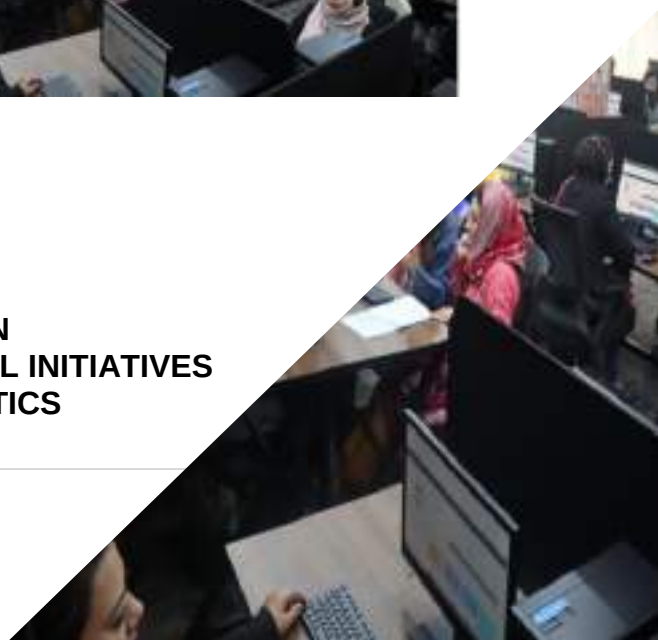
ESTABLISHMENT OF CALL CENTRE AND ITS UTILIZATION FOR COMPLAINT MANAGEMENT SYSTEM (CMS)

&

QUALITY ASSURANCE OF CENSUS 2023 THROUGH COMPUTER ASSISTED TELEPHONIC INTERVIEW (CATI)



GOVERNMENT OF PAKISTAN
M/O PLANNING DEVELOPMENT & SPECIAL INITIATIVES
PAKISTAN BUREAU OF STATISTICS
ISLAMABAD

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ACKNOWLEDGEMENT

The efforts of officers who played a pivotal role in the successful execution of the reports on "Establishment of Call Centre and Its Utilization for Complaint Management System (CMS)" and "Quality Assurance of Census 2023 through Computer Assisted Telephonic Interview (CATI)" are highly appreciated.

National Telecommunication Corporation (NTC) provided invaluable assistance, guidance, and resources to facilitate the establishment of the call centre and implementing CMS and CATI for Census 2023.

The expertise and guidance of Mr. M Sarwar Gondal, Member (SS/RM) and efforts of Mr. M Ehtesham, Director DP were invaluable in developing and maintaining the technical infrastructure required for the establishment of call center and CATI systems. The successful quality assurance of Census 2023 would have been impossible without the dedicated data collection team who conducted the telephonic interviews with utmost professionalism.

The hard work of Ms. Sobia Munawar, Director DP and Mr. M Yasir Ishfaq, Director DP and their teams for the successful execution of CMS and CATI and for providing initial reports on CMS and CATI are highly acknowledged. Further, the efforts of team leaders and teams of all the of Working Groups are also appreciated for timely response of the issues observed during Field Operations supporting staff members who, through their collective efforts, ensured the seamless operation of the call center and the efficiency of the CATI process.

The efforts put by Ms. Sana Habib Chaudhry, Statistical Officer (CPMU/PSLM) and Ms. Tayyaba Rehman, System Analyst, to conceptualize, plan, and present all the findings in this report under the guidance of Ms. Rabia Awan, DDG, CPMU/CP & C are also valued.

Executive Summary

In compliance of Government decision to Conduct the 7th Population and Housing Census, a committee was constituted to devise recommendations for the adoption of best practices. Comprehensive work has been done by a detailed Process Review of the 6th Population & Housing Census, Issues were raised by the Members of the Technical Committee of Governing Council were considered. International/National Observers Reports, Provincial Technical Committees and the Media/ Articles were also reviewed. Considering all aspects, establishment of Complaint Management System and Quality Assurance of Census data through Computer-assisted telephonic interviews (CATI) were found crucial for transparency and credibility of census results.

For effective management and to address the complaints timely, working groups were formulated and a Census Support call center was established. The Census Support Call Center also played a pivotal role in conducting Computer Assisted Telephonic Interviewing (CATI), which was carried out for quality assurance of Census 2023. Further SMS Gate Way was also launched for communicating the messages to the field staff.

The Complaint Management System (CMS) was found to be a valuable tool managed through the call center during the Census field operation. It helped to streamline communication, track issues, ensure accountability, and improve the overall quality of field operations. Further CMS was also launched during field operations to resolve the complaints of the General public, Supervisors and Enumerators.

It was also recommended by the committee constituted that Quality assurance mechanism may be adopted during and after field operations to ensure the data quality. Considering the fact CATI survey was carried out, automated calls were generated and respondent input was taken to ensure data integrity.

Dr. Mehtab S Karim, Senior Fellow SCHAR School of Policy and George Mason University in Arlington & Consultant UNFPA also recommended to use the Computer Assisted Telephonic Interviews (CATI) for Quality assurance as CATI is very flexible and less error-prone compared to legacy data collection methods which can be implemented to ensure community reach and system load management, he has also submitted a comprehensive report on the utility of CATI.

This report delves into the multifaceted role of CMS and CATI Module within the census framework and utilization of both modules. Report also cover the issues and challenges faced during implementation of modules and lessons learnt.

Background

Pakistan Bureau of Statistics (PBS) with the consultation of key International organizations and National stakeholders developed the Census methodology which was the most appropriate in current prevailing situation of the country, so that Census data be collected in a free and fair manner by using, and following the best international practices adopted for Population & Housing Censuses. Like previous census, De-Jure enumeration method was applied in the census. In this method people are counted at their usual place of residence and time period of residence was defined as 6 months and above. The homeless population was counted using the De-Facto method. In this case persons are counted where they are found (residing) during the census. All persons living in a particular census block (enumeration area) were counted whether they are nationals or foreigners, legal or illegal.

The 7th Population & Housing Census was conducted in the transparent way by involving all stakeholders & by adopting modern technologies for credibility and wider acceptability. In the regard best practices of regional and developed countries were considered.

PBS higher management also visited South Africa, Bangladesh and Egypt to review, the system flow and PBS designed the 7th Population and Housing Census accordingly, CATI & CMS was part of the flow and adopted for transparent and smooth execution of census and for quality assurance purpose.

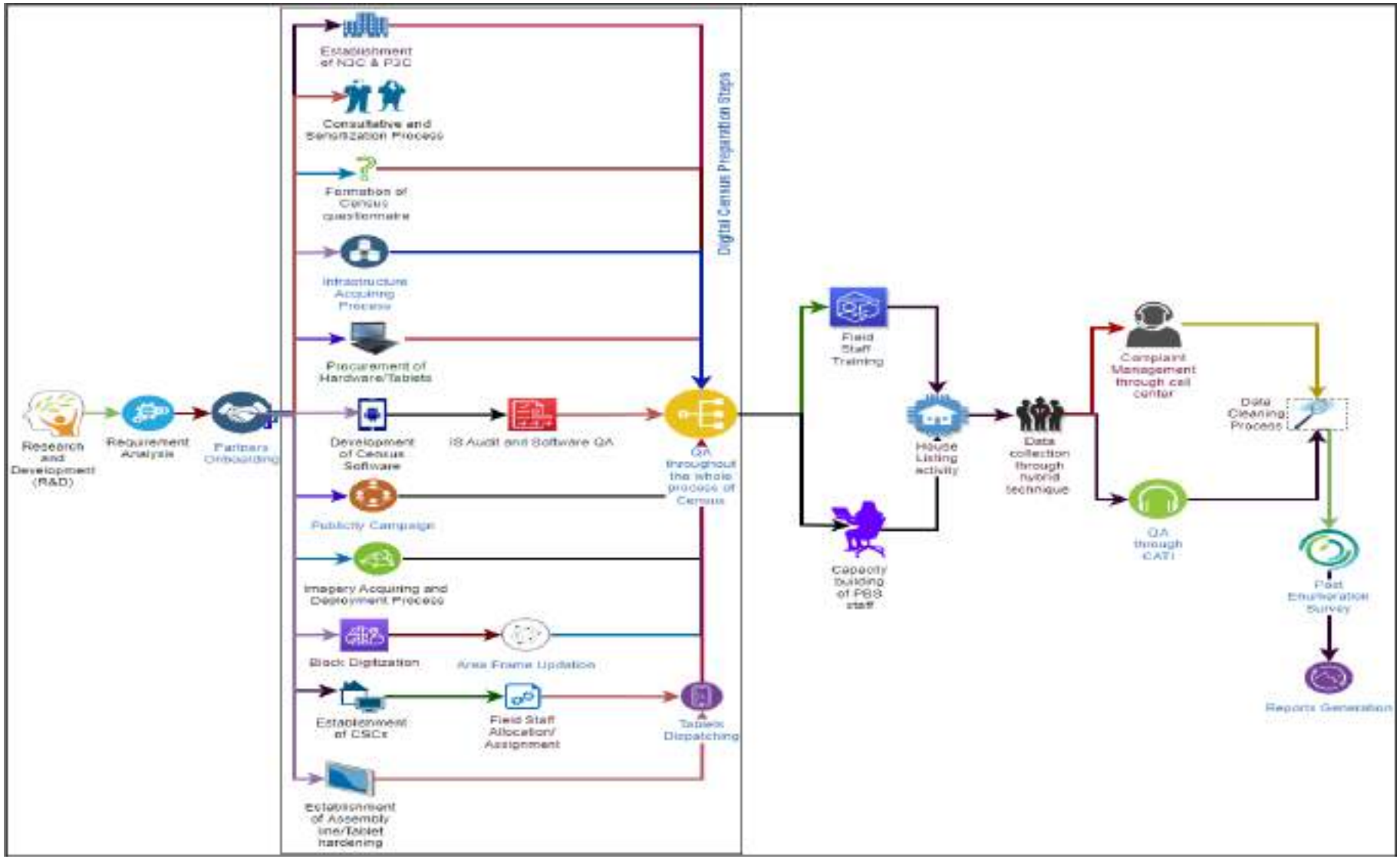

Figure 1: System Flow

Both the modules were among the 16 Modules designed for the conduct of Census 2023. CMS & CATI, were originally designed to manage complaints and for quality assurance and by conducting interviews over the phone, to validate collected data during the census. But for practical implementation of both modules there was dire need to establish a Census Support Call Centre within the premises of PBS.

This report delves deep into the whole process of establishment of Call center and SMS gate way mechanism for implementation of CMS and CATI module. This report comprises the multifaceted role of modules within the census framework, encompassing its implementation mechanism, extensive application during census activities, intricate call generation breakdown, challenges faced, vital lessons drawn from experience, and a visual representation of the essence through insightful infographics.

In the rapidly evolving landscape of data collection methodologies, the integration of technology has brought in innovative approaches. One such paradigm shift is the utilization of QA module's, a dynamic tool that has redefined the process of collection and validation of census data**.**

Teams were Constituted for preparation of Specification and Requirement of CMS & CATI Module and to ensure its implementation, under the guidance of Member (SS/RM) and DDG (CPMU/CP&C, as below:

COMPLAINT MANAGEMENT SYSTEM (CMS)		
Lead	**DP Persons**	**Subject Matter for Preparation of Requirements**
Ms. Sobia Munawar (Director), PBS	Mr. Ghulam Kibria (DPO) Mr. Irfan Bajwa (DPA)	Qazi Ismatullah (DCC) Mr. Sayyad Anwar (CSO) Ms. Rumana Sadaf (CSO) Mr. Ali Raza (S.A) Mr. Zameer (S.A)

COMPUTER ASSISTED TELEPHONIC INTERVIEW (CATI)		
Lead	**DP Persons**	**Subject Matter for Preparation of Requirements**
Mr. M Yasir Ishfaq (Director), PBS	Ms. Sumaira Yasmeen, SA, PBS Mr. Asad, Software Developer, NADRA Mr. Sufiyan, NTC	Dr. Arshad Mehmood, CSO Ms. Sana Habib, SO Mr. Faridoon Khan, SO Mr. Ali Raza, SA Mr. Zameer Ahmed, SA

1. Establishment of Census Support Call Center

PBS Headquarters has established Call Centers within the PBS premises to manage the complaints and to carry out telephonic interviews with the help of National telecommunication Corporation (NTC), NTC provided a total of 80 well-trained call agents, with 40 agents working during each shift, ensuring 24/7 coverage. These call centers serve the purpose of registering complaints and to conduct the CATI Survey regarding First Ever Digital Census simultaneously. PBS also established SMS gate way with the collaboration of PTA and NADRA, for sending short text messages for effective communication during field operations.

1.1 Establishment of Call Centre

The Pakistan Bureau of Statistics (PBS) operates a robust call center, designed to offer comprehensive support to individuals engaged in the census process. This section provides an in-depth overview of the call center's operations, highlighting its integral role in facilitating a successful census undertaking.

1.1.1 Call Center Agents

The Census support call center boasts a dedicated team of trained agents who possess an in-depth understanding of the census process. These agents are adept at assisting a diverse range of callers, including Census Data Operators (CDOs), Supervisors, Field Staff, and respondents, proficiently addressing inquiries in various languages.

1.1.2 Wide Range of Services

The call center offers an array of services to ensure that every aspect of the census process is smoothly navigated. Services encompass answering queries related to the census, guiding staff through the completion of census forms, and adeptly resolving any issues or concerns arising from the census operations. Notably, during the digital Census, the call center plays a pivotal role in facilitating, Complaint Management and Computer Assisted Telephonic Interviewing (CATI) for outbound call generation, enhancing data quality and enabling post-Census surveys.

1.1.3 Call Routing

Incoming calls to the Census support call center are seamlessly routed to the most suitable agent based on the caller's preferred language and the nature of their query. This meticulous call routing system ensures that callers are promptly connected with the agent who is best equipped to address their specific inquiry.

1.1.4 Ensuring Quality Assurance

Quality assurance stands as a cornerstone of the PBS Call Centre's operations. Rigorous measures are implemented to ensure that the agents consistently provide accurate information and uphold exceptional customer service standards. This involves monitoring calls to ensure adherence to PBS policies and procedures. Regular training and coaching sessions further refine the skills of the agents, fostering a high level of competence.

1.1.5 Feedback and Performance Metrics

The call center actively solicits feedback from callers, actively seeking insights to enhance its performance. This feedback mechanism serves to identify areas for improvement and refine the overall service delivery. Additionally, the call center closely tracks performance metrics, including call volume, wait times, and service levels, to guarantee that every call is promptly attended to with efficacy.

1.1.6 Enhancing Census Completion

In essence, the Census support call center stands as an indispensable asset in facilitating census completion and accuracy. It extends valuable assistance and guidance in a multitude of languages, while its adherence to quality assurance principles ensures consistent high-quality service. Through diligent feedback analysis and performance monitoring, the call center continuously evolves to better cater to the needs of its callers.

The proactive engagement of the PBS Census support call center underlines its commitment to ensuring that the census process is conducted meticulously and that each individual's contribution is accurately accounted for. The call center's multifaceted services and dedication to excellence epitomize its critical role in the broader census framework.

To keep the call center after Census training of PBS staff was also carried out, which enables PBS to use the Call Centre for future surveys and to provide the CATI Services to other organizations.

Figure 2 Call Centre Pictures and Demographers visit of Call Centre

2. Communication Mechanism through SMS Gateway

Apart from modern IT-based solutions, Pakistan Bureau of Statistics utilized a range of technologies, with a prominent focus on the SMS gateway, during the 7th Population and Housing Census - The Digital Census. The SMS Gateway was employed alongside the launch of the Self-Enumeration Portal to raise awareness among the general population. Subsequently, numerous SMS campaigns were initiated to convey instructions to trainers, trainees, field force personnel, enumerators, and supervisors. Subsequently, multiple SMS campaigns were initiated, disseminating instructions to trainers, trainees, field force, enumerators, and supervisors. These messages encompassed updates on technological advancements, quality assurance procedures, the generation of complaint management tickets through SMS, and the dissemination of public awareness messages, among other functions.

An application for sending an SMS message to the gateway was designed by NADRA, and PTA assigned Short code **9727** to PBS to white list PBS short code to all telecom providers.

PBS used the SMS Gate Way Services in following ways:

- SMS gateways was integrated into automated systems established with the collaboration of PBS, PTA and NADRA
- SMS gateway was also used to send verification code & Confirmation message for self-enumeration
- PBS use SMS gateways to send mass messages and alerts to a large number of recipients regarding training date and venue.
- PBS sent alerts and Messages regarding pending task to enumerators
- Supervisors were approached through SMS gateway to enhance the monitoring mechanism to improve and ensure data quality.
- Supervisors were also informed about the data quality issue of enumerators if observed through
- CATI Survey.
- PBS communicated the information regarding Eid leaves and Extension in date of Field operations of Census to the field staff.

SMS gateways was effectively utilized during Census field operations for smooth execution of training and field operations.

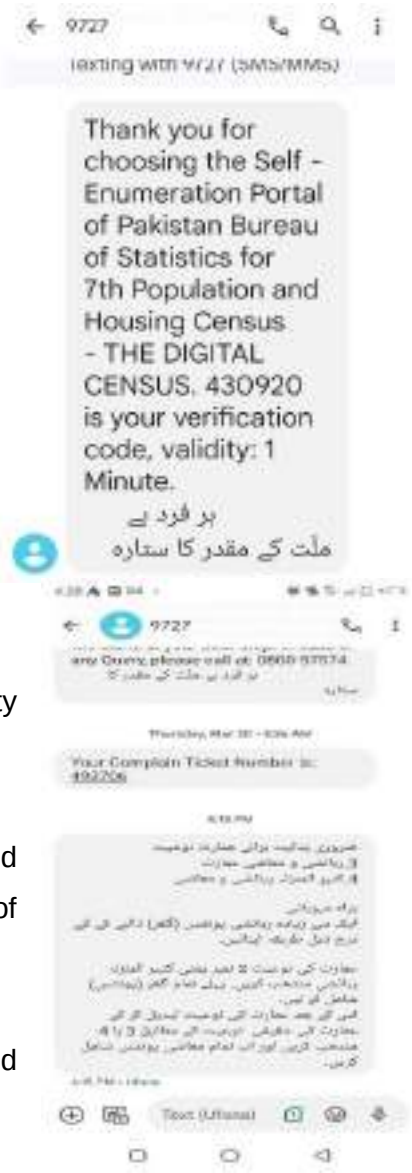

Figure 3 Message sent through SMS Gate Way

PART -1
Complaint Management System
CMS

3. Complaint Management System (CMS)

A Complaint Management System (CMS) is a software tool enabling to efficiently address users' inquiries and complaints. By centralizing users' interactions, categorizing and prioritizing issues, automating workflows, and offering communication tools, the system streamlines the complaint resolution process. Additionally, it provides valuable reporting and analytics, facilitating the monitoring of complaint trends and overall performance.

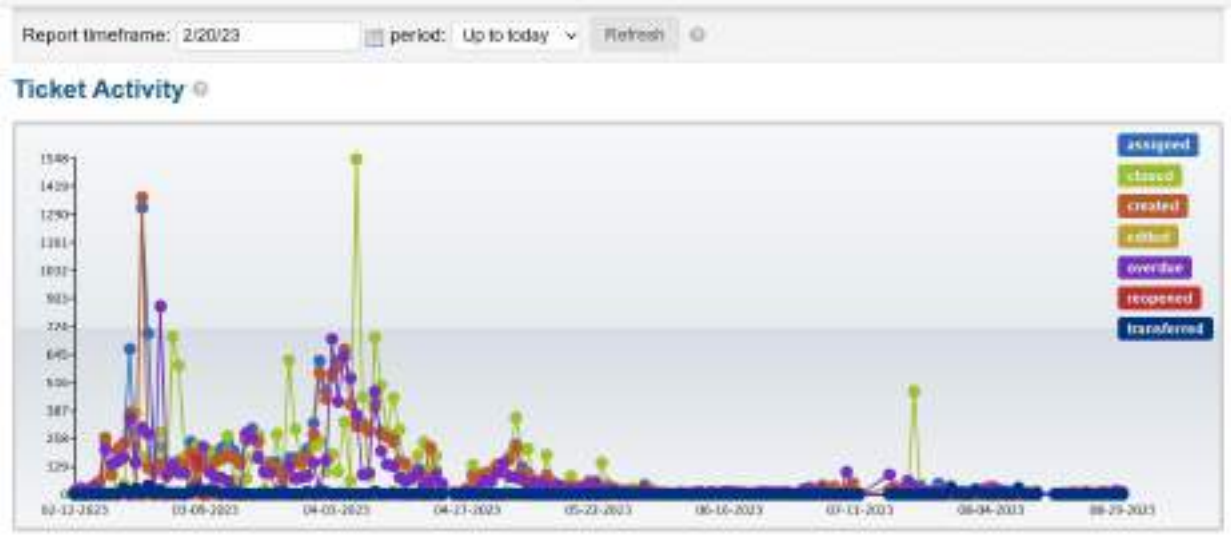

Figure 4 Ticket Generation Statistics

Pakistan Bureau of Statistics (PBS) adopted Complaint Management System (CMS) to implement a structured and organized approach to handle all stages of complaint resolution for various types of issues during 7th Population and Housing Census (First Ever Digital Census 2023). PBS provided a toll-free Universal Access Number (UAN) **0800 – 57574** to facilitate reporting of complaints. The complaints are originated by different user groups, such as **Field Enumeration Staff, Census Support Center, and General Public.** PBS aims to efficiently address and manage these complaints, ensuring a systematic and effective resolution process. The PBS CMS guides complaints through a well-defined life cycle, from the initial reporting stage to the final resolution.

Figure 5 Utilization of UAN

The Complaint Management System serves as an administrative module within the Census Software. Users can access the system to report their issues and complaints. This module enables efficient handling and

resolution of complaints, contributing to better management of First Ever Digital Census related complaints and ensuring a smooth overall census process.

CMS was designed to handle diverse types of complaints based on the roles and associated issues related to help topics. Whenever a ticket is generated, the CMS automatically routed it through the appropriate help topics, directing it to the relevant **working group** designated for its resolution (**Working Group along with TORs is Annexed as Annexure A**). This process ensures that each complaint should efficiently directed to the appropriate team, streamlining the resolution workflow and improving the overall complaint management process.

3.1 CMS and Call Center Integration

PBS Headquarters has established Call Centers with a total of 80 well-trained call agents, with 40 agents working during each shift, ensuring 24/7 coverage. These call centers serve the purpose of registering complaints regarding First Ever Digital Census into the Complaint Management System (CMS). Once registered, these complaints are then directed to various working groups responsible for their resolution.

NADRA develops application of Complaint management system and with the collaboration of PBS, NADRA and NTC the system was integrated to make system functional. This approach ensures an organized and efficient process for handling and resolving complaints raised by complainants. The call center serves as an entry point, ensuring that each complaint is appropriately addressed by the relevant working group.

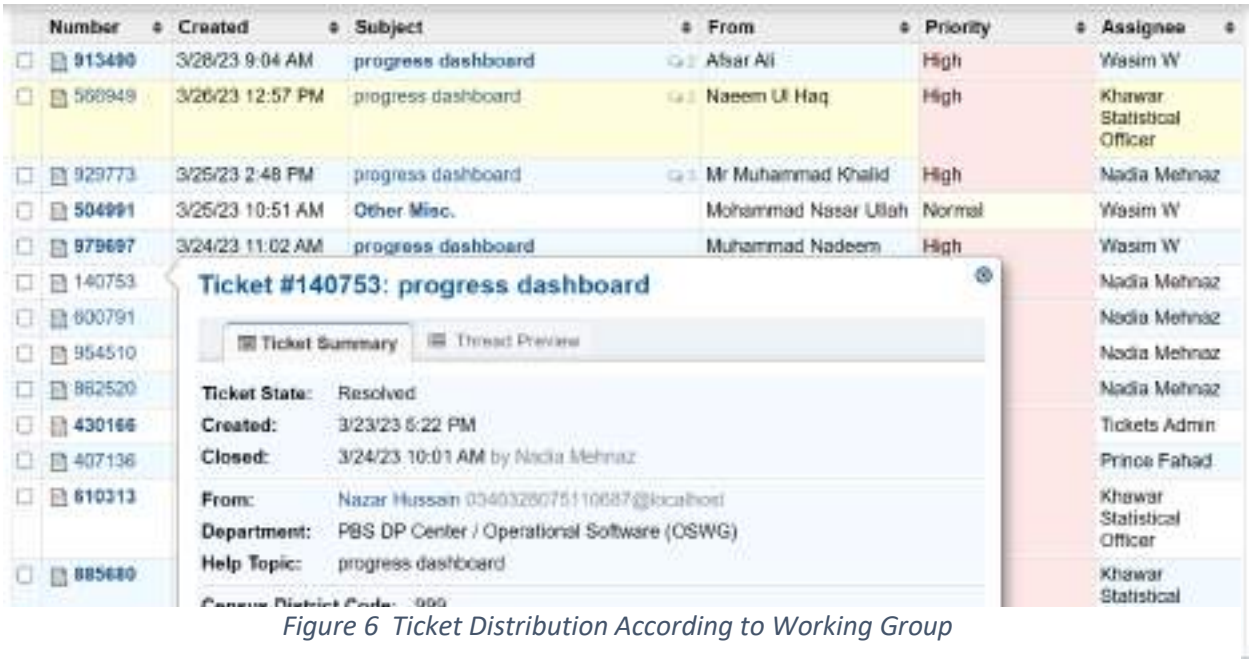

Figure 6 Ticket Distribution According to Working Group

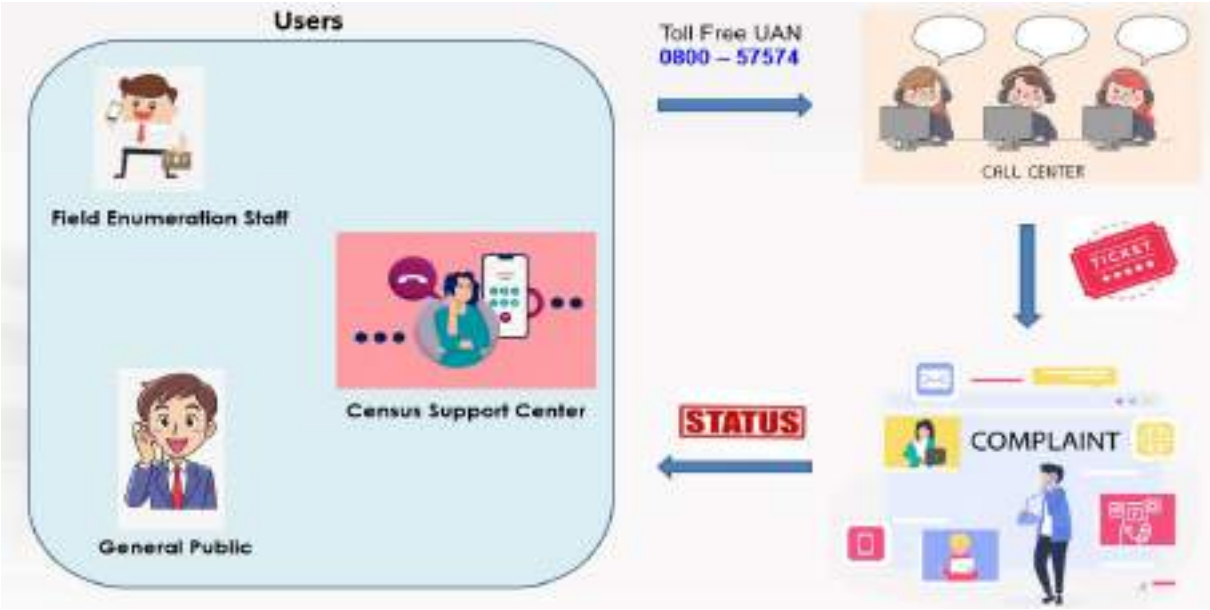

Figure 7 CMS & Call Centre Integration

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Teams

Add New Team | More

Team Name	Status	Members	Team Lead	Created	Last Updated
Admin and Logistic Group(ALG)	Active	12	Dr Amjad Javaid Sandhu	2/10/23	2/10/23 8:52 AM
Administrative Modules	Active	17	Muhammad Yasir Ishfaq	12/20/22	2/7/23 11:02 AM
Advocacy team	Active	12	Muhammad Bashir Janjua	2/10/23	2/10/23 12:08 PM
Area Frame	Active	23	Muhammad Yasir Ishfaq	2/6/23	2/8/23 10:43 AM
Call Center Team	Active	11	Muhammad Ehtesham	2/10/23	2/10/23 11:50 AM
Census Support Rawalpindi	Active	20	Syed Hassan Raza	2/7/23	2/7/23 2:10 PM
Data Center(DCWG) Team	Active	10	Muhammad Ehtesham	2/7/23	2/10/23 11:26 AM
Data Quality Assurance and Tabulation	Active	22	Muhammad Yasir Ishfaq	2/10/23	2/10/23 10:21 AM
Field Support (FSWG)	Active	26	Rafiq Hussain Talpur	2/7/23	2/7/23 2:16 PM

Figure 8 Complaint Assignment to Working Group

3.2 . CMS Work Flow

The Complaint Management System (CMS) workflow follows a series of steps to efficiently handle and resolve enumerators complaints. The CMS workflow is outlined as follows:

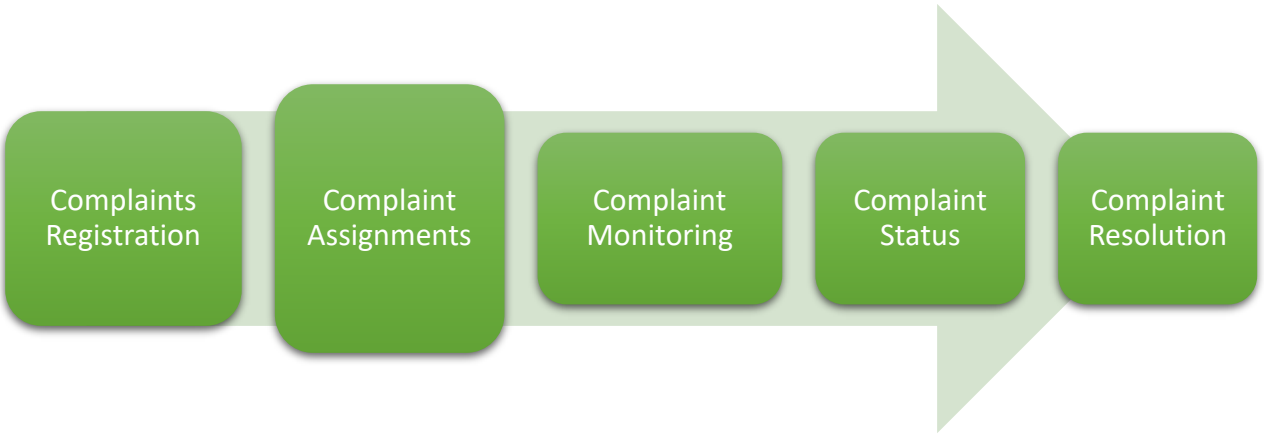

Figure 9 CMS Work Flow

3.2.1 Complaints Registration

Complaint's registration was the initial step in CMS workflow, where users initiate the process of lodging complaints related to the issues faced by them.

3.2.2 Complaint Assignments

Complaint assignments was the process of allocating complaints to the appropriate working groups for resolution based on the tickets an assigned SLA. Each working group had its agents who are provided with username and password to access CMS. Super user is admin having complete access of Complaint Management System.

Figure 10 CMS Login Mechanism

3.2.3 Complaint Monitoring

Complaint monitoring is a crucial aspect of effective complaint management. It involves closely overseeing and tracking the entire lifecycle of complaints, starting from the moment they are initiated to their eventual resolution. The primary goal of complaint monitoring is to ensure that complainant concerns are addressed promptly, fairly, and efficiently, leading to improved satisfaction and transparency.

3.2.4 Complaint Status

Complaint status refers to the current stage of a complaint within the CMS. It helps support complainants to track the complaint's journey. The complaint status provides information about where the complaint stands in the resolution process and helps to track the progress and ensure that the complaint is being addressed properly.

The complaint status provides transparency by allowing to have a clear understanding of the progress made toward resolving the issue. It's an important aspect of effective complaint management, as it helps maintain accountability, satisfaction, and process efficiency.

3.2.5 Complaint Resolution

Complaints were resolved mostly on call to the complainant. if a complaint is about login from a particular enumerator CMS will route the complain to relevant working group focal person and they coordinate with the relevant support center to help that enumerator. When his issue will be resolved by the concerned working group. He can auto understand when he refreshes the system. Sometimes in most critical situation call has been done by particular working group to the concerned complainer to ask for issue to be resolved. Similarly, census support center can also be able to resolve the complainer issue on spot.

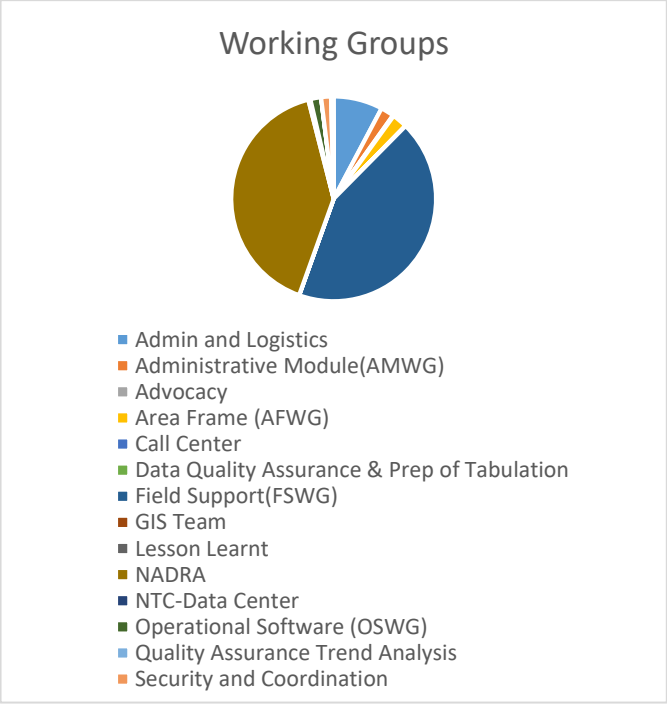

Figure 11 Dashboard with Assignment of Complaint to Relative Working Group

3.3 CMS ISSUES

The Complaint Management System (CMS) is designed to address various issues related to managing complaints and inquiries efficiently. Main categories of issues that CMS caters are depicted in table.

Table 1 Main Issues Reported through CMS

Issue	
Network	Non-Response
Tablet	Concepts Clarification
MDM	Media Issue
Listing	Access Required
Enumeration	Data Security
Boundary or Map	Data Required
GPS Location	Delivery
HR & Task	NADRA Staff
Self-Enumeration Portal	Dashboard
Security	Stolen or missing
Duty Reporting	Reserve
Staff Availability	Other Software
Behavior	Area Frame
SMS Gateway	Weather Issue
Public Issue	Local or Political
Other Hardware	Misc. Complaints

3.4 COMPLAINANTS' ROLES

The successful execution of a nationwide census relies not only on thorough planning and advanced technologies but also on the effective coordination and management of stakeholders. Comprising individuals responsible for data collection, supervision, and resolution of issues, the following roles play a crucial part in streamlining the entire Complaints resolution process.

Figure 12 Complainants

3.5 Issues and Challenges

The implementation of the Complaint Management System (CMS) faced multidimensional challenges.

- Coordination issues between NADRA and NTC
- Disrupted API functionality due to interdependence
- The manual user creation process demanded time and effort.
- CMS lacked proper configuration, and delayed integration with HR impacted user management in initial days of Census Field Activity.
- The absence of integration with the Inventory Management System led to resource allocation issues.
- NADRA's reluctance to deploy CMS at Census Support centers and provinces due to time constraints posed obstacles.
- Lack of proper training and support from NADRA hindered PBS officials' CMS proficiency.
- Frequent VPN connectivity issues and session timeouts affected system usage.

The provided CMS did not align well with PBS requirements, and its dashboard lacked comprehensiveness. System allowed only one-way communication; No mechanism to update complaint's status to complainants was provided. PBS team had to analyze and inform the status to all complainant through direct calls. Overcoming these challenges requires improved collaboration, thorough training, enhanced technical support, integration improvements, and a more user-centric approach to CMS implementation.

3.6 Lessons Learnt

The integration of the CMS with the census software was to be accomplished before the start of Census Field activities. Implementation of the CMS at Province-wise and Census Support Centers-wise level could not proceed as intended due to shortage of time. Integration of the CMS with Census Apps did not take place well in time, It was necessary to establish a direct mechanism for forwarding complaints from the Apps to the CMS. Provision of a web interface for the general public to access the CMS was not done which limit the accessibility and engagement of the public with the CMS, potentially affecting the ease of information dissemination and interaction.

Complaints from users were successfully directed to the CMS and resolved. However, the absence of a mechanism to respond back to users, aside from direct phone calls, posed challenges. Not being able to convey complaint status to complainant led to one-way communication, causing operational difficulties. In the initial 2 days of the Census Operations, time constraints prevented the capture of district and province data due to the lack of integration between the Call Center and CMS APIs. This resulted in empty entries (blank) in the province field.

3.7 Management System Reports

3.7.1 Complaints stats from 20-02-2023 to 20-05-2023

Table 2 Total Complaints Received

TOTAL COMPLAINT STATUS	TOTAL NUMBER OF COMPLAINTS
Open	**262***
Resolved	14416
Grand Total	**14678**

3.7.2 Province wise Complaints dated 20th February to 20th May 2023

Table 3 Provincial Complaint Distribution

PROVINCE WISE	TOTAL COMPLAINTS
Azad Jammu & Kashmir	77
Balochistan	863
Gilgit-baltistan	6
Islamabad Capital Territory	662
Khyber Pakhtunkhwa	1484
Punjab	7649
Sindh	3812
(blank)*	125
Grand Total	**14678**

***262** Open Complaints are related to Security and Budget Issues (**Annexure B**).*

*** Integration issues between Call Center and NADRA APIs during initial Census Operations led to **Blank** entries in the Province field.*

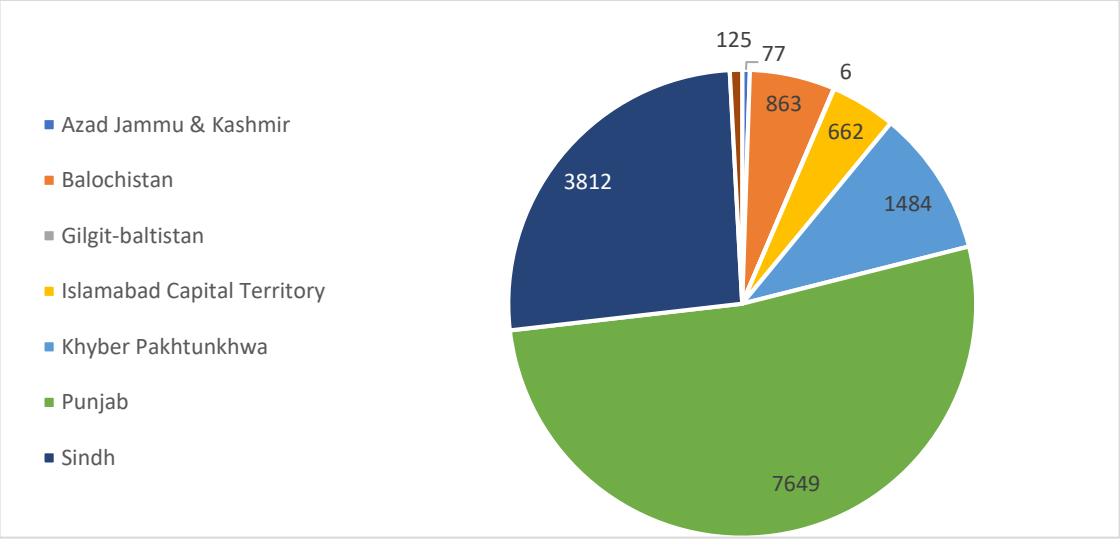

Figure 13 Provincial Complaints Distribution

3.7.3 Working Group Wise Complaints dated 20th February to 20th May 2023

Following table shows total number of complaints received for each working group. (Annexure-F; Detail)

Table 4 Complaint Distribution W.r.t Working Groups

Working Groups	Complaints
Admin and Logistic Group	2186
Application Support team for Administrative Module	233
Advocacy Group	31
Area Frame Working Group	628
Data Quality Assurance & Preparation of Tabulation	2
Field Support Working Group	5590
Operational Working Group	5596
Data Center Working Group	88
Security and Coordination Group	220
Tablet Management Working Group	84
Training Management Working Group	20
GRAND TOTAL	**14678**

**All the working group closely in coordination with NADRA and forwarded the tickets or complaints which are closely related to NADRA for the resolution of issues/complaints generated from any type of user (field staff and general public)*

3.8 Summary

The Complaint Management System (CMS) implemented by the Pakistan Bureau of Statistics (PBS) offers an efficient way to address and manage user complaints during the 7th Population and Housing Census. The CMS streamlines complaint resolution through centralization, categorization, and automation, aiding in effective communication and resolution. PBS established a toll-free Universal Access Number (UAN) to facilitate complaint reporting, with complaints originating from various user groups.

The CMS workflow consists of several key steps, including complaint registration, assignment, monitoring, and resolution. Complaints are categorized, assigned to appropriate working groups, and tracked through the process. The integration of CMS with call centers ensures complaints are efficiently registered and routed to the respective teams for resolution. SMS notifications and a user-friendly interface facilitate the process.

Despite challenges such as integration issues, time constraints, and one-way communication, the CMS has successfully handled and resolved a substantial number of complaints. PBS adopted an organized approach to resolve complaints, benefiting from a structured workflow and efficient call center integration. The CMS addresses a wide range of issues categorized under roles and areas, with a comprehensive list of complainants' roles, including enumerators, supervisors, and the general public. Despite lessons learned and challenges faced, the CMS has demonstrated effectiveness in managing complaints related to the First Ever Digital Census. Reporting on CMS activities shows that a significant number of complaints have been resolved, contributing to a smoother census process. The system's integration with call centers, categorization of complaints, and effective tracking have all played roles in its success.

In conclusion, the Complaint Management System adopted by PBS has provided an organized and streamlined approach to handle complaints during the First Ever Digital Census. Despite initial challenges, the system's integration, categorization, and monitoring have collectively contributed to efficient complaint resolution and improved user experience.

PART -2
QA Through Computer Assisted Telephonic Interviews
CATI

4. Introduction of Computer Assisted Telephonic Interviews (CATI)

The CATI module serves as a critical component in modernizing census data collection, offering an array of features and an intricately designed implementation mechanism that ensures efficient and accurate data collection. Mr. Mehtab Karim, UNFPA Expert also recommend quality assurance through CATI and Post Enumeration Survey, he submitted the detailed report (Detailed Report Mehtab Karim, UNFPA, Consultant, Report)

This section delves deeper into the **Specifications of the CATI module** and how it is implemented within the census framework.

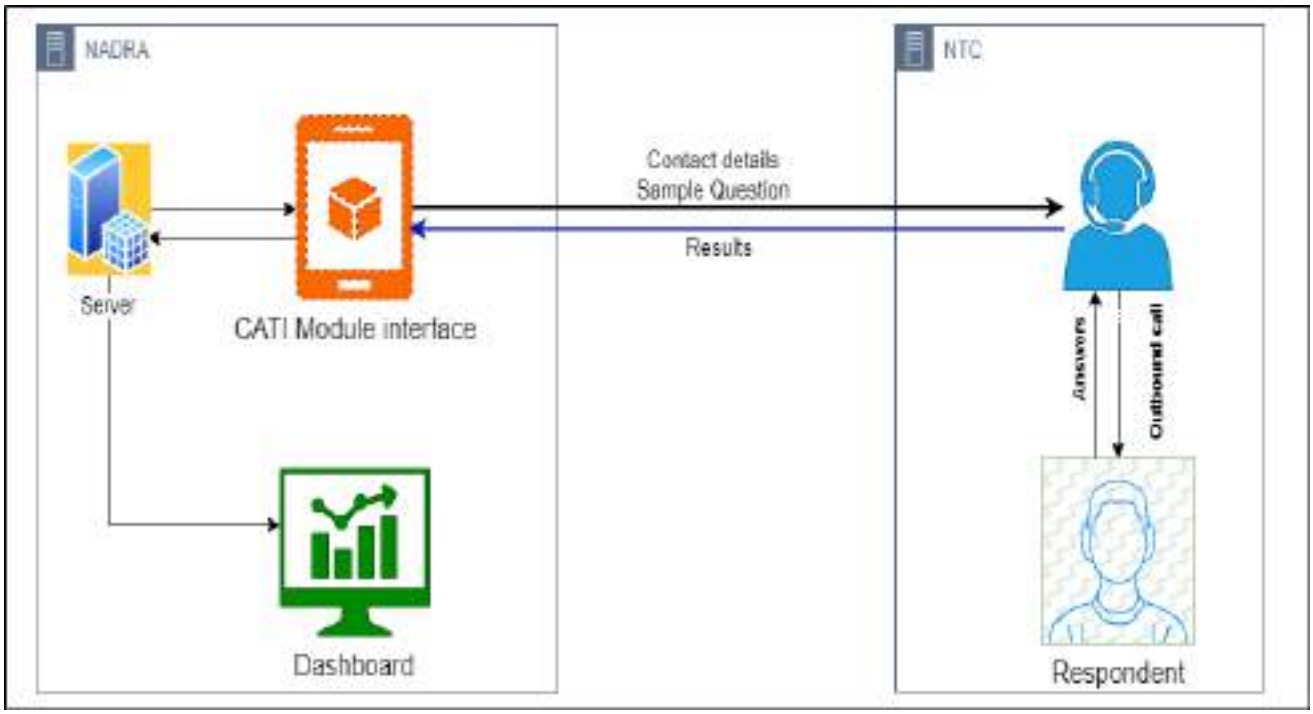

Figure 14 CATI Work Flow

Accessible Interface for Remote Interviews

The CATI module provides an accessible interface for interviewers and respondents, enabling remote interactions while maintaining the rigor of data collection. The module is designed with user-friendliness in mind, ensuring that interviewers can seamlessly navigate through the system and respondents can comfortably provide information over the phone.

Customizable Questionnaires

One of the key advantages of CATI is the flexibility it offers in terms of questionnaire customization. The module allows for the creation and customization of questionnaires to cater specific scenarios and demographics. This customization ensures that the questions posed to respondents are relevant and capture the necessary data points accurately.

Real-Time Data Validation Checks

CATI incorporates real-time data validation checks to enhance data accuracy. As interviewers enter responses into the system, the module automatically performs validation checks to identify discrepancies or inconsistencies. This immediate feedback loop allows interviewers to address errors on the spot, reducing the likelihood of data entry mistakes.

Secure Transfer of Sensitive Information

Data security is a paramount concern in any data collection process. CATI employs robust encryption protocols to ensure the secure transmission of sensitive information between interviewers and the centralized database. This encryption safeguards respondent data, ensuring that confidentiality is maintained throughout the process.

Call Generation Algorithm

At the heart of the CATI module lies a sophisticated call generation algorithm that orchestrates the distribution of calls to respondents. This algorithm is informed by various factors, including regional population data, census progress dynamics, and trend analyses. These factors collectively guide the algorithm's decisions on call distribution and intensity.

Population Density-Based Allocation

The call generation algorithm employs population density-based allocation to ensure proportional representation to provinces. It strategically distributes calls to regions based on their population densities, ensuring that areas with higher populations receive a commensurate number of calls. This approach prevents overloading certain regions while underserving others.

Dynamic Adaptation for Data Consistencies

The call generation algorithm operates dynamically, adapting to emerging data inconsistencies. If deviations from expected data patterns are detected, the algorithm responds by intensifying calls to specific areas. This targeted approach helps address potential data inaccuracies in real time, allowing supervisors to intervene and rectify issues promptly.

Interviewer Training and Implementation

Implementing the CATI module involves deploying the software onto the devices of trained interviewers. Comprehensive training equips interviewers with the skills to effectively navigate the software's features, interact with respondents, and manage data collection processes. The training phase is critical to ensure interviewers are proficient in both technological and interpersonal aspects of the process.

The amalgamation of these technological features and algorithmic sophistication creates a well-rounded CATI module that seamlessly integrates into the census framework. It empowers interviewers to collect accurate data while maintaining data security, resulting in a more efficient and reliable census operation.

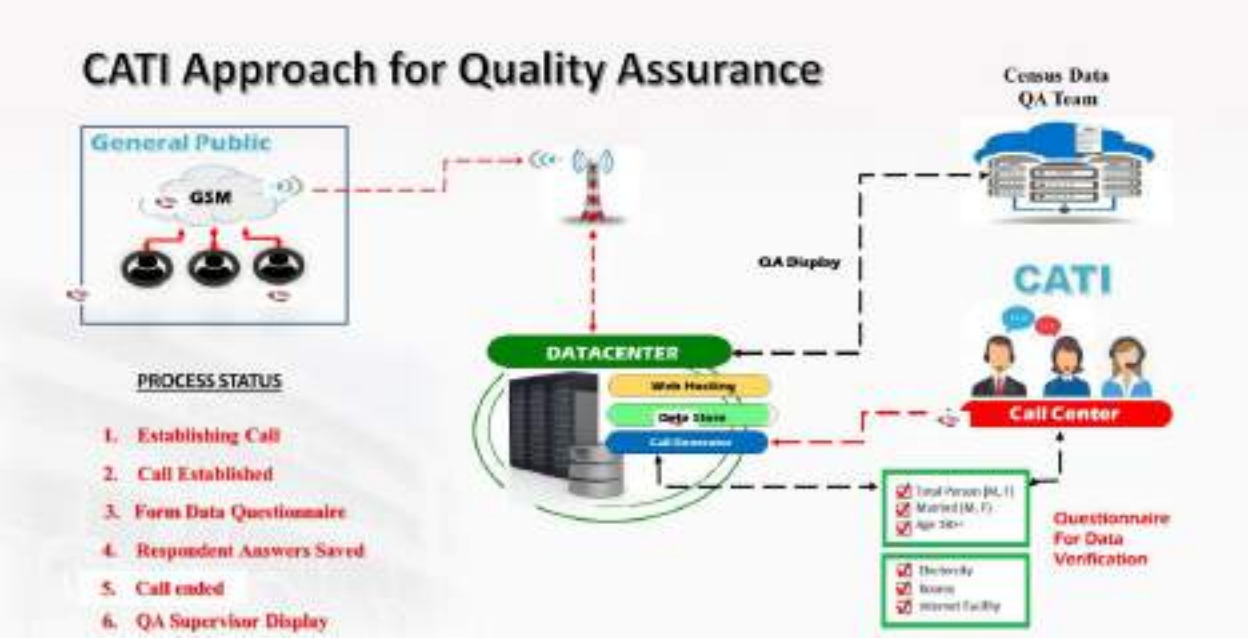

Figure 15 QA Through CATI: A Flow Diagram

Considering the specifications requirements has been shared with NADRA and NTC for development of Module

4.1 Requirements of CATI for Quality Assurance

The Module was designed for the Quality Assurance (QA) of the 7th Population and Housing Census to ensure the accuracy of the census data collected through field enumeration and provide a reliable basis

for decision-making, give confidence to the data users that the census results are reliable for purpose and will allow early release of the census results.

For 7th Population and Housing Census, QA will be carried out by using two approaches: Computer Assisted Telephonic Interviewing (CATI) and Trend Analysis. Regarding the CATI, requirements shared by subject matter section with Data proceeding Centre for review and elaborations are as below, the same was shared with NADRA by focal Person DP dated 15th October 2022.

4.1.1 Criteria-I Complaint Management

From Day 1-4 complaints will be managed through call centers. (call center will manage all the queries and escalation will be entertained related to field operations, hardware and software etc. and calls will be forwarded for prompt action by generating tickets.

4.1.2 Criteria-II Random Call

1 Calls generation for QA may be started on the 5th day of field operation.

2 Calls received at call center will be entertained based on following priority queues i.e.

- ✓ Normal Inbound calls/complaint Management Priority Queue (100% field related issues)
- ✓ QA priority Queue (30% random+ 70% trend analysis (from 7th day when Trend Analysis started till then 100 percent random)

Note: number of agents (may be adjusted during operations depend on work load) in priority queue will be managing normal inbound call. Second priority will be assigned to QA priority queue to perform quality assurance tasks. Initially 30 will continue working on complaint management and 10 will manage QA

3. Initially Calls will be generated in each province randomly proportional to the total number of households (**Annexure-C**). However, from 7th day call will also be generated on trend Analysis basis.
4. On the 7th day of the census, in addition to high-priority complaints and QA random calls, follow up calls will also be generated and for follow up, two more households of the same block will be approached where the information of the enumerator deviates from the agent's information. If the issue of inconsistent information persists, then the respective supervisor will be informed for action through the Supervisor Dashboard/ CMS etc. (may be elaborated by DP center while implementation)

5. Calls will be generated randomly to assess the QA of data till the 7th day, where agents will be managing complaint calls on the basis of criteria defined above. The system will compare the data available in the database and collected by agents. If the information is mismatched (criteria is annexed as **Annexure-D**), the message will be indicated on the QA/CATI dashboard.

    - ✓ *QA priority Queue (30% random (50 % will manage follow up calls and 50 % will continue random calls) + 70% trend analysis (from 7th day when Trend Analysis started till then 100 percent random)*

6. Further calls will not be generated to those blocks in which satisfactory feedback will be received from three households.

4.1.3 Criteria-III Trend Analysis

1. On the basis of the trend analysis dashboard, QA team will identify the blocks where issues will be analyzed and supervisors will be approached.
2. From 7th day of field Operations, while observing the trend analysis, 70 percent of QA calls will be generated by considering the trend analysis and 30 percent will be generated on the basis of random calls. The following parameters will be considered for assessment:
    - ✓ Population size, (5 percent tentative ranges will be provided on the basis of growth rate)
    - ✓ Household size, (5 percent tentative ranges will be provided)
    - ✓ Literacy, (5 percent)
    - ✓ Employment/ Unemployment rate (5 Percent)
    - ✓ Population Projection
3. If data of a block is found deviating from Census 2017 data on these parameters, then ten calls will be generated in that block. If data is found unsatisfactory, the block will be approached through the supervisor for further investigation;

Data Sources for Trend Analysis

- ✓ Census-2017: Block level, District, Province, National
- ✓ PSLM 2019-20: District, Province, and National
- ✓ LFS: Employment, Unemployment
- ✓ Projections

The supervisor will be informed for action through the Supervisor Dashboard/ CMS (will be elaborated by DP center).

4.1.4 Criteria-IV Robo Calls

1. Robo calls (4-digit code with mask PBS) will be generated randomly and message will be sent to the household with the message

اسلام وعلیکم!

جیسا کہ آپ کو معلوم ہے کہ محکمہ ادرہِ شماریات کی جانب سے، ملک میں ساتویں مردم شماری جاری ہے۔ ہمارے نمائندے نے آپ سے کوائف اکٹھے کیے ہیں ان کی تصدیق کے لیے آپکو یہ کال کی جا رہی ہے،کیا آپ کے گھر میں (یہ تعداد ڈیٹا بیس سے اٹھائی جائے گی) اتنے افراد ہے؟

اگر معلومات درست ہیں تو 1 دبائیں ۔

اگر معلومات درست نہیں ہے تو 2 دبائیں۔

(In case of non-verification message will be repeated for again verification)

2. Along calls same Message will be sent on the provided numbers for verification
3. The information of the number of calls in block, verified and not verified should be visible on the QA dashboard.

4.1.5 Requirements for Agents

- Auto calls will be generated to facilitate the operators as the response rate of CATI is 5-10 percent. After identifying the respondent, the call will be transferred to the agent for QA. *If the same respondent is not available, then the household will not be considered and calls will be made to the next household randomly**. (this requirement will be tested during the mini pilot and if required may be relaxed after testing**)*
- Each Agent will call 90-120 households per day in one shift (Assuming 4 minutes for each call and 6 hours shift).
- Questions to be asked from respondent has **already been shared** and annexed as **Annexure-E**.
- Household once selected will not be contacted again (Without replacement).

In the meeting held on 24th February 2023 to discuss the matter regarding Quality Assurance and Tabulation of 7th Population and Housing Census, under the chairmanship of member (SS/RM). It was decided that, instead of random **questions Standard set of 4- 6 questions will be asked form all the selected households during census data validation through CATI.** Questions has been finalized and enclosed as **Annexure-F** for sharing it with NADRA Development team. Later on the question no 3 & 4 were also excluded to facilitate the respondent and caller.

4.1.6 Dashboard Requirement

- Dashboard will be linked with HR dashboard, GIS/Supervisor Dashboard and Trend Analysis dashboard.
- Data on the dashboard should be available from Enumerator/Block, Circle, Charge, Admn District, Division and Province till National Level.
- GIS based visualization and correct responses w.r.t questions, overall by question, operators /Agents progress, Robo calls.
- Customized reports/ progress will be generated from National level till block level.
    - ✓ Daily Progress Summary on each criteria (I-IV) mentioned above (QA calls generated, Verified questions not verified questions identified in blocks/Census district, Admn district, division, Province, National level.
    - ✓ Enable printable Customize report generation w.r.t hierarchy.
- Population pyramids for Census-2022 (Solid color) embedded on the population pyramids of Census-2017 (transparent color) with a table of the following parameters: total population, sex ratio, literacy rate and household size, from national to block level.

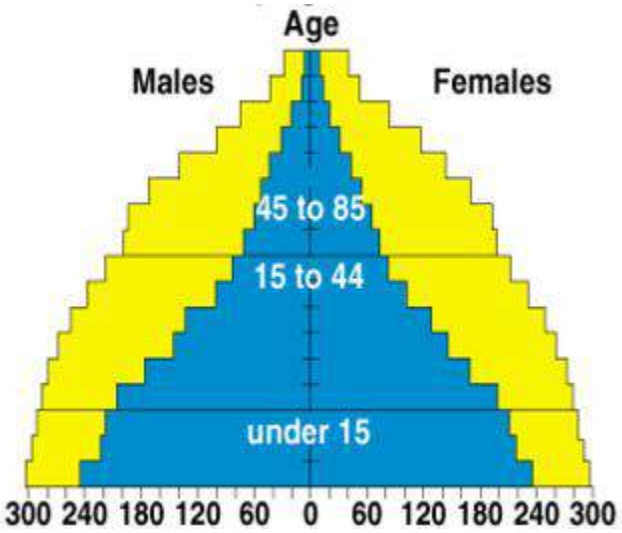

Figure 16 Population Pyramid for Trend Analysis

In case of unsatisfactory progress, supervisors will be intimated for taking action as discussed above (may be elaborated by DP team while implementation)

4.1.7 Hierarchy for Dashboard Access

CATI Dashboard will be visible only to the following Officers/ Officials at HQ.

- Chief Statistician
- Member (SS/RM) & Member (C&S)
- DDG CPMU
- Director FS, Director DP, Director CPMU, GIS
- CSO CPMU & CPC
- Officer of CPMU & DP
- The relevant QA Working Groups (information will be shared when finalized)

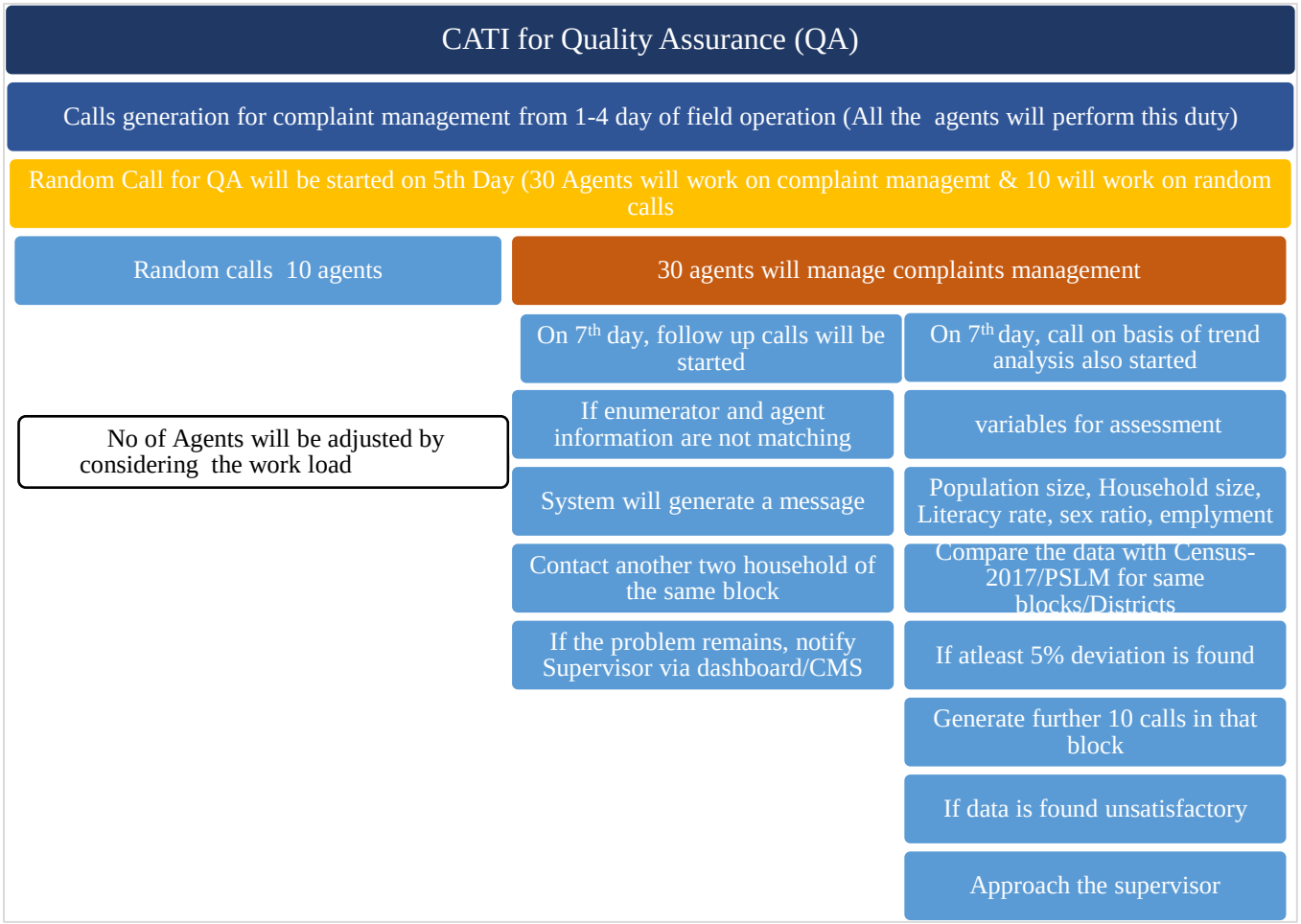

Figure 17 CATI Criteria Chart

4.2 Limitations in Implementation and Utilization of Module during Census Activities

4.2.1 Limitations in Implementation

a Delayed Deployment

Requirements of Module was shared with NADRA dated 25th October 2023, despite several reminders the demonstration was not provided to PBS. NADRA preferred the operational Modules and the CATI was being neglected. The demonstration of call generation was only given.

b Pending Features of CATI

It is pertinent to mention that, the first version of CATI dashboard was supposed to be deployed in the **first week of March 2023** but shared with PBS after multiple formal requests and in-person pursuance, on **14th March 2023** for testing purpose.

Issues were observed and during the course of time PBS continuously coordinated with NADRA development team but they were unable to implement following features:

- Age pyramid which was required for the comparison of age stats of 2017 and 2023 for trend analysis is not provided as per requirement.
- The demographic statistics supposed to be generated based on dataset was already shared with NADRA, Pre-requisite data comprising of indicators from Population Census 2017 ***(population, average household size, literacy, employment rate, sex ratio and population growth rate at block level with complete hierarchy), PSLM 2019-20 and LFS (literacy, Pakka HH and employment rate at district level) were provided to NADRA via email on 19th February***
- The formulas for indicators calculation based on Census 2023 data were also confirmed by NADRA in the revised SRS document's page no 150,which they requested again and again by NADRA but was not implemented.
- Follow-up calls mechanism that was shared with NADRA, was not established and demonstrated till the first week of April 2023 for the blocks where issues were observed during CATI survey, which was required to intimate the supervisor to ensure data quality. ***However, PBS sent the intimation message to the supervisor on 1st April 2023. Census 2023.***
- **Robo calls were not generated**

Due to developmental delays the module was not fully functional as per PBS requirements, but PBS has shared the intimation message with NADRA via mail on 8th April 2023 for necessary action in this regard.

c. Availability of Dashboards

Requirement for dashboard were shared for provision of insights based on a comparison of the Census 2023 data with data of Census 2017 and Surveys for the identification of problematic areas so that subsequent call generation activity for verification may be focused on the identified area, but PBS was unable

to utilize the module for identification of problematic areas and to intimate supervisor timely for rectification of the issues.

- **The** testing of the first version revealed that dashboard were not as per requirements provided by PBS rather is limited to providing outgoing call statistics along with top 5 blocks where information was incorrect (without any detail visualization). Whereas, it was deemed that the dashboard will provide insights based on a comparison of the Census 2023 data with data of Census 2017 and Surveys (already provided) for identification of problematic areas so that subsequent call generation activity for verification may be focused on the identified area, and same observations were shared with NADRA on 20th March, 2023.
- Consequently, the second version of dashboard was shared on **24th March 2023** with only populated lists of blocks where calls were generated. However, demographic data was missing in the same. Observations in this regard were also communicated vide letter of even no on 26th March 2023. The third and last version of the dashboard of CATI was shared with PBS in the evening of **6th April 2023** comprising of age pyramid and other demographic indicators, and field activities were concluded on 10th April 2023.

Due to delay in development PBS is unable to effectively utilize the CATI procedure as envisaged during planning for Quality assurance purpose, despite the continuous pursuance.

4.2.2 Utilization of Module During Census Activities

During census activities, the CATI module assumed a pivotal role, contributing substantially to data validation. Initially during first 4 days of field operations complaints were managed by the staff deputed at Call center.

Calls for Quality Assurance purpose were started from 14th March 2023 and a substantial total of 553,440 calls were strategically generated, meticulously distributed across provinces and drilled down to the block level for quality assurance purpose. For quality assurance Calls were not merely generated at random; their intensity was tailored based on the status of census activities within specific blocks as per requirement shared with NADRA & NTC. If a block was identified with mismatched information," the system triggered an increased call frequency and concurrently alerted supervisors about emerging data discrepancies.

These calls were strategically disaggregated by province, with the following distribution:

Table 5 Provincial Call Generation

Province	Surveys Generated	Surveys Completed	Success ratio (%)
Azad Jammu & Kashmir	8015	3552	44
Balochistan	20674	5305	26
Gilgit-Baltistan	2387	922	39
ICT	3603	1836	51
Khyber Pakhtunkhwa	58828	20393	35
Punjab	200580	85919	43
Sindh	91568	32536	36
Overall	**385655**	**150463**	**39**

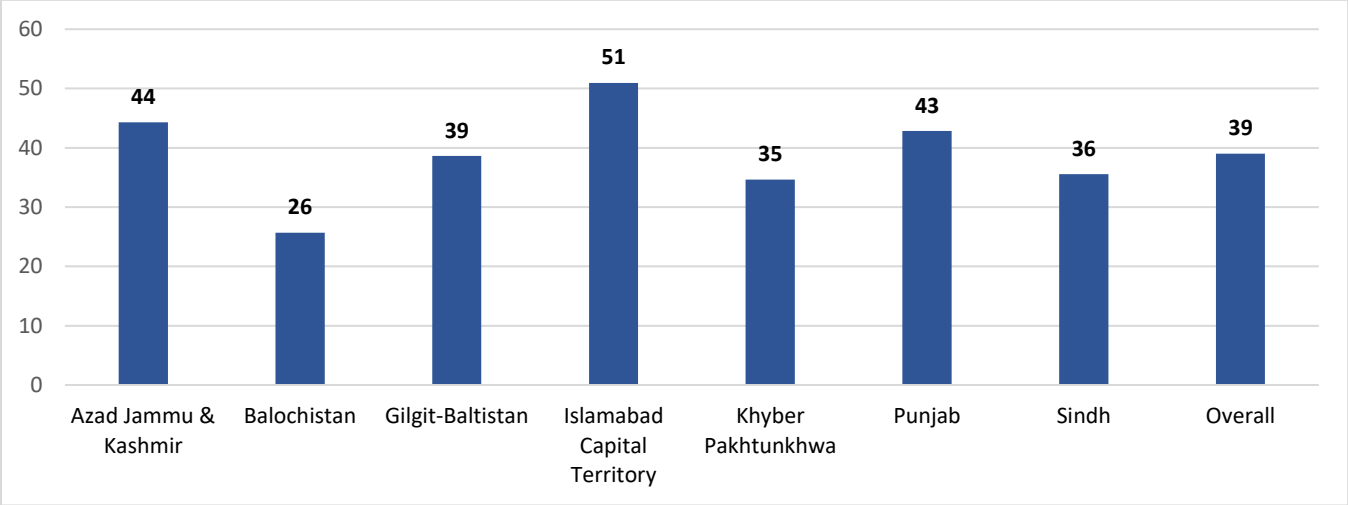

Figure 18 Provincial Response in Percent

The more detailed analysis of CATI Survey statistics depicted in **Annexure G.**

Table 6 Provincial Distribution of Correct Survey Responses

Province	In Correct	Correct
AJK	4.75	95.25
Balochistan	52.44	47.56
Gilgit-Baltistan	9.11	90.89
ICT	5.21	94.79
Khyber Pakhtunkhwa	24.67	75.33
Punjab	7.80	92.20
Sindh	32.54	67.46
Overall	**15.68**	**84.32**

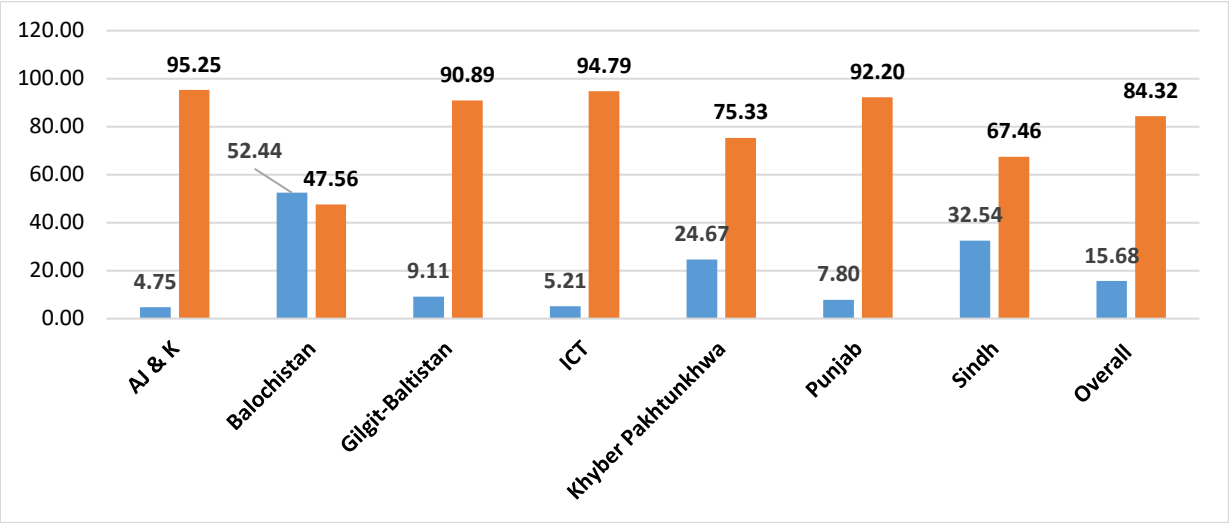

Figure 19 Correct Survey Response by Province

Follow up calls were generated considering the response of surveys and Supervisors were intimated accordingly to enhance the monitoring of data quality of the block.

4.3. Issues and Challenges

The implementation of the CATI module during the 7th Population and Housing Census (Digital Census 2023) brought about significant advancements in data collection processes. However, despite these advancements, several notable challenges and issues were encountered:

4.3.1 Digital Divide

One of the primary challenges faced during CATI implementation was the existence of a digital divide. Limited access to technology and telecommunication services, particularly in rural areas, hindered the

process of data collection. In these remote regions, where internet and phone connectivity were often unreliable or unavailable, conducting phone interviews and transmitting data posed logistical difficulties. This digital divide underscored the need for infrastructure development to ensure equitable access to technology in all areas.

4.3.2 Language Barriers

Pakistan is a linguistically diverse country with numerous languages spoken across different regions. This diversity created language barriers that affected effective communication during CATI interviews.

Ensuring that interviewers and respondents could communicate in their preferred languages presented a significant challenge. Addressing these language barriers required the development of multilingual resources and effective translation mechanisms to facilitate accurate data collection.

4.3.3 Data Security

The paramount concern of ensuring the utmost confidentiality and security of data transmitted over the phone was a critical challenge. CATI involved the collection of sensitive information over telephone lines, and safeguarding this data was of utmost importance. To mitigate this challenge, robust encryption protocols and security measures were implemented to protect the integrity and confidentiality of respondent data. This required meticulous planning and continuous monitoring to ensure that no data breaches occurred.

4.3.4 Response Bias

Another challenge observed during CATI implementation was the potential for response bias. The respondents interviewed during CATI may not have been the same individuals who were surveyed during the initial field operations. This discrepancy in respondents could contribute to variations in responses and potentially impact the accuracy of survey data. Addressing response bias required careful consideration of how to account for changes in respondents and ensure that data consistency was maintained throughout the census process.

Despite these challenges, it is important to note that the report highlights that they were effectively addressed during the CATI implementation. Measures were put in place to bridge the digital divide, overcome language barriers, ensure data security, and minimize response bias. These challenges served as opportunities for improvement and valuable lessons for future census endeavors, emphasizing the importance of robust planning and adaptability in data collection processes.

4.4. Lessons Learnt

The lessons learned from the CATI implementation during the 7th Population and Housing Census (Digital Census 2023) provide valuable insights for future data collection endeavors:

4.4.1 Deployment

One of the crucial lessons learned was related to the timing of module deployment. It was noted that the CATI module was deployed after the commencement of field operations, which led to certain operational challenges and limited testing opportunities. To address this issue, future deployments should prioritize a well-planned and thorough testing phase before the actual census operations begin. This ensures that any technical issues or glitches can be identified and resolved in a timely manner, minimizing disruptions during data collection.

4.4.2 Effective Training

Adequate training for interviewers emerged as a critical factor in ensuring accurate data collection. The report highlights the importance of comprehensive training programs that equip interviewers with the necessary skills to effectively use the CATI module. Such training should not only cover the technical aspects of the software but also emphasize the importance of effective communication and data collection techniques. Well-trained interviewers are essential for maintaining data quality and consistency.

4.4.3 Localized Approach

The report underscores the significance of tailoring questionnaires to regional languages and concerns to enhance engagement. Pakistan's linguistic diversity necessitates the ability to communicate with respondents in their preferred languages. A localized approach ensures that respondents feel comfortable and understood during interviews, leading to more accurate and reliable data collection. Future census efforts should prioritize the development of multilingual resources and translation mechanisms to accommodate diverse linguistic needs.

4.4.4 Technological Readiness

The digital divide and limited access to technology in certain areas highlighted the importance of technological readiness. To ensure equitable data collection, it is essential to invest in telecommunications infrastructure, particularly in rural and underserved areas. This investment enables interviewers to effectively conduct CATI interviews, even in regions with limited technology access. It also promotes the inclusion of all populations in the census process.

4.4.5 Data Encryption

Data security was a paramount concern during CATI implementation. The report emphasizes the necessity of implementing robust encryption mechanisms to safeguard data during transmission over phone lines. Ensuring data security is crucial for maintaining respondent confidentiality and preventing breaches. Future

data collection efforts should prioritize robust encryption protocols and security measures to protect sensitive information effectively.

In summary, the lessons learned from the CATI implementation underscore the importance of careful planning, adequate training, localization, technological readiness, and data security in census and data collection processes. These insights can serve as a valuable guide for future census endeavors, helping to improve the accuracy, efficiency, and inclusivity of data collection efforts.

4.5. Infographics

Figure 20 Glimpse of CATI Dashboard

Figure 21 Outbound Call Visibility in CRM

In conclusion, the adoption of Computer Assisted Telephonic Interviewing (CATI) marked a significant advancement in census data collection. While challenges like the digital divide and response bias was encountered, valuable lessons were learned, highlighting the importance of tailored training, technological readiness, and data security. The accompanying infographics visually encapsulate the CATI process, call distribution, challenges, and lessons. The integration of CATI in census activities stands as a testament to the transformative potential of technology in enhancing data collection methodologies.

ANNEXURE-A

S#	Working Group	Names	TORs
1	**Operational Software Working Group (SSWP)**	**DP-Team** **Ms. Sobia Munawar (Team Lead)** Mr. Asif Usman Khattak, CSA Ms. Nadia Mehnaz, System Analyst Mr. Ghufran Ullah, SA Mr. Ghulam Kibria, DPO Mr. Arsalan Bashir, DPO Mr. Muhammad Zubair, DPO Ms. Aleena Qadir, DPA Mr. Irfan Bajwa, DPA Ms. Mehreen Syed, DPA Mr. Umair Saeed, SA Mr. Ali Raza, SA	• House Listing, Enumeration, Self-Enumeration • CMS Communication • Supervisor Dashboard Application • Must ensure removal and record keeping of all anomalies/ exceptions arises during pilot. • Devise mechanism and ensure deletion/ removal of all tested data during training phase, also devise a strategy that all enumerators have same block/ block boundary/ imaginary without any doubt. • To maintain close liaison with NADRA technical support team for devising strategy for provision of support during field operations • To provide support during field operations regarding application within stipulated time with NADRA technical support team reported through complaint management system • Removing any anomalies from program reported from field with the help of NADRA team • Passing appropriate instructions during field regarding applications use /update • Ensuring timely resolution of complaints regarding software and monitoring of dashboard • Preparation of daily reports regarding the major problem faced during field operations for high ups • Conduct of meetings of high ups (level 2) committee to devise strategy for the issues which cannot be resolved at their end and to report them about decisions taken
2	**Application support team for Administrative Modules**	**DP team** **Mr. Muhammad Yasir Ishfaq, Director (Team Lead)** Mr.Tahir Mahmood Chief System Analyst Mr. Ziaullah, System Analyst Ms. Sumaira Yasmeen, System Analyst Mr. Saddam Hussain Data Processing Assistant.	• To ensure implementation of functionality required by subject matter team for Administrative Modules i.e. **HR & Task Assignment Module, Inventory Management Module, Area Frame Updation Module, Training Management, GIS Field Monitoring, CATI** • To monitor administrative module micro data and sensitize NADRA

S#	Working Group	Names	TORs
		Mr. Muhammad Tasleem Data Entry Operator **FS Team** Ms. Kanwal Murtaza, CSO (FS) Mr. Muhammad Mazahir, SO (FS) / Mr. Muneer Warriach, SO (FS) **GIS Team** Qazi Ismatullah, JCC(GIS) Mr. Muhammad Nadeem Baig, Geographical Assistant Staff from GIS **CPMU** Dr. Naveed Iqbal, JACC Mr. Saqib Sultan Khawar, SO Ms. Hina Kanwal, SO Ms. Sana Habib SO, Mr. Saeed Ahmed, ACC Mr. Ali Raza, System Analyst, Mr. Zameer Ahmed, System Analyst	Software development Team for anomaly removal (if any) • To work as lesion between PBS subject matter and NADRA software development team. • To ensure application bug fixing of administrative module through NADARA Software Developer. • Filed support provision in handling of administrative module. • In Administrative module Preparation of daily reports regarding the major problem faced during field operations for higherups • Ensuring timely resolution of complaints regarding Administrative Modules • Preparation of Control form regarding Administrative Module
3	**Area Frame Working Group (AFWG)**	**Mr. Yasir Ishfaq, Director (DP)** Mr. Muhammad Ehtesham, Director (DP) Ms. Rumana Sadaf, CSO (SD) Mr. Sayyad Anwar, CSO (FS) Mr. Asif Khawaja, DPO Mr. Sabahat Nadeem, DPO Mr. Usman Ali, DPA Ms. Maryam Shahzadi, DPA Mr. Waqar Ahmed Khan, DPA Mr. Yasir Habib, SA (SD) Representative of SUPARCO Team **ISLAMABAD HQ** Qazi Ismatullah, JCC(G) Muhammad Nadeem Baig, GA Syed Akbar Ali, GA Rafaqat Mehmood, GA Izhar-ul-Haq, SA Iffat Habib, GA Mughash Bin Khalid, JDM **OTHER GIS LABS** Akhtar Ali Khan, JCC(G), PBS, Peshawar Mussarat Yaqoob Khan, DCC(G), PBS, Lahore Manzoor Akhtar, Geographer, PBS, Multan	• Ensuring deployment of high-resolution imagery with relevant polygons on the map server and subsequently to tablets through integration of HR & task management and Inventory management • Provision of support to field staff regarding digital maps • Provision of SOPs for enumeration in big blocks and its implementation • Reporting of big block • Segmentation of big block • Vetting of updation of boundaries and blocks reported by field staff during field operations • Updation of blocks (reported during field enumeration) through area frame updation module • Updation of hierarchy in Area frame during field operations (reported from field staff) • Monitoring of field work through GIS based dashboard • Preparation of reports of the areas with problems for higherups for appropriate decisions for resolution

S#	Working Group	Names	TORs
		Azhar-ud-Din Jokhio, System Analyst, PBS, Karachi Momina Babar, System Analyst, PBS, Quetta	
4	**Tablets Management Working Group (TMWG)**	**Mr. Muhammad Ehtesham, Director (DP)** Mr. Umer Bilal, NADRA Ms. Asma Hamza, System Analyst Mr. Irfan Haider, System Analyst Ms. Samra Iqbal, System Analyst Mr. Anwar Zain, Data Processing Assistant Mr. Ziaullah, System Analyst Raja Aurangzeb Khan, SA	• Devising appropriate mechanism for resolution of problems reported from field through complaint management system and call centers • Assurance of provision of tablets (7% spare tablets at big cities and 3 % at small cities) at all census support centers. (Bay-charag blocks may also be considered for extra tablet distribution plan) • Assurance of hardening of tablets and installation of relevant applications • Ensure provision of fully prepared tablets with appropriate SIM according to network connectivity in the area • Monitoring the tablet distribution, movement, and retrieval in the field
5	**Field Support Working Group (FSWG)** Suggested group with no Network coverage and monitoring of operations already addressed in this group (TORs updated)	**Mr. Rafiq Hussain Talpur, Director (FS)** Mr. Tahir Mehmood , Chief System Analyst Qazi Ismatullah, JCC(G) Mr. Saeed Ahmed, ACC Mr. Muhammad Muzahir, SO (FS) Akhtar Ali Khan, JCC(G), PBS, Peshawar Mussarat Yaqoob Khan, DCC(G), PBS, Lahore Manzoor Akhtar, Geographer, PBS, Multan Azhar-ud-Din Jokhio, System Analyst, PBS, Karachi Momina Babar, System Analyst, PBS, Quetta Officers from FS Section, NADRA	• Ensure provision of reserve /extra staff at each census support center for coverage in case of any problem and big blocks • Deployment of enumerators for big blocks • Ensure complete kit / material • Coordination with PBS staff for smooth conduct of field work and monitoring of field work through monitoring dashboards • Resolution of matters regarding problems raised during field operations and timely provision of services • Preparation of all evaluation forms • Coordination with evaluator • Coordination for Logistic support • Daily progress report on evaluation and training • Progress monitoring after completion of one enumeration block in census district where in network is available. • Provision of special transport • Security of tablets and events recoding • Monitoring of coverage (High rise building, Far flung areas, Becharag mouzas, Leftover households

S#	Working Group	Names	TORs
			• Any matter related to smooth conduct of field operations • Login of tablets in the adjacent Census District wherein network is available. • Sync of data in the network area after completion of one EB on the 15th day. • Issuance of additional tablet to enumerator in backup. • Ensure security of enumerator by deploying police or army personnel in the distant area throughout the census. • Provision of additional funds to enumerator for travelling & remuneration (10% higher allowance).
6	**Data Center Working Group** [Data Centre & DR site team (Data Infrastructure & Storage] (DCWG)	**Mr. Muhammad Ehtesham, Director (DP)** Mr. Umer Bilal, NADRA Ms. Asma Hamza, System Analyst Mr. Irfan Haider, System Analyst Ms. Samra Iqbal, System Analyst Mr. Anwar Zaib, Data Processing Assistant Representative from NTC Mr. Ali Raza, System Analyst Mr. Zameer Ahmed, System Analys Mr. Syed Farhan Ali, DPO Mr. Anwar Zaib DPA Mr. Muhammad Umair SA (support)	• Equipping servers and local domain for applications • Preparing servers, local domain for spatial number, data warehouse and publishing • Download and make settings for the MDM (Mobile Device Management) • Preparing databases for applications, spatial number and data warehouse • Periodic backup of servers, network devices, security devices, databases, and secure backups • Equipping the servers and local domain for census disaster recovery DR Site • Ensure there is a secure network connection between the main data center and the DR site • Inform the NTC for preparing the DR site and the work group responsible for managing the main data center and DR site of problems, if any, and follow up on solving those problems and repeat the test again after solving the problem
7	**Quality Assurance / trend analysis teams**	**Ms. Rabia Awan, DDG** Mr. Yasir Ishfaq, Director (DP) Dr. Waqas Ahmed, CSO(CPMU) Mr. Saeed Ahmed, ACC, Mr. Saqib Sultan Khawar, SO Ms. Hina Kanwal, SO (CPMU) Ms. Sana Habib, SO Mr. Najeeb Ullah, SO. Mr. Faridoon Khan, SO	• Daily monitoring of reports through dashboards generated through **CATI random calls** and indication of appropriate follow-up mechanism • Monitoring of **trends based on selected variables and conduct in depth analysis with and generation of customized reports** for appropriate decision from higher

S#	Working Group	Names	TORs
		Ms. Madiha Amjed, (SO) Mr. Zubair Ahmed, DPO Mr. Umair Saeed, System Analyst Mr. Ali Raza, System Analyst Mr. Zameer Ahmed, System Analyst Ms. Tayaba Rehman, SA Mr. Irfan Bajwa, DPA	ups whether follow-up is needed or not • Monitoring of work based on GIS and report problems to the higher committee for timely decisions • Follow up the cases for quality assurance of data and propose alternate criteria for quality assurance • Assurance of implementation of data consistency and validation rules
8	**Data Quality Assurance & Preparation of Tabulation**	**Mr. Muhammad Yasir Ishfaq, Director (DP)** Mr. Mudasir Akhtar, CSA Dr. Waqas Ahmed, CSO(CPMU) Mr. Saeed Ahmed, ACC Mr. Saqib Sultan Khawar, SO Ms. Hina Kanwal, SO (CPMU) Ms. Sana Habib, SO Mr. Najeeb Ullah, SO. Ms. Madiha Amjed, SO Mr. Faridoon Khan, SO Mr. Zubair Ahmed, DPO Mr. Waqar Ahmed Khan, DPA Ms. Marium Shazadi, DPA Mr. Usman Ali, DPA Mr. Irfan Bajwa, DPA Mr. Muhammad Azhar, DEO Mr. Umair Saeed, System Analyst Mr. Ali Raza, System Analyst Mr. Zameer Ahmed, System Analyst Ms. Tayaba Rehman, SA	• Analysis and Preparation of Tables for Election Commission • Highlighting of Data anomaly if any • Finalization of data cleaning rules with close coordination with subject matter • To ensure Incorporation of approved rules in data clearing module by NADRA Software Development Team • To ensure development of reports as per approved Tabulation plan • To act lesion between PBS Subject matter and NADRA software Team regarding clarification/rectification in any report • To apprise the higherups about the statistics generated as per approved tabulation plan
9	**Media Working Group (MWG)**	**Ms. Ayesha Sajid (Instructor)** Ms. Hina Kanwal, SO (CPMU) Tayyeba Rehman (System Analyst) Mr. Umair Saeed, System Analyst Ms. Sumaira Yasmeen. System Analyst Iram Sultana, (SA) Nubeed Sohail, (SA) Bushra Warsi, (SA) Sana Naz, (SA) Bilqees Nazir, (SA) Sadia Maryam, (SA) **Proposed** Hina Javed (SA) Tasmia Mohsin (SA) Hafsa Batool (SA) Nasir Riaz (SA) Adil Mehmood (SA)	**Pre-Census:** • Preparation of communication strategy • Provision of material to print/ electronic/social media for awareness, information, advertisement and publicity Preparation of phase wise plan for education, motivation, action and dissemination phase • Collecting content and videos from Print and Electronic media companies and present to higher ups for approval • Finalization of media execution plan • Census spokesperson • Finalization of Census spokesperson • Training of higher ups to deal with media • Preparation of standard content for media

S#	Working Group	Names	TORs
		Qazi Saeed ul Hassan, Deputy Director Admn.	• Decision of procedure for allocation and distribution of work among agencies **Before and during Field Operation:** • Press releases • Archiving event wise picture and videos • Sending Census related Classified advertisements / notices inviting tenders to PPRA / PID and processing PPRA/ PID bills to general section for further processing **During Field Operation:** • Ensure timely implementation of communication strategy • Campaigns in print/electronic and social media regarding awareness of census process and motivation to participate • Arranging programs at print / electronic media for clarification regarding the census process • Monitoring the print / electronic and social media for spread of misconceptions and devising the appropriate mechanism for addressing the issues • Ensuring complete coverage specially in far flung areas
10	**Training Management Working Group (TMWG)** A subgroup will also ensure the provision of facilities and allied matters	**Dr. Naveed Iqbal, JACC,** Mr. Mudassir Akhtar, Chief System Analyst Ms. Kanwal Murtaza, CSO (FS) Mr. Muhammad Saleem, ACC Mr. Saeed Ahmed, ACC Ms. Hina Kanwal, SO Ms. Sana Habib, SO Mr. Saqib Sultan Khawar, SO Mr. Muhammad Ali, SA (PSLM) Mr. Asif Usman Khattak, CSA Ms. Sumaira Yasmin, System Analyst Mr. Ziaullah, System Analyst Mr. Zubair Ahmad, DPO Mr. Irfan Bajwa, DPA **Sub group** Dr. Naveed Iqbal, JACC Mr. Rafiq Hussain Talpur, Director Mr. Zubair Ahmed, DPO Mr. Faridun Khan, SO Miss. Ehsana Anum Syed, SO	• Management & Monitoring of trainings at all three tiers • To ensure provision of training material and facilities at all training centers for smooth training • In case of shortage/non-availability, ensure alternate arrangements for training material and facilities for training. • To coordinate with the relevant PBS officers/officials for smooth conduct of training • Provision of testing material for pre and post training tests • Coordination with district administration, NADRA and stakeholders. • Preparation of evaluation Performa • Control forms • Additional staff training on need basis • Attendance **Sub group mandate before training**

S#	Working Group	Names	TORs
		Mr. Faiz / Shahbaz Ashraf, SO	• Preparation of Tender documents (RFP, Advertisement etc.) for hiring of firm providing Facilities like Laptop/computer, multimedia, Speakers • Complete all formalities, i.e. pre-bid meetings, address queries, opening of proposals, supply order etc. • Ensure supply of these equipment to destination • Ensure proper installation these facilities at venues • Ensure installation of generators which may be locally arranged • Ensure retrieval back of this equipment to the vendor at the end of training • Ensure working of equipment • Ensure other allied arrangements
11	**Internal Coordination Working Group (ICWG)**	**Mr. Imran Saleem, Director (CPL)** Mr. Arshad Mahmood, CSO (CPC) Mr. Liaquat Ali, CSO (NA) Ms. Sana Habib, SO Mr. Muhammad Saleem, ACC Ms. Ehsana Anum Syed, SO Ms. Sadaf Touqeer, SA Mr. Muhammad Awais, SA	• Preparation of minutes • Preparation for agenda item • Arrangement of meetings • Meetings with service provider • Prepare controlled documents for effective monitoring
12	**Security and Coordination Group (SCG)**	Mr. Muhammad Bashir Janjua, (JCC) Mr. Muhammad Sarfraz, CSO Mr. Muhammad Saleem, ACC Ms. Kinza Maroof, SO / Ms. Ayesha Tariq, ACC Staff from sections	• Coordination with all security agencies • Deployment of security persons • In case of rapid response • Apprise the senior management last day security related issues. • Prepare controlled documents for effective monitoring • Ensure seamless security of enumerators, PBS staff and assets during field operation & at the Census District. • Consultation of PBS HQ with law enforcing agencies about their level of security plan upto the Census district. • Consultation of PBS staff deployed at Census District with law enforcing agencies about their level of security plan at the respective Census district. • Updation / sharing of security related advisories received from central command at respective Census District and general instructions.

S#	Working Group	Names	TORs
			• Development Coordination mechanism with PBS HQ and security agencies. • Ensure Reporting Mechanism for Rapid Response along with its timelines for response in emergency. • Ensure financial arrangements in lieu of provision transport facility in distant areas to enumerators and security personnel.
13	**Call Center Working Group (CCWG)**	**Mr. Muhammad Ehtesham, Director (DP)** Dr. Waqas Ahmed, CSO(CPMU) Mr. Ali Raza, System Analyst Mr. Zameer Ahmed, System Analyst Representative from NADRA and NTC Mr. Kamran Anees CSA Mr. Ali Raza, System Analyst Mr. Ghulam Kibria, DPO	• Coordination with NTC and NADRA for smooth implementation of call center • Apprise senior management on daily report • Ensure seemless role base dashboard to senior management • Prepare controlled documents for effective monitoring
14	**Admin and Logistic Group (ALG)**	**Dr. Amjad Javaid Sandhu, DG (Admn)** Mr. M. Bashir Janjua, JCC (Admn) Dr. Naveed Iqbal, JACC Mr. Rafiq Hussain Talpur, Director (FS) Mr. Tahir Khattak, Director (Budget) Mr. Muhammad Zareef, Librarian Mr. Fakhar Abbas Hashmi, AD (Admn) Mr. Muhammad Saleem, ACC Ms. Hina Kanwal, SO Mr. Tajamul Hussain, Supervisor Relevant staff	• Transportation • Urgent purchases • Urgent printing • Facilitation to the all working groups • Field Material dispatch • Printing of manuals, questionnaires and training material
15	**Advocacy group**	**Mr. M. Bashir Janjua, JCC (Admn)** Dr. Naveed Iqbal, JACC Qazi Ismatullah, JCC (G) Mr. Rafique Hussain Talpur, Director (FS) Mr. Imran Saleem, Director (CPL) Ms. Sobia Munawar, Director (DP) Mr. Yasir Ishfaq, Director (DP) Mr. Muhammad Ehtesham, Director (DP) Mr. Munir Waraich, SO	• To tackle the non-response • Dispute resolution with all vigilance committees • Coordination with all vigilance committees • Prepare controlled documents for effective monitoring • Apprise the senior management • Convince respondents in case of refusal from enumeration through enumerator, Advocacy Group & local influential people of the area. • Dispute resolution through advocacy if chances of adverse situation arises during census.

S#	Working Group	Names	TORs
			• Identification of areas/ places, people, sects or group of people who intends to sabotage the census process in the light of Census 2017 experience. • Preparation of supportive material, expected questions answers related to census in advance. • Participation of local communities, faith-based groups, Pesh Imam of masjid through PBS staff to talk about positive aspects of Census with the local communities before conduct of census.
16	**Lesson learnt**	**Mr. Muhammad Sarfaraz, CSO** Ms. Kaneez Amna, SO Ms. Sadaf Imtiza, SA	• Record all events • Collection of material for Preparation of report • Administrative report

Order were modified dated 9th January and Following Groups were notified in addition to perivosly notified groups

	Working Group	Names	TORs
	Economic Activities Analysis team	-Team **Mr. Attiq-ur-Rehman, DDG(NA) (Team Lead)** Mr. Muhammad Anwar,CSO, (BR) Mrs. Ayesha,SO, BR Mrs. Saima, SA, BR	• Monitoring the bench mark indicators of economic activities and conduct in depth analysis along with generation of customized reports for appropriate decision from higher ups whether follow-up is needed or not • Monitoring of work based on GIS and report problems to the higher committee for timely decisions • Follow up the cases for quality assurance of data and propose alternate criteria for quality assurance • Assurance of implementation of data consistency and validation rules (level 2) committee to devise strategy for the issues which cannot be resolved at their end and to report them about decisions taken
2.	**Sub-Group for Election Commission of Pakistan**	**Team** **Mr. Yasir Ishfaq, Director (DP) (Team Lead)** Mr. Shahid Iqbal, Additional Director General, ECP Mr. Imran Ahmed Khan, Director (MIS), ECP Qazi Ismatullah, JCC (GIS) Mr. Mudassir Akhtar, CSA (DP) Mr. Saeed Ahmed, ACC (DP) Mr.Saqib Sultan Khawar, SO Mr. Usman Ali, DPA	• Coordination with NADRA for timely provision of report / statistics required by Election Commission of Pakistan

ANNEXURE-B

Table Working Groups wise Help Topics

Help Topics	Ticket Count
Admin and Logistic Group	**2186**
Local or Political	2
Other Misc.	935
Public Issue	897
Transport Facility	352
Application Support team for Administrative Module	**233**
CDO Complaint	4
HR & Task	38
Inventory	1
Other Software	11
Supervisor Dashboard	179
Advocacy Group	**31**
NADRA Staff	1
Behavior	30
Area Frame Working Group	**628**
Area Frame	2
GPS Location	65
GPS Location / Map / Imagery	329
GPS Location / Map / Imagery / 'Download Map' Already Download Issue	5
GPS Location / Map / Imagery / 'Download Map' Application Not Installed	19
GPS Location / Map / Imagery / 'Download Map' Login Issue	49
GPS Location / Map / Imagery / No Map for a Particular Block	26
GPS Location / Map / Imagery / No Map of SUPARCO	23
GPS Location / Map / Imagery / 'Download Map' Not Opening (Permission Issue)	5
GPS Location / Map / Imagery / No Map of OSM	1
MAP ISSUE	103
Block Boundary Issues	1

Help Topics	Ticket Count
Data Quality Assurance & Preparation of Tabulation	**2**
Data Security	2
Field Support Working Group	**5590**
Big Block Issue	590
Big Block Reserve Enumerator Assignment	199
Duty Reporting	5
Enumerator not come	4766
Login	24
Reserve	4
Weather Issue	1
Block Boundary Issues	1
Operational Working Group	**5596**
Access Required	2
Backup & Restore Problem	44
BRING BACK PREVIOUS DATA	145
Data Required	8
IMEI ALREADY REGISTERED	291
INTERNAL SERVER ERROR	31
Listing	35
Listing / Application Not Installed / Listing not work	64
Listing / Listing	314
Listing / Listing / Access to App is Blocked (Permission Denied)	4
Listing / Listing / Application Updation Issue	44
Listing / Listing / Backup Facility	24
Listing / Listing / Block Boundary (Incorrect)	43
Listing / Listing / Block Completion	24
Listing / Listing / Block Description (Incorrect)	33
Listing / Listing / Block Map Not Available (SUPARCO / OSM)	19
Listing / Listing / Concept Clarification	1
Listing / Listing / Data Deletion / Visibility Issue	332
Listing / Listing / Data Not Uploading Issue	456

Help Topics	Ticket Count
Listing / Listing / How to Delete (Structure/Unit/Household)	24
Listing / Listing / Increase Outside Boundary Range	1
Listing / Listing / Latest Version Confirmation	3
Listing / Listing / Listing – Enumeration Data Mismatch	416
Listing / Listing / Login - No Block Assignment	12
Listing / Listing / Login - User Not Found	27
Listing / Listing / Network Issue (Login, Import, Sync)	34
Listing / Listing / Not Opening (Permission Denied)	3
Listing / Listing / Old Version	5
Listing / Listing / Restore Option (Disaster Recovery)	3
Listing / Listing / Wrong Block Assignment	35
Login username/Password	168
MDM Issue	6
MDM Issue / Access is Blocked (Permission Denied)	8
MDM Issue / An App Not Installed	2
MDM Issue / App Disappearing	153
MDM Issue / Application Update Issue	140
MDM Issue / Download / Updation Errors (Failures)	30
PROVIDE LOGOUT FACLITY	719
Self-Enumeration Portal	857
UPLOAD ISSUE IN LISTING APP	183
Enumeration	589
Enumeration / UTN issue in Enumeration	108
progress dashboard	127
WRONG BLOCK CODES	25
Data Center Working Group	**88**
Network	40
Network / Miscellaneous Connection Failure	9
Network / No Internet Service (Intranet)	22
Network / Different Network SIM Required	7
Network / Extra SIM Required (another Network)	2

Help Topics	Ticket Count
Network / No Signal/No Coverage	7
MDM Issue / Wi-Fi Connectivity (Intranet) Required	1
Security and Coordination Group	**220**
Security	220
Tablet Management Working Group	**84**
Stolen or missing	5
Other Hardware	5
Tablet	74
Training Management Working Group	**20**
Education Section Concept	1
Employment Section Concept	2
Housing Section Concept	1
Enumeration Concepts	16
GRAND TOTAL	**14678**

Table Complaints Not Resolved During Operations

Province	Complaint	Count of Ticket Number
Balochistan	Network and Related	1
	Security	6
	Total	**7**
Islamabad Capital Territory	Network	1
	Security	3
	Total	**4**
Khyber Pakhtunkhwa	Security	1
	Transport Facility	1
	Total	**2**
Punjab	Duty Reporting	1
	Other Hardware	1
	Other Misc.	17
	Public Issue	1
	Security	111
	Transport Facility	1
	Total	**132**
Sindh	Misc. Complaints	3
	Network	1
	Other Misc.	10
	Public Issue	1
	Security	98
	Transport Facility	4
	Total	**113**
Grand Total		**262**

Annexure C

Table Quality Assurance through CATI

Provinces	No' of household	Prop	Adj prop
Punjab	17,103,835	53%	40
Khyber Pakhtunkhwa	3,845,168	12%	14
Sindh	8,585,610	27%	30
Balochistan	1,775,937	6%	14
GB	196426	1%	1
AJ&K	640165	2%	1
	32,147,141	**100%**	**100**

Annexure D

Table Questions ratio for Criteria-II

Section	Question Asked	Weightage
1	**1**	**50**
2	**1**	**10**
3	**2**	**20**
4	**2**	**20**

Note:

- During QA through CATI for question 1 matching of enumerator and operator data is mandatory.
- If the percentage will be less than 70% then the follow up calls in the same block will be carried out for further two households; in case of fever than 70 percent in at least one household, repeat the process and again take in a loop additional two households and ask the questions, if again the agent received less than 70 percent then supervisor will be intimated for taking action in this regard.

Annexure E

A Digital system for monitoring and evaluation through android based Monitoring Application for supervisors and CATI Software

Section 1

- **Question-1 is asked for capturing family composition.**
- **Answer of this question will be matched with original data.**
- **Q1 will be for those living and eating together as according to Census definition.**
- **Statement of question and code option must be same as in case of original question.**

1. How many Male _____, female_____ and transgender _____in the household living and eating together.

Section 2

- **One Question from q2 to q5 may be asked randomly for monitoring and verification.**
- **In following columns Name of household member age >=15 will be Selected randomly for verification of required information.**
- **Statement of questions and code options must be same as in case of original question.**

2. Name **(**Only one name**)** Relationship with head (Name) _____.
3. Name **(**Only one name**)** Mother Tongue_____.
   OR
   Mother tongue of most members of Household _____.
4. Name **(**Only one name**)** Nationality _____.
5. Name **(**Only one name**)** Religion _____.
   OR
   Religion of most members of Household _____.

Section 3

- **Two Questions from q6 to q12 may be asked randomly for monitoring and verification.**
- **In following columns Name of household member age >=15 will be Selected randomly for verification of required information subject to the fulfillment of pre requirement mentioned in point below.**
- **Each question will have a chance for selection if there is any case available for that vary question. For example**
  - **Literate will be selected if Household has at least one literate person.**
  - **If at least one person have responses in Q11 (education completed) then that vary person have a chance for selection.**
  - **Similarly for Employment, Reason for not working and Functional limitation.**
- **Statement of questions and code options must be same as in case of original question.**

6. Name (Only one name) can read and write with understanding and can solve simple calculations _____.
7. Name (Only one name) Enrolment Status _____.
8. Name (Only one name) completed Education _____.
9. Name (Only one name) employment status _____.
10. Name (Only one name) reason for not working _____.
11. Name (Only one name) district of Birth _____.
12. Name (Only one name) Function limitation _____.

Section 4

- **Two Questions from q13 to q21 may be asked randomly.**
- **Statement of questions and code options must be same as in case of original question.**

13. Source of Drinking water _____.
14. Source of lighting _____.
15. Fuel of Cooking _____.
16. Rooms in the house _____.
17. Material used for walls _____.
18. Material used of roof _____.
19. Kitchen Type _____.
20. Toilet Type _____.
21. How many members of household living abroad for more than 6 months _____.

General Instructions

- QA of Normal Household is required only.
- Operator must ensure that same respondent may be interviewed for verification. Otherwise Operator request for replacement of Household.
- Overall six (6) questions will be ask/verified.
- These Questions will be used for QA.
- Software at backend will match the results automatically and assign score as mentioned in **Annexure-E**

ANNEXURE-F

Revised Questionnaire for CATI

1) How many Male _____, female_____ in the household.
2) Number of persons in the household age grater or equal to 15 year_____.
3) Number of persons in the household age less than 5 year_____.
4) Education of Head _____. *(If never attended school, leave this blank)*
5) Source of lighting _____.
6) Rooms in the house _____.

1. گھر میں کتنے مرد(لڑکے) _____، خواتین(لڑکیاں) _____ ہیں۔

2. گھر میں ایسے افراد کی تعداد جن کی عمر 15 سال یا زیادہ ہے_____ ۔

3. گھر میں 5 سال سے کم عمر کے افراد کی تعداد_____۔

4. سربراہ کی تعلیم _____۔ (اگر کبھی سکول نہیں گئے تو اسے خالی چھوڑ دیں)۔

5. گھر میں روشنی کا ذریعہ _____۔

6. گھر میں کمروں کی تعداد_____۔

Annexure G

Figure Month-wise CATI Survey Statistics

Table Date Wise Survey Analysis

Date	Surveys Generated	Surveys Completed	Ratio
14-Mar-23	418	106	25%
15-Mar-23	1,026	332	32%
16-Mar-23	1,003	378	38%
17-Mar-23	3,172	1,142	36%
18-Mar-23	1,301	432	33%
19-Mar-23	4,346	1,516	35%
20-Mar-23	3,966	1,482	37%
21-Mar-23	5,203	1,941	37%
22-Mar-23	5,263	2,352	45%
23-Mar-23	2,317	1,015	44%
24-Mar-23	3,592	1,603	45%
25-Mar-23	5,115	2,577	50%
26-Mar-23	2,698	1,343	50%
27-Mar-23	4,888	2,208	45%
28-Mar-23	4,155	1,889	45%
29-Mar-23	4,676	2,084	45%
30-Mar-23	5,712	2,598	45%
31-Mar-23	2,140	968	45%

Date	Surveys Generated	Surveys Completed	Ratio
1-Apr-23	5,587	2,597	46%
2-Apr-23	1,916	867	45%
3-Apr-23	3,333	1,457	44%
4-Apr-23	3,914	1,714	44%
5-Apr-23	2,678	1,189	44%
6-Apr-23	2,644	1,080	41%
7-Apr-23	7,425	3,083	42%
8-Apr-23	3,216	1,345	42%
9-Apr-23	2,317	1,086	47%
10-Apr-23	2,554	1,061	42%
11-Apr-23	3,198	1,293	40%
12-Apr-23	9,924	4,240	43%
13-Apr-23	704	328	47%
14-Apr-23	8,672	3,444	40%
15-Apr-23	4,361	1,737	40%
16-Apr-23	3,174	1,293	41%
17-Apr-23	4,418	520	12%
18-Apr-23	6,421	2,536	39%
19-Apr-23	5,176	1,961	38%
20-Apr-23	4,598	1,680	37%
21-Apr-23	516	0	0%
22-Apr-23	516	0	0%
23-Apr-23	515	0	0%
24-Apr-23	516	0	0%
25-Apr-23	522	18	3%
26-Apr-23	4,614	1,870	41%
27-Apr-23	4,865	1,969	40%
28-Apr-23	6,614	2,770	42%
29-Apr-23	6,116	2,547	42%
30-Apr-23	4,049	1,559	39%
1-May-23	521	9	2%

Date	Surveys Generated	Surveys Completed	Ratio
2-May-23	6,121	2,621	43%
3-May-23	6,014	2,407	40%
4-May-23	6,616	2,734	41%
5-May-23	4,739	1,863	39%
6-May-23	5,831	2,407	41%
7-May-23	4,170	1,625	39%
8-May-23	6,109	2,600	43%
9-May-23	5,590	2,317	41%
10-May-23	527	0	0%
11-May-23	547	56	10%
12-May-23	3,589	1,304	36%
13-May-23	6,303	2,472	39%
14-May-23	3,531	1,257	36%
15-May-23	6,366	2,617	41%
16-May-23	5,440	2,424	45%
17-May-23	5,484	2,475	45%
18-May-23	4,296	1,808	42%
19-May-23	4,387	2,017	46%
20-May-23	3,093	1,473	48%
21-May-23	296	142	48%
22-May-23	2,017	774	38%
23-May-23	2	0	0%
1-Jun-23	5,181	1,896	37%
2-Jun-23	5,436	2,049	38%
3-Jun-23	5,513	2,193	40%
4-Jun-23	4,176	1,615	39%
5-Jun-23	6,202	2,586	42%
6-Jun-23	4,611	1,776	39%
7-Jun-23	5,741	2,259	39%
8-Jun-23	5,218	2,004	38%
9-Jun-23	5,040	1,983	39%

Date	Surveys Generated	Surveys Completed	Ratio
10-Jun-23	5,102	1,875	37%
11-Jun-23	4,145	1,403	34%
12-Jun-23	5,415	2,054	38%
13-Jun-23	5,040	1,747	35%
14-Jun-23	3,548	1,104	31%
15-Jun-23	4,232	1,345	32%
16-Jun-23	3,583	1,206	34%
17-Jun-23	5,502	1,993	36%
18-Jun-23	2,981	946	32%
19-Jun-23	5,194	1,857	36%
20-Jun-23	4,269	1,455	34%
21-Jun-23	4,546	1,604	35%
22-Jun-23	1,791	466	26%
23-Jun-23	611	80	13%
24-Jun-23	4,579	1,506	33%
25-Jun-23	3,263	1,006	31%
26-Jun-23	1,190	193	16%
27-Jun-23	517	0	0%
28-Jun-23	481	0	0%
29-Jun-23	525	0	0%
30-Jun-23	516	0	0%
1-Jul-23	506	0	0%
2-Jul-23	508	61	12%
3-Jul-23	2,961	799	27%
4-Jul-23	3,879	790	20%
	389,655	**150,463**	**27%**

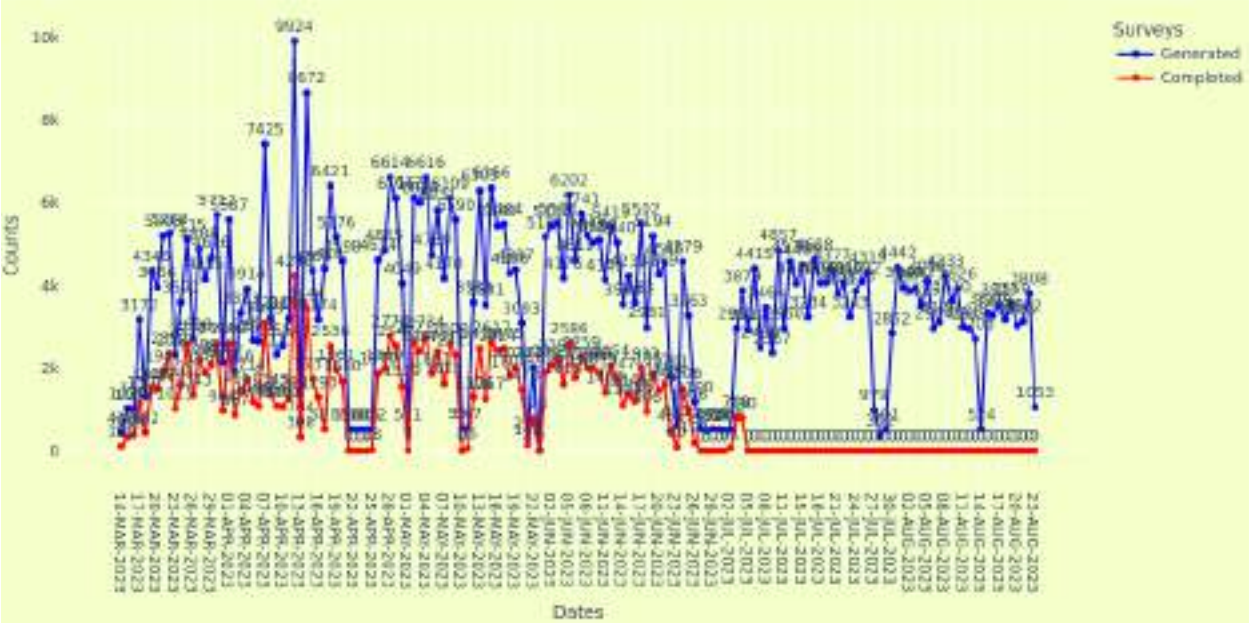

Figure Date Wise Survey Counts

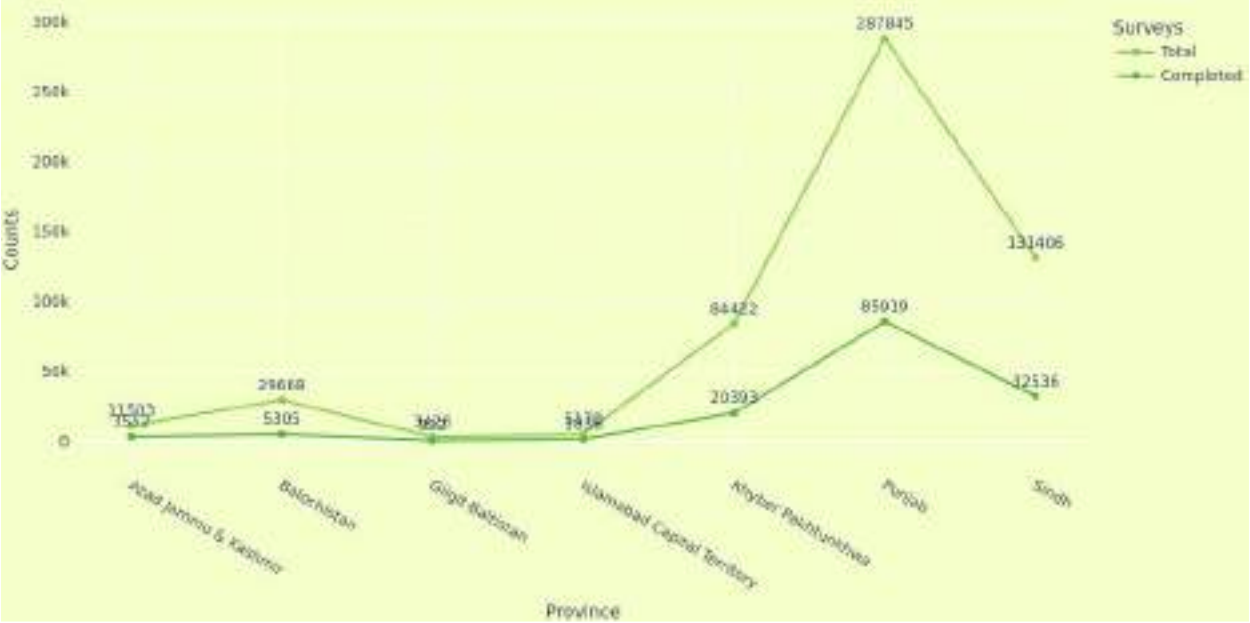

Figure Province Wise Survey Counts

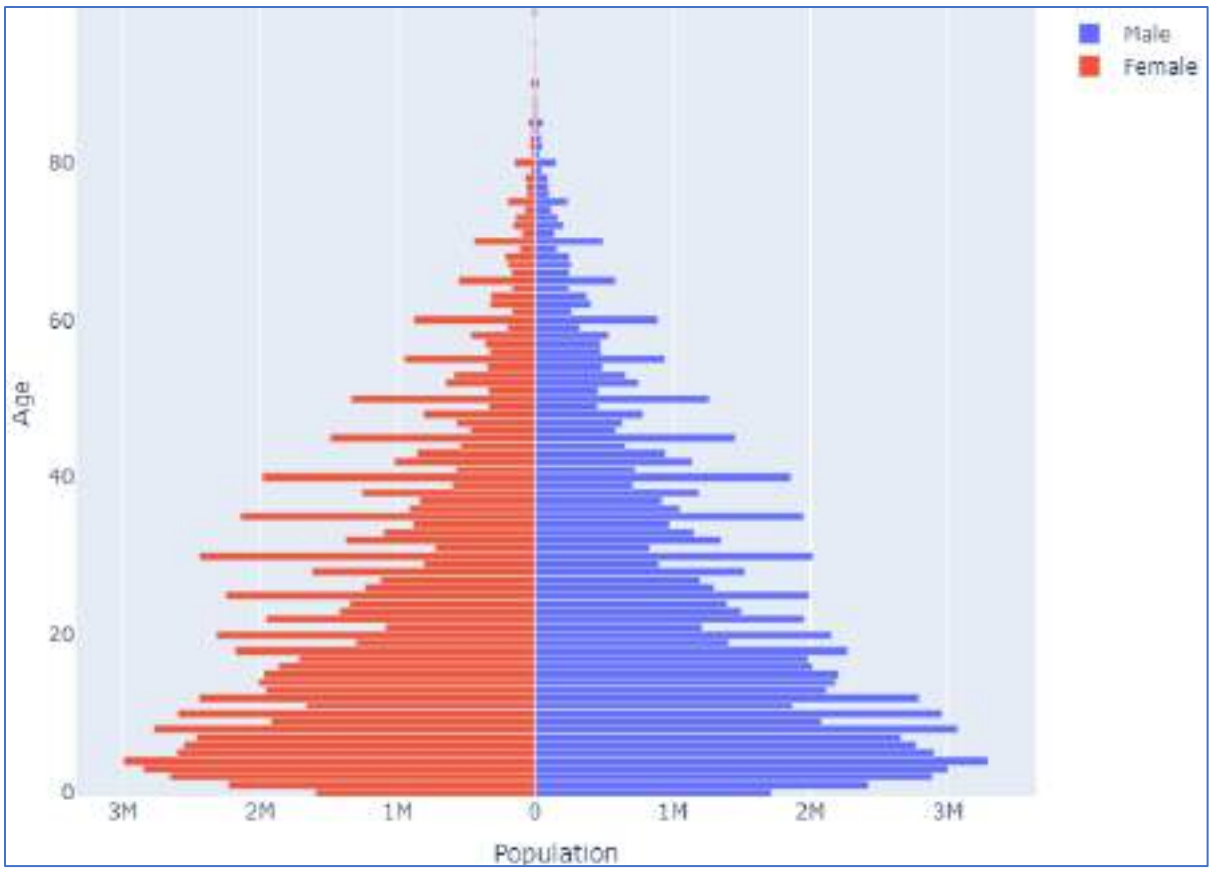

Figure Age and Gender Pyramid

REPORT

Dr. MEHTAB S KARIM REGARDING Quality Assurance

Report Regarding the 7th Census, Submitted to Pakistan Bureau of Statistics-Part 1 & 2 by Dr. Mehtab S Karim, UNFPA Consultant.

22 November, 2022

Prepared by:
Mehtab S. Karim
UNFPA Expert/National Consultant

Objectives

Services of the national consultant have been acquired to support the implementation of Pakistan's seventh housing and population census. The assignment has the following objectives:

- To conduct a detailed comparative analysis of the countries regarding methods adopted for data quality assurance for census along with identifications of their limitation;
- To propose the strategy for the conduct of quality assurance through CATI and Post Enumeration Survey;
- To devise a detailed action plan along with its assumptions, responsible stakeholders and their responsibilities for the adoption of modern data quality assurance methods and monitoring mechanism to improve data quality, coverage and timelines.

This report has been divided into three parts:

Part I. Introduction
Part II. Digital Census: Methodology, Literature Review and Recommendations
Part III. Post Enumeration Survey (PES): Methodology and Recommendations.

Timeline for:

Part I & II- Submission of 1st draft: 22 November, 2022
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Submission of the final draft: 13 December, 2022

Part I. INTRODUCTION

A population and hosing census forms the basis for reviewing demographic changes in a country and its sub-regions as well as the progress made since the last census (usually during the past decade) in some crucial social, economic and health indicators. Data collected in the census also helps in monitoring the progress made in ongoing schemes initiated by the Federal, Provincial and Local governments and in developing future plans. For that reason, most countries in the world have been conducting a census every ten years. A census is labor-intensive, requiring large numbers of temporary staff. Thus, personnel costs usually are the principal component of census budgets, with expenditure for information and communication technology coming second.

Following the tradition set by the British colonial government, during 1881 to 1941, a population and housing census was conducted after every ten years, in areas now constituting Pakistan (Jillani, 2003). When Pakistan emerged as an independent country in 1947, its first census was conducted in 1951, second in 1961 and third in 1972. The 1973 constitution of Pakistan made it mandatory to conduct a census after every 10 years and subsequently, the fourth census was conducted in 1981. However, the fifth census was conducted after a delay of 17 years in 1998. The seventh census was further delayed and was conducted in 2017, after a delay of 19 years. When the results of the sixth census were released several questions were raised about its reliability (Karim, 2018) and consequently, the Government of Pakistan decided to conduct the seventh census in 2022, which is now schedule to be conducted in March, 2023 (Dawn, 2022). Besides, a decision has been made, that for the first time, it will be a paperless census being termed as "digital census" (Pakistan Bureau of Statistics, 2021). Thus, it is extremely important, that data collected in the seventh census are accurate as much possible, with minimum errors in coverage and contents and its results are acceptable to all the stakeholders.

Due to various reasons, Governments in many developing countries are increasingly facing several challenges in conducting population census. This is particularly the case in a country like Pakistan, where population growth rate is still about 2% per annum; the rural-to-urban and inter-provincial migration is highest in the region; there is increasing demand from small sub-groups to count them and; census has become a political issue, due to its crucial roles in determining allocation of national assembly seats and allocation of resources to provinces. To overcome these challenges, alternative and more appropriate ways of data collection and processing must be followed.

PART II. DIGITAL CENSUS

II.1. Introduction

Since the availability of technology for census enumeration only started towards the beginning of the 21st century, several developing started using it during the past two decades. Thus, in the 2001 Census of India, high-speed scanners were used and handwritten data from the questionnaire after being converted into digitized form through Intelligent Character Reading (Government of India, 2011). In the Asia-Pacific region, Australia performed its first digital census in 2016, when 63 per cent of respondents completed their census form online (Australian Bureau of Statistics, 2016). It is expected, that in the 2021 census, nearly two-thirds of the public will be choosing the online form, including 50% of seniors, 45% of Aboriginal and Torres Strait Islander people, and 90% of people born in China, people (Australian Bureau of Statistics, 2021).

As mobile technology, such as tablets or smartphones, have become more widely available, many developing countries have or are shifting towards collecting, monitoring, processing and verifying population and housing census data with the help of these technologies. At the same time, during the 2020s, Censuses are taking place in a complex setting, such as requiring many countries to have more disaggregated statistics in consideration for achieving the Sustainable Development Goals; the recent outbreak of the COVID-19 pandemic and; as consequences of climate change affecting weather thus increasing disasters (such as the recent floods in Pakistan) have added complications to data collection. However, with technological advancements and its availability, National Statistical offices now have more options at their disposal. A global survey by the United Nations Statistics Division (UNSD, 2021) on plans for the 2020 round of population and housing censuses indicates, that face-to-face interview using an electronic questionnaire, known as computer-assisted personal interviewing (CAPI) is becoming the most commonly used method by countries. Out of 142 responding countries conducting field-based data collection, 72 per cent reported opting for CAPI. The survey also reports that in the Asia-Pacific region, that out of 41 countries 32 countries (78 per cent), in the recent past, have used or in their next census will use, the full field enumeration with paper or electronic questionnaires, while others have opted to utilize registers in combination with full-field enumeration or combining registers with sample surveys. About one-fifth (17) conducted the census using *de jure* method; about one-third (13) used *de facto method*; while the rest, chose a combination of both (*de jure* and *de facto*) method.

The use of portable electronic devices for data collection has quickly gained popularity due to their features, which include the ability to improve the quality of collected data, facilitate field operations, improve management and supervision of enumerators, and enhance the usability of census data. Below are examples of two digital censes conducted in the recent past, in Pakistan's neighboring countries.

Digital Census in Iran

The first complete census of population and housing in Iran was conducted in 1956. Till 2006, a census has been conducted in the country, after every 10 years interval. However, a census was conducted in 2011. Iran was the first country in South-Central Asia to use tablets for collecting data in its 2016 census (Statistical Centre of Iran, 2018). In the 2016 census, for the first-time data was collected through a combination of internet, telephone (by calling the call center by the absent household) or face-to-face interviews recorded on tablets. For the purpose, it required synchronizing between internet-based data and tablet data; using backup files on the tablets; preparing daily reports at district level for informing enumerators and experts through tablet device; using internet website and telephone-assisted enumeration for absent households; checking coverage control and integration of the results via internet and tablet device and; monitoring and supervising census operation through designing and establishing control room.

Before undertaking the full census exercise in 2016, it was felt necessary to conduct two pilot censuses. The first pilot was conducted in two cities to for evaluating and comparing the results through self-administration and face-to-face interviews and telephone-assisted interviews. The second pilot census was implemented in 2015 through internet and face-to-face interview to check the validity of internet census; tablet software; time required for completion of the household questionnaire; evaluation of access methods to absent households and; evaluation of the enumerator's work load.

Web-based monitoring forms were developed with the specifications for online monitoring of; the smallest administrative levels (block and village); all enumerators; of progress being made and; on-time precise reporting. For the purpose, several software was developed for:

- internet and phone census
- face to Face interview with tablet
- map module
- supervising the filed operation
- post enumeration survey
- workforce recruitment portal for customer relationship management
- virtual training
- editing and imputation
- monitoring the census infrastructures

The 2016 census was conducted in two phases. Phase 1, was implemented during 24 September to 21 October, through internet, requiring a household member to visit the census' website and completing the questionnaire. Against the target of 35%, 48.4% of households participated in the internet census.

In Phase 2, during 22 October to 20 November, face-to-face interviews were conducted by enumerators, by visiting households and in the case of no one present in the household, sticking "absent household notice card" advising the household to call the call center. Care was taken about enumerator's background characteristics; 52% were males and 48% were females and about 80% over 16 years of education. It was estimated, that if the traditional method of data collection would have been utilized as was done in in the 2011 census, 65,000 enumerators would have been required. However, 22,000 enumerators were utilized in the 2016 census, for face to face interview.

Digital Census in Bangladesh

Till 2011, Bangladesh had used the traditional method of data collection through paper questionnaire. However, its sixth population and housing census is the first digital census conducted by any South Asian country, using the Computer Assisted Personal Interviewing (CAPI) method. It was completed in June 2022, through a computer-assisted personal interviewing system using tablets (Bangladesh Bureau of Statistics, 2022). The midnight of 14 June 2022 was determined as 'the census reference point/time' and the following week (June 15-21), was declared as 'the Census Week'. The main data collection of the Population and Housing Census 2022, was carried out across the country during the one week time period, following the international protocol of census. However, due to sudden floods, in four districts data collection period was extended for one week. Modified de-facto Approach was adopted, so that, in addition to counting household members in the place where they are at the census moment, members who were on journeys, in hospitals and hotels, or on duty at the census moment were counted in their usual residences. The most significant characteristics of the 2022 census are:

- Easily and clearly identifying the enumeration area using digital maps developed by integrating Geographic Information System (GIS) and Geocode;
- Using the data center with Tier IV Security, in which a multilayer firewall was installed to prevent hacking by any means, in order to ensure utmost security and proper storage of data;
- Transmitting data from the field to the server in completely encrypted form to protect the confidentiality of individual's information;
- Using a web-based Integrated Census Management System (ICMS) to manage all activities of the census;

- Establishing a Network Operations Centre (NOC) for real-time monitoring the progress of data collection in the field and to follow the trends of data in various dimensions, which played a significant role in ensuring data quality;
- Establishing a Call Centre to provide quick solutions to various problems arising at the field level during data collection and to ensure direct interaction between BBS and the people to be included in the enumeration by themselves;
- In addition to the traditional approaches, using all types of online platform including social media for the campaign of the census.

Three zonal operations were carried out as part of the census preparations. The latest zonal operation took place from 21 to 26 April 2022. Under these zonal operations, formation of enumeration areas, maps' development, updating of geocodes of all administrative units, selection of training centers, preparing the list of protected areas and making the list of VIPs were done. Additionally, supervisors and enumerators were appointed for selecting Census Workers with the help of the field administration. Integrating the information generated through these zonal operations into ICMS, map integration etc. were also carried out during these operations.

The campaign or publicity about the census played a very crucial role in ensuring accuracy of the data collected from the respondent. Keeping this in consideration, a wide range of campaign activities were undertaken so that the census message could be reached to every person living in every corner of the country. The Prime Minister sent Voice Calls to mobile subscribers about the census. Countdown clocks on the census were placed on the web portals of all government organizations. In order to ensure massive publicity of the census, various promotional contents, including talk shows, were frequently publicized in print, electronic and online media and telecast in various electronic media. In addition, census activities were regularly published on social media such as Facebook, WhatsApp, Twitter, YouTube, Instagram etc.

Other Developing Countries Opting for Digital Census

According to information available from the United Nations Statistics Division (2022) several developing countries which have used mobile technology or will be using mobile in their latest census. Among others, these include the 2017 census conducted in Egypt (Central Agency for Public Mobilization And Statistics (n.d); 2021 census in Ghana; 2022 census in South Africa (Digital 2022; South Africa, 2022) and the upcoming Census in India in 2023 (India,2019).

II.2 Methodology to be adopted in Pakistan's 7th Census

It is important to note, that the decision on whether to use mobile data capture should begin in the initial census planning stages, as CAPI, when enumerators use electronic questionnaires on tablets or smartphones to conduct face-to-face interviews. CAPI technology allows taking advantage of added features that can be programmed into mobile devices, such as integrated maps and GPS; computerized case management; automated skip patterns; simultaneous data collection, editing, consistency and nonresponse checks and processing. Although CAPI technology may have many advantages, however, using mobile data capture in Pakistan also has some disadvantages. For example, one has to consider the interruptions in electricity supply, internet availability and its speed (especially in remote areas) and damages which may be caused to devices in the field. Besides, one of the most import aspects of the exercise should be proper training of enumerators, including of

foremost importance, their being computer savvy and having capabilities to handle the device properly and ability to fix it or seek timely help, if something goes wrong with it in the field. For that reason, before embarking in the field work, more preparation time is required than conducting a paper-based census. While the problems due to interruptions in electricity supply could be overcome through giving the team access to mobile high speed internet facilities and mobile uninterrupted power supply (UPS) kits. However, it is likely that quality of enumerators, especially those who are assigned to rural and particularly remote areas may be compromised. Besides, there is likely to be issues of quality assurance, given that about 150,000 enumerators will be used for data collection and quality of their output will depend on their educational background and experience in handling the mobile devices.

However, the advancement in information technology offers unprecedented opportunities to innovate and transform the census operations, which has substantially improved and reduced data collection and processing time on the one hand, and made it easier to monitor and evaluate the results obtained in the census, on the other hand. Thus, with proper training and planning in using the modern technology, the efficiency, accuracy and effectiveness of the census could be substantially improved. With the advent of internet, and availability of tablets, it has not only made digital census more efficient but with the availability of mobile telephones in almost all households, it has become much easier and cheaper to verify the results through post-census enumeration survey (PES), discussed in Part III.

Conducting several pilot censuses using the technology will help in solving many problems which the field staff could face. Therefore, success in conducting a problem free census, could only be achieved when enough care has been taken through a careful preparation process, including multiple pilot censuses in different parts of the country. Thus, adopting the latest technology in conducting a census, can lead to substantial increase in the quality and cost-effectiveness of the whole process, which has made a breakthrough in conducting more accurate and faster census in many countries. In general, countries that planned carefully using the new technology and did pilot censuses have been more successful in their endeavors.

Similarly mapping prior to conducting the census has made great strides in the last few decades, from an activity requiring extensive fieldwork and manual drawing to one using remote sensing and computer-assisted map production. Geographic information system (GIS) technology is increasingly being used in population and housing censuses to generate maps for enumeration and for data presentation purposes. To locate households providing GPS to each team is an ideal technology, which is cheap and can be used by cartographic field staff to annotate topographical maps and satellite photographs to produce excellent maps for enumerators.

II.3 RECOMMENDATIONS

Pakistan Bureau of Statistics has assembled a good team of experts, has been planning to conduct a digital census for well over a year and, is well prepared to go in the field within the next six months. While most of the administrative issues have been resolved and a pilot census has already been conducted, the following recommendations are made which could help in further improving the census operations, particularly the coverage:

1. Pakistan has the advantage of learning from the experience of the digital censuses conducted in other countries, particularly Iran and Bangladesh, both having similarities with Pakistan in geographical conditions and socio-cultural characteristics. It will be appropriate, to review their methods of data collection and questionnaires used in the two countries. For example, a substantial proportion of urban households in Pakistan have access to computers and smartphones, and they could be approached to fill the census form using Internet self-response (CAWI method). Besides, as one of the major reasons of under-coverage in census, in urban areas is absent or locked households, it will be most appropriate to ask them to reach out to call centers by making arrangements for free call. For the purpose, a publicity campaign is to be launched through social and mass media. Both these methods were adopted in Iran's 2016 census with successful results.
2. It will be appropriate to review the results of the pilot census with experts and conduct another pilot census, to be fully prepared prior to launching the field work. The second pilot census should be conducted to see the feasibility of self-response, using internet by urban households and asking selected households to reach out to call centers.
3. It is important that all the households are identified prior to the census operations and are easily located by the enumerators through GPS.
4. Since the enumerators are the backbone of the census, not only they should be well trained but it's important that are also computer savvy and are easily use the tablet. Furthermore, it is also important, that they are well educated, younger and there is proper gender balance.
5. To overcome frequent electricity outages, each team should be well equipped with UPS, mobile internet facilities and have additional tablets, to be replaced in case of breakup or loss. Besides, the team should have easy and prompt access to technical support.

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