 5
DEMOLISHED/NON EXISTING BUILDINGS
OMITTED BUILDINGS

- **Work assigned to enumerators**
- **Supervisor inputs the assigned buildings to each enumerator in his assignment sheet**
- **Demolished and non existing buildings are assigned census building code Zero by the system as number is passed to the next building.**
- **Enumerator 1 finds 2 buildings omitted during numbering**

BUILDING VERIFICATION AND HOUSEHOLD LISTING 2

ENUMERATOR 1
ENUMERATOR 2
ENUMERATOR 3
ENUMERATOR 4
ENUMERATOR 5
DEMOLISHED/NON EXISTING BUILDINGS
OMITTED BUILDINGS

NOTE
- **The EAD building code for newly added buildings is shown multiple time on the screen because this mirrors the screen of 5 different devices.**

Recall that a new building is assigned the next EAD code after the last in the EA on every device, but the census building code differentiates them.

BUILDINGS OMITTED DURING NUMBERING

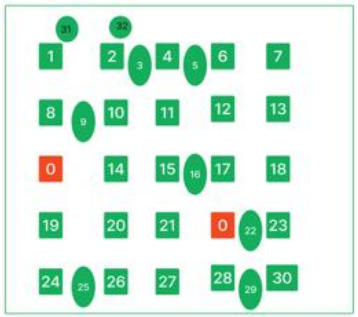
ENUMERATOR 1
ENUMERATOR 2
ENUMERATOR 3
ENUMERATOR 4
ENUMERATOR 5
DEMOLISHED/NON EXISTING BUILDINGS
OMITTED BUILDINGS

- Enumerator 1 communicates the omitted buildings discovered to the supervisor
- Supervisor ensures that the omitted buildings are captured by the enumerator 5 when he/she concludes the last part of the EA numbered.

GROUP LISTING DATA SYNCHRONIZATION

- Enumerators click the final submission button when done with assigned buildings in an EA.
- The supervisor then checks the EA on the monitoring app, and ensure all buildings have been verified, all households have been listed and then submits the EA from his device to certify the EA has been completed before the validation process is initiated.
- After validation, each enumerator will refetch their originally assigned EA to begin enumeration. (all parts of the EA listed by different enumerators will be fetched)

BUILDINGS AFTER VALIDATION



- **After validation of buildings and households listed, the buildings refetched for enumeration displays the census building codes.**