Post Enumeration Survey

7th Population and Housing Census-2023

First Ever Digital Census

Pakistan Bureau of Statistics
Ministry of Planning Development and Special Initiatives,
Islamabad
Government of Pakistan

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EXECUTIVE SUMMARY

The 7th Population and Housing "the First Ever Digital" Census of Pakistan was conducted in 2023 using digital technology. Although use of digital technology proved paradigm shift of Pakistan Bureau of Statistics (PBS) from conventional paper based census to the paperless data collection towards E Governance of Pakistan, but at the same time, PBS also faced many challenges in use of digital technology. The Tablets using software applications, the management and supervision software applications, use of dashboards for real time monitoring and progress, complaint resolution mechanism through CATI approach using call centre established at PBS, HQs, effective usage of SMS gateway, advertisements for public awareness, use of self-enumeration portal for public convenience and involvement, and many other innovations for digital census provided learning and capacity building opportunities to the PBS team. The digital census was not only a data collection task but was also a management exercise for PBS in the digital world. In spite of all the best efforts and optimum utilization of the digital technology, the chances of errors, omissions, duplications etc. cannot be ruled out. To cope with these issues, the Post Enumeration Survey (PES) is considered as a feasible and best possible solution according to the international best practices. The conduct of PES was also approved by the CCI and Census Monitoring Committee constituted for the census.

A two stage stratified random sampling was utilized to select a representative sample of blocks from four provinces and ICT according to the ground realities. The PBS planned and executed PES in July, 2023 just after completion of the census field operation. The services of the same enumerators were utilized who already worked during the census field operation, however, they were deputed in other than their previous blocks during census for independent assessment of the census enumeration. The enumerators were familiar with all the digital technological procedures for the data collection, but even then, they were trained for the PES by using smart questionnaire designed for the purpose. They were closely supervised by their supervisors as well as by the PBS teams to get the complete benefits and achieve the objectives of the PES. The enumerators deputed for PES were also supervised using CATI approach through call centre and their daily progress was monitored. PBS completed PES within the shortest possible time of 12 days from 8th to 19th July, 2023 to assess the possible under coverage or over count of the population to provide the actual results of the population census.

This report presents the background of PES along with its objectives and the issues of coverage errors caused the survey. It also highlighted the complete scenario of the sample design, size, and

procedures of the sampling for ultimate selection of blocks from four provinces and Islamabad is elaborated in detail in coming chapters. The software modules used for PES have also been briefly described in this document. The complete methodology for analysis of the PES has been elaborated in the last chapter. The validation procedures in cases of under or over enumeration have been explained for quality assurance to evaluate, analyze, and provide the final results of the census according to the international practices. PBS finalized the result of 7th Population and Housing Census-2023. CCI in its 50th meeting held on 5th August 2023, unanimously approved the results of 7th Population and Housing Census.

This report will hopefully become a useful document in the field of census and PES practices especially for interested readers, analysts, future planners in Pakistan as well as for international community.

I would like to express my sincere appreciation to my whole team and especially Mr. Muhammad Sarwar Gondal Member (SS/RM) for leading this initiative and have generously given their time, knowledge, and assistance to the digital census. Without your help, this would not have been possible.

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CHAPTER-1: INTRODUCTION

1.1 Background

Population and Housing Census, traditionally is a decennial activity within the geographical area all over Pakistan which provides benchmark data on population size, its geographical distribution and demographic characteristics along with residential facilities for socio-economic development planning and its evaluation. It also meets the legal and constitutional requirements as Article 51(5) of the Constitution of Pakistan says that "the seats in the National Assembly shall be allocated to each province, the Federally Administrative Tribal Areas and the Federal Capital on the basis of population in accordance with the last preceding census officially published". Similarly, Article 160(2) of the Constitution deals with distribution of resources among Federation and the Provinces through National Finance Commission whose basic parameter is population size of the respective Province/Area.

The Population and Housing Census is a count of people, and structures, living within geographical boundaries of a designated area with reference to a particular period and time, whether they are nationals or foreigners, legal or illegal. These numbers are needed for;

- future policy and planning,
- comparison with past to evaluate the policies,
- national and international comparisons,
- resources allocation,
- sampling frames,
- delimitations of electoral constituencies,
- allocation of number of seats in National and Provincial Assemblies.

The census results have become sensitive and highly important due to the linkage between the resource allocation as well as number of seats in National and Provincial Assemblies owing to the sensitivity it comes under critique of every sector of the society which closely watches the trends of population growth so that interests and benefits of their areas can be properly recognized.

According to the General Statistics (Reorganization) Act, 2011, the Pakistan Bureau of Statistics (PBS) is mandated to conduct the Population and Housing Censuses in the country as well as other data collection activities through various censuses and surveys. Previously, the Population and Housing Censuses were conducted during the years 1951, 1961, 1972, 1981, 1998, and 2017; whereas, the latest

and digital Population and Housing Census has been conducted in 2023. The Post Enumeration Survey (PES) for this census has also been conducted in the same year of 2023.

1.2 An Overview of Population and Housing Census, 2023

The Council of Common Interests (CCI) in its 45th meeting held on 12th April, 2021 approved final results of the 6th Population and Housing Census 2017 and also directed that "the process of next Census should start as early as possible according to international best practices by using latest technology". Accordingly, Census Advisory Committee (CAC) of renowned demographers and experts was constituted under the Chairmanship of Deputy Chairman Planning Commission (DCPC) to devise recommendations for adoption of International best practices by using latest technology for the conduct of 7th Population and Housing Census. The CAC further constituted a Technical Committee on Questionnaires to finalize the details of questionnaires by involving all relevant stakeholders.

The CCI in its 49th meeting held on 13th January, 2022 approved the recommendations of CAC which also includes conduct of census digitally through tablets linked with GIS, Geo Tagging of structures and real time monitoring also approved the recommendation of Post Enumeration Survey as per best international practices. The de-jure method of enumeration has been adopted for the 7th Population and Housing Census-2023, as per recommendations of CAC. The *de-jure* method of enumeration counts people according to their usual place of residence, which is defined as the place where a person has lived continuously for at least six months (not including temporary absence for holidays or work). Further Intention to live for at least six months in the place is to be considered as usual residence. The de-jure Method of enumeration is widely used method in the census world and therefore, was used in all the previous Censuses conducted in Pakistan as it ensures the capturing of data as per objective of census i.e. to provide the count of people who are living in particular areas and using its resources.

PBS demarcated the whole country into small compact areas called Census Blocks comprising of, on the average 200-250 houses, with total number of 185,514 blocks and each block with well-defined boundaries and maps. The whole delimitation process was carried out with the close coordination of Provincial Governments, Local Government Departments, Revenue Departments and District Administration.

For effective administrative support for the field activities of 7th population and Housing Census, Census Districts have been established nationwide, including Gilgit Baltistan and Azad State of Jammu & Kashmir. In Punjab, Sindh and Khyber Pakhtunkhwa tehsils/talukas/sub-divisions have been

designated as Census Districts, whereas in rest of the country, including Gilgit Baltistan and Azad State of Jammu & Kashmir, administrative districts have been declared as Census Districts. Moreover, all Cantonments have also been treated as Census Districts. The Census Districts have been further subdivided into Census Charges, Census Circles, and Census Blocks.

The 7th Population and Housing Census is the Pakistan's first ever digital census and its requirements are unique and challenging as compared to paper-based data collection. The significant characteristics of the first digital census include:

a) Acquisition of high resolution images

b) Clearly identifying the enumeration areas (blocks) based on high-resolution digital maps developed by integrating Geographic Information System (GIS) of PBS

c) Geo-tagging of all the structures

d) Collecting data with tablet devices

e) Development of Census Software Solution (Enterprise Resource Planning) comprising of 16 different modules

f) Acquisition of data infrastructure and storage

g) Real time monitoring through dashboards

h) Transmitting data from the field to the server completely encrypted to protect the confidentiality of individual's information

i) Establishment of (495) Census Support Centers (CSCs) at tehsil level with furniture, IT equipment, and internet facility.

j) Establishment of N3C (National Census Coordination Center) for real-time monitoring of the progress of data collection in the field linked with Census Support Center.

k) Provision of 126,000 secure tablets

l) Establishment of Assembly line for Tablet hardening at PBS headquarter to install all the necessary software in tablets, SIM installation, testing of tablet and functionality.

m) Establishment of Call Center at PBS headquarter, Islamabad with toll free number (**0800-57574**) and SMS gateway (**9727**) for complaint resolution and control centers at PBS provincial offices, to provide quick resolution for various problems arising in the field during data collection.

n) Publicity campaign of the census through National Media as well as other traditional approaches (**brochures, flyers, posters and banners with information about the census**) and online platforms including social media (**Facebook, YouTube, Twitter, Linkedin, Instagram**)

o) A fully secured Web-based Self-Enumeration portal launched fifteen days before start of the Census Field Enumeration

p) CATI (Computer Assisted Telephone Interviewing) for data quality assurance.

q) Training including Technological Interventions: Training manual with audio-video clips for each question developed to better understand the theme of the questions. Separate video films and presentation for each level prepared for training of field staff, supervisory staff and senior management of provincial level.

r) 121,000 Enumerators and Supervisors trained during census operation.

Tablet devices were hardened for data collection purpose using MDM software while Customized Operating System was used in the tablets. These tablets were connected to private secured network through a designated intranet. Data entered in tablets reached in encrypted form through VPN (Virtual Private Network) tunnel online where data quality and constraints were checked before saving data to the online database. The database has strong validation, lock management and access control mechanism to ensure accuracy, consistency and integrity of data.

The core components of any census are well-designed questionnaires and comprehensive training. Training sessions for the 7th Population and Housing Census were planned in three tiers to train field staff: (a) Training of Master Trainers (MTs); (b) Training of Trainers (TOTs); (c) Training of Enumerators (TOEs). Total 328 Master Trainers (Subject + IT) were trained at Islamabad to further impart training to 4000 Trainers (Subject + IT) at Divisional Level. There were 77 venues established for TOTs and each batch of TOTs was trained in 5 days, during 19th - 23rd December, 2022. The final round of training was training of Enumerators across Pakistan, in which 121,000 Enumerators and Supervisors were trained at 495 Tehsils. There were 992 venues established for training of TOEs, which was held during 7th - 21st January, 2023 throughout the country. These enumerators and supervisors were trained to collect the data using Tablets from their assigned areas.

Launching of fully secured Web-based Self-Enumeration portal (20th February to 10th March, 2023) ten days prior to Field Enumeration. Field operation of Census started from 12th March, 2023 to 22nd May, 2023. For monitoring of the Census field operation, PBS's monitoring teams visited the field areas according to the issued SOPs w.e.f 12th March to 22nd May, 2023. The purpose of the field operation monitoring was twofold:

• Checking of data collection quality and improving the coverage.

• More detailed investigation of issues faced during the field operation.

It is worth mentioning here that PBS taken all necessary steps for quality assurance. PBS constituted a **Technical Expert Committee (Annex-1A)** for census-2023 as per following TORs

- Device the strategy for the overall success and credible Census -2023field operations.

- Fortnightly review of the census activities and suggestion and their smooth timely completion

- Periodic review of results with Provincial and District stakeholders.

- Communication Strategy for ensuring credibility of Census results

The Technical Expert Committee for census-2023 conducted series of meetings and recommended that a Post Enumeration Survey must conducted.

Accordingly, during conduct of Census, Census Monitoring Committee in its 9th meeting held on 22nd March,2023 constituted a **Demographer/Trend Analysis Committee (Annex-1B)** of renowned experts as per following TORs.

- The committee will analyze the data of the problematic areas after complete enumeration of the field operation of 7th Population and Housing Census-2023 through demographic and other techniques and decide on its suitability for publication / placing before the competent forum for approval.

- The committee will also suggest alternate statistical techniques/ methods and corrective measures in case the data of any specific area/ region is found significantly deviated from the expected values which will be derived based on some other relevant available information with surveys such as LFS, PSLM and Population and Housing Census previously conducted in the country.

The Demographers Committee for Trend Analysis conducted series of meetings to deliberate and understand the demographic trends. After carefully examining indicators of census results like sex ratio, median age, and age-sex pyramids, the Committee concluded and also gave recommendations, among these recommendations committee strongly agreed that Post Enumeration Survey must be conducted by PBS to address any over/under enumeration issue.

Despite best efforts, the Census is usually not flawless and errors may creep in at all stages of census, from planning till execution of the census field operations. As a consequence, under enumeration or over enumeration at certain areas cannot be ruled out. Therefore, it is important to assess the quality of the

Census, including coverage and content errors. Incomplete coverage may include difficulty in enumerating people on the move, higher percentage of nonresponse from urban areas, as well as some people may choose not to participate in the census either because they are unwilling to cooperate with enumerators or unaware of census importance. Omissions may also occur due to misunderstanding of the question and concept or intentionally not reporting a person living in a household for any particular reason, e.g., the person may be reported at the irrelevant place, hesitate to disclose personal information like name, sex, particularly females, fear of government policies like taxes, traditional bindings etc. Figure-1 depicts various steps of the digital census. To provide the reliable and authentic data, PBS tried best efforts through various steps involved in the whole census process. These steps have been depicted in the **Figure-1**.

To evaluate the extent of errors, omissions, over and under enumeration during data collection process, the Post Enumeration Survey (PES) is considered the best possible solution internationally. Therefore, PBS conducted PES quickly just after completion of the census field operation in four provinces.

Figure -1
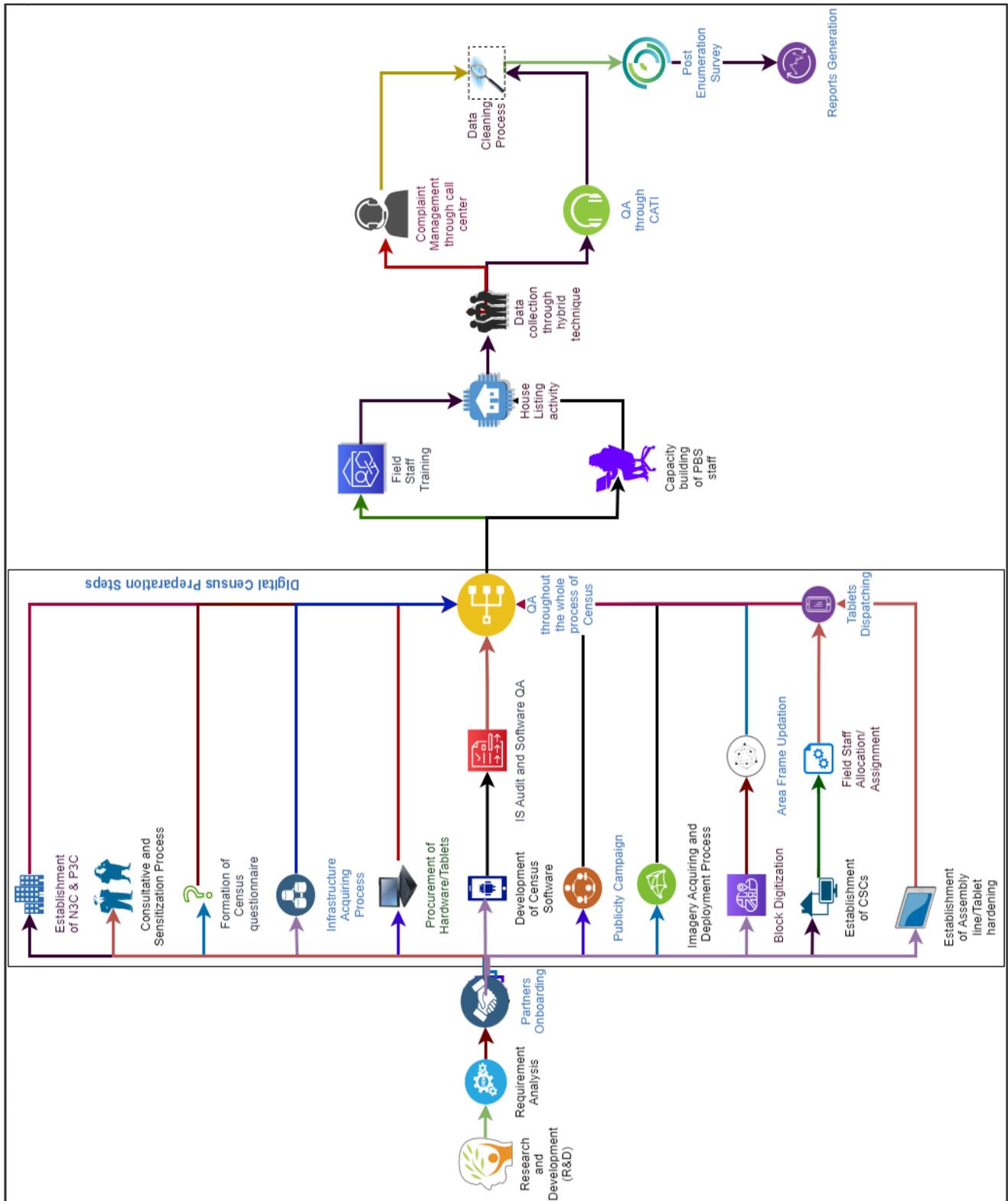
1.3 PES for 7th Population and Housing Census-2023

The conduct of a PES was one of the main recommendations of the **Census Advisory Committee** (CAC), and this recommendation was also approved by **Council of Common Interest** (CCI). Afterwards, it was also decided in the 15th meeting of the CMC, held under the Chairmanship of Federal Minister PD&SI on June 7, 2023, that a Post Enumeration Survey must be conducted to check the coverage of Census-2023.

1.4 Committee to Finalize the Modalities of Post Enumeration Survey

A PES is a crucial component of a national Population and Housing census. For preparation of the road map for conduct of PES for 7th Population and Housing Census, PBS was constituted a committee on 13th June, 2023 *(Annex-IC)* under the chairmanship of Mr. Ayazuddin, Member (Census & Survey) to finalize the modalities of Post Enumeration Survey especially regarding sample methodology, suitable sample size, finalization of questionnaire for PES, and timelines for conduct of field operation for the PES of 7th Population and Housing Census-2023, with ToRs mentioned here.

i)   Finalization of suitable sample size for PES.

ii) Finalization of questionnaire for PES.

iii) Modalities and timelines for conduct of field operation.

iv) Estimation methodology for finalization of results of Census considering PES

v)   Finalization of data Cleaning Mechanism of Census 2023.

vi) Review and finalization of Tabulation and results of Census-2023.

This committee studied PES methods conducted by various countries for successful planning of the PES. Several meetings were convened to deliberate and decide about the important issues regarding PES such as **Objective of PES, Sampling Methodology, Areas Identification, Designing of Questionnaire, Time Period for Field Operation and Monitoring Mechanism** to achieve the objectives of the survey.

PBS also established a Sub-Committee headed by Ms. Rabia Awan DDG(CPMU/CP&C) for implementation to ensure efficient analysis of the Post Enumeration Survey as per directives of the main committee. The Progress was also shared time to time with the committee. After collecting PES data, a subcommittee conducted a number of meetings for detailed data analysis. After a thorough examination, the subcommittee's task was to accommodate the population in the light of PES and present the results to the PES committee. The Sub-Committee is placed at **(Annex-ID)**

1.5 International Practices of Post Enumeration Survey

Although PES is an effective strategy to evaluate and validate the census results but all countries could not practice PES after conducting each census. Post enumeration surveys are usually carried out to assess the accuracy and coverage of the census, to identify potential undercounts or overcounts, and to adjust the census data if necessary. Some countries are mentioned here that have historically implemented PES:

i. **United States:** The U.S. Census Bureau conducts the *Census Coverage Measurement (CCM) Survey*[1,2] as a post enumeration survey to estimate the net undercount and overcount in the decennial census.

ii. **Canada:** Statistics Canada conducts the *Census Coverage Survey (CCS)*[3] to evaluate the coverage and quality of the census data.

iii. **Australia:** The Australian Bureau of Statistics (ABS) conducts the Census *Post Enumeration Survey (PES)*[4] to assess the accuracy of the census data.

iv. **New Zealand:** Statistics New Zealand carries out a *Post Enumeration Survey (PES)*[5] after the census to measure the coverage of the census.

v. **United Kingdom:** The Office for National Statistics (ONS) has conducted *Post Enumeration Surveys (PES)*[6] in the past to evaluate the coverage of the census.

vi. **Japan:** The Ministry of Internal Affairs and Communications (MIC) has conducted *post enumeration surveys*[7] to assess the quality of the census data.

Summary for all the countries is given in Table-1

Table-1: Summary Table of Countries Conducting PES

COUNTRY	PES	YEAR	OVERCOUNT	UNDERCOUNT	
United States	Census Coverage Measurement (CCM) Survey	2010 2000 1990	0.01% 0.49% --	-- -- 1.61%	
Canada	Census Coverage Survey (CCS)	1991	--	2.2%	
Australia	Post Enumeration Survey	2021	-- --	0.7% 6.0%	Overall

[1] https://www.census.gov/programs-surveys/decennial-census/about/coverage-measurement.html
[2] https://www.census.gov/newsroom/press-kits/2021/post-enumeration-survey.html
[3] https://www150.statcan.gc.ca/n1/pub/11-522-x/2001001/session11/6266-eng.pdf
[4] https://www.abs.gov.au/census/about-census/census-post-enumeration-survey
[5] https://www.stats.govt.nz/corporate/2023-post-enumeration-survey/
[6]https://www.ons.gov.uk/file?uri=/census/2011census/howourcensusworks/howwetookthe2011census/howweprocessedthe information/coverageassessmentandadjustmentprocesses/nsmac13censusovercoverage_tcm77-189761.pdf
[7] https://openjicareport.jica.go.jp/pdf/1000043657.pdf

			0.6%	--	Northern Territory Capital Territory
New Zealand	Post Enumeration Survey	2023	---	---	Under Process
United Kingdom	Post Enumeration Surveys	2001	0.5%	--	
Japan	Post Enumeration Surveys	2019	--	--	No Results Found

1.6 Major Situations That Can Lead to Coverage Errors in the Census

1. The enumerators may leave the structures from counting where people live but usually are not used for residential purposes e.g., mosques, temples, boats, huts etc. All these types of structures may be left out or not properly counted in the census.

2. In urban areas, household members may be away from home during day time due to their jobs, business, shops, or other issues. Similarly, some houses may be found locked and enumerators do not probe further about the status of the household residing there and count these types of houses as nonliving.

3. Respondents' availability may also be a reason for under and over enumeration during a census. Sometimes, respondent of a household does not have full information about all the individuals residing in the household. As a result, the information collected may be incomplete or may skip some of the individuals living within the household.

4. Conceptual or definitional issues may also cause over or under enumeration. As the visitors need to be skipped or servants who need to be enumerated as per the employed De-jure methodology, may be left by the enumerators due to less clarity on the issue.

5. Sometimes, people don't want to participate in the census process. They may refuse to provide information due to the concerns about the confidentiality of their personal information and fear of misuse of the provided data or due to fear of government policies like taxes etc.

6. Respondents may be hesitant to open their doors to strangers during the census, particularly in urban areas due to security reasons. In urban environment, people may be more conscious due to various factors such as higher crime rates or general sense of anonymity within a densely populated area. These concerns can contribute towards reluctance in participating fully in the census process potentially resulting in incomplete data representation for that particular area.

7. The traditional trends may also restrain the people to provide actual data particularly for females in specific areas.

8. Political or other incentives like aid or support etc. may encourage people to report more household members than the actual ones.

These reasons and concerns may contribute towards reluctance of respondents for fully contributing and participation in the census process potentially resulting in incomplete data for that particular area or household. Therefore, PBS considers conduct of PES essential after enumeration of the census 2023 to cope with the errors of all types in the actual data which was also conducted in the same year.

1.7 Objective of Post Enumeration Survey

The PES is carried out for evaluation of the overall quality of the census data. It helps to identify the **under and over enumeration, inconsistencies** within the reported data, **coverage errors**, and other issues that may have occurred during the enumeration process of the actual census. After PES study for the current census, improvements can be made for future census operation through reliable and robust data collection strategies to ensure data accuracy and quality. Therefore, PBS conducted PES within three months of conclusion of field operation of the actual census, to evaluate the reliability, accuracy, and completeness of census coverage and for adjustment of the population if needed. It involved an independent remunerations of a statistically representative sample of households and the persons living within the households covered by the census 2023. The general objectives of the PES are to evaluate the accuracy of the actual census data by providing quantitative information on coverage and content errors at specified domains of estimation, to provide stakeholders with quantitative information to enable the determination of the overall success of the census, and to provide a statistical basis for adjustments of census data across domains if and when it becomes necessary. However, specific key objectives of the PES are outlined here:

1. **Assessing Undercount and Overcount:** The PES aims to estimate the undercount or overcount in the census. It compares the results of the survey with the initially collected data to identify any discrepancies or omissions in the population count. PES helps to determine the accuracy of the census and provides insights for any potential bias(s).

2. **Identifying Coverage Errors:** The PES helps to identify and understand the reasons behind coverage errors in the census. It examines whether certain population groups or areas were

missed or overrepresented in the initial enumeration. By analyzing these errors, adjustments may be made to ensure fair and equitable representation of all the segments of the population.

3. **Informed Policy Decisions:** The results of PES provide policymakers with crucial information to make informed decisions. Accurate population data is essential for resource allocation, policy planning, and development initiatives. By understanding the strengths and weaknesses of the census data, policymakers can be in a better position to address the needs of specific population segments by designing effective policy measures.

4. **Improving Census Methodology:** The findings of the PES contribute significantly towards refining the census methodology for use in future census data collection efforts. By identifying areas of improvement, such as enumeration techniques, questionnaire design, or data processing procedures, the PES helps to enhance the accuracy, efficiency, and reliability of the future censuses.

The coverage errors are considered more harmful due to missing or over reporting of any area or population in the census. PBS emphasized to minimize the coverage errors during data collection phase of the census, however, these errors cannot be ruled out in spite of all the best efforts. Let us have a look over the coverage errors.

1.8 Development of PES Questionnaire

The Committee organized numerous meetings and detailed deliberations were made to finalize the questionnaire by considering the purpose and objective of PES. The questionnaire of the Post Enumeration Survey, was designed based on the Population and Housing Census-2023 questionnaire. The questionnaire consisted of two separate forms: one for listing (**PES Form-3**) (*Annex* **-II)** and the other for enumeration (**PES Form-4**) (*Annex* **-III).** The effective design of PES questionnaire plays a crucial role in identifying errors and discrepancies in the census data and helps in improving future census operations and data accuracy. It was decided that only question related to objective of PES will be included in questionnaire and questionnaire will be made as small as possible for quality assurance. Common Parameters of PES Questionnaire are given.

a) **Geographic Information:** PES listing questionnaire includes questions related to the geographical location of the households, such as the address, GPS coordinates, or other location indicators. This helps to verify the accuracy of the spatial coverage in the census data.

b) Demographic Information: The PES questionnaire collects demographic details such as age, sex, marital status, relationship with the head of Household.

After several meetings and deliberations of PES committee finalized the work plan and timelines for Post Enumeration Survey.

S.no	Description	Time line
1	Preparatory Phase	26th June,2023-03rd July,2023
2	Testing of Software and Training	3rd July,2023-7th July,2023
3	Field Operations	8th July,2023-22nd July,2023
4	Finalization of Results	Last week of July

Several meetings were held by the PES Committee headed by Mr. Ayazuddin, Member (Census & Survey) to finalize the questionnaires. The Questionnaires were developed by considering the objective of PES and final Questionnaires were presented in the meeting held on 22nd June,2023 that was presided over by the Chief Statistician/Chief Census Commissioner and also attended by Member (SS/RM). Questionnaires were approved by Chief Census Commissionaire and handed over to NADRA for Development of Post Enumeration Survey Software.

For Selection of representative sample UN guidelines for PES, UNFPA technical considerations for PES and sample design of Several Countries have been reviewed by PES Committee. Detail of all matters being explained in the upcoming chapters. After several meetings and detail deliberations PES committee made recommendations related to Sampling Methodology, Time Period for Field Operation was presented to Chief Statistician/Chief Census Commissioner. Finally, all of the recommendations regarding sampling methodology, questionnaire, field operation time period, were approved by the Chief Census Commissioner. It is pertinent to mention here that CMC in its 16th meeting held on 27th June,2023 approved all the recommendations regarding Sampling Methodology and Proposed Analysis Methodology of Post Enumeration Survey

For detail analysis of post enumeration survey, PES committee along with sub-committee /working group who has worked around the clock to develop algorithm of high quality with in shortest possible time regarding methodology for analysis of census-2023 results. Detail methodology was presented in the meeting and Chief Census Commissioner approved the methodology/ algorithm steps. In the upcoming chapter 5 of the report, the analysis of census result -2023 are discussed.

CHAPTER-2: SAMPLE DESIGN

Sample design is the most important step of any survey to get desired results out of the survey. To achieve the objectives of the PES, a well thought and efficient sample design was developed. The basic requirements of the sampling viz universe, frame, sample size, stratification etc. are briefly explained here.

2.1 Universe, Scope of the survey and Sampling Frame

2.1.1 Universe

The universe of the survey consists of household-based population in all urban and rural areas of four provinces of Pakistan and Islamabad.

2.1.2 Scope of the survey

PES survey covered all the households and persons in the sampled blocks. The units of observation are the households and persons living within the household.

2.1.3 Sampling Frame

The updated Sampling Frame of 2023 Population and Housing Census was used for sample selection purpose for the PES survey. The sampling frame consists of complete list of **180,046** Enumeration Blocks (EBs) or Primary Sampling Units (PSUs) covering four provinces of Pakistan and Islamabad Capital Territory. Province wise summary of EBs/PSUs is given in Table-2.

Table-2: Province Wise Sampling Frame of Blocks

Enumeration Blocks			
Name of Province	**Rural**	**Urban**	**Total**
KPK	24,983	3,885	28,868
Punjab	59,285	34,461	93,746
Sindh	19,688	24,150	43,838
Balochistan	9,261	2,596	11,857
Islamabad	904	833	1,737
Total	**114,121**	**65,925**	**180,046**

2.2 Sample Size, Stratification, and Allocation Plan

Trend Analysis Team conducted demographic analysis, in detail to explore the under/over reporting of each district of four provinces of Pakistan and Islamabad. The variables used for demographic analysis are discussed here.

i. Cohort Analysis for identification of over/under reporting
ii. Dependency Ratio
iii. Sex Ratio
iv. Median Age
v. Migration Data
vi. Household size
vii. Growth rates comparison between 1998 Census and 2017 Census
viii. Data from other relevant sources

On the basis of above analysis, the sample design of PES was devised including two stages

First Stage

Stratification

Keeping in view the in-depth demographic analysis of each district of Pakistan and homogeneity of the population characteristics; stratification inside each province was developed. Each province of Pakistan has been stratified into 2-3 strata. Khyber Pakhtunkhwa (KP), Punjab and Sindh provinces were divided into three strata while Balochistan into two strata. Therefore, total of 48 districts were selected out of total of 133 districts, wherein, 12 districts from KP,13 districts from Punjab, 12 districts from Sindh, 10 districts from Balochistan and Islamabad were selected. Detailed stratification at **Annex-IV**. Brief province wise summary is given in table -3

Table-3: Total Number of Districts

Name of Province	Total No of Districts	No of Sample Districts
Khyber Pakhtunkhwa	32*	12
Punjab	36	13
Sindh	30**	10
Balochistan	34	12
Islamabad	1	1
Total		**48**
* Three districts of Kohistan were not considered for selection		
** Seven districts of Karachi division considered as one district		

Second Stage

Sample Size and its Allocation

The total sample size of **2500 Enumeration Blocks covering 625,000 households** was selected from the **48** districts (overall level) with relative margin of error (RMOE) of 1.1%. The sample size is also sufficient and representative at provincial and national levels. The 48 districts selected was presenting their respective stratum from which the sample was selected. The sample size was further proportionally allocated to urban and rural part of each district. The province wise summary is given in Table-4. Name of districts with sample size places at Annex -V

Table-4: Sample Allocation

Name of Province	Rural	Urban	Total
Khyber Pakhtunkhwa	287	93	380

	471	586	1057
Punjab	471	586	1057
Sindh	313	538	851
Balochistan	124	43	167
Islamabad	23	22	45
Total	**1218**	**1282**	**2500**

In the Second stage; sample blocks were selected using Probability Proportional to Size (PPS) Design, having number of households as measure of size. Complete household listing was carried out in the selected blocks and afterwards, all household members were enumerated using PES questionnaire

2.3 Weighting Scheme

As per sample design of the survey, two stage selection probabilities and weights were developed. The details are highlighted here.

i)   Selection Probability of District (First Stage)

p_1 = probability of selection of districts in each province

=Number of districts selected in a province ÷ total number of districts of a province

The inverse of probability of selection is weight, therefore,

$$w_1 = 1/p_1$$

ii)   Selection Probability of Block (Second Stage)

p_2 = probability of selection of block in a stratum

= (number of households in a block ÷ total number of households in a stratum) × number of blocks to be selected

The inverse of probability of selection is weight, therefore,

$$w_2 = 1/p_2$$

The final weight is the product of first stage and second stage weights i.e.

$$w_t = w_1 \times w_2$$

After complete and fresh field household listing, difference of households and population under Census and PES was computed. Later on, the weights were applied to each block to estimate weighted population impact, as per detail:

Household difference in a block b_i was weighted as

$$Household\ Diff\ b_i = \left(PES\ HH\ b_i - Census\ HH\ b_i\right) \times w_t$$

While, Population difference in a block b_i was weighted as

$$Population\ Diff\ b_i = \left(PES\ Pop.b_i - Census\ Pop\ b_i\right) \times w_t$$

The weighted difference was proportionally allocated among all the districts of a stratum, all tehsils of each district and ultimately in all blocks of a tehsil.

CHAPTER-3: DIGITAL INFRASTRUCTURE AND SOFTWARE FOR PES

3.1 Introduction

Pakistan Bureau of Statistics conducted first ever "Digital Census" using digital technology. The process adopted for the said Census for data collection, quality checking, monitoring and progress visualization was automated and digitized for achieving the goals of efficiency, transparency and timely availability of data to the stakeholders. PBS used various software modules to manage the whole digital census exercise. PBS not only automated the data handling processes of the Census but also Administrative/Management processes were digitized e.g. Human Resource Management, Area Frame Management, Training Management System, Complaint Management System etc. It is also pertinent to mention here that all the structures were first time "Geo-tagged". Geo-coordinates were captured through tablets for exact location capturing Geo locations were auto fetched where GPS signals were working but users/enumerators were also provided with "SUPARCO and "Open Street Maps (OSM)" maps for manual geotagging of their location. All the digital technology used for census was also utilized for the PES.

3.2 Datacenter and Infrastructure

Data centers and infrastructure are the backbone for digital Population and Housing Census-2023 operation. The role of data centers and infrastructure for a census -2023 is crucial for the successful planning, execution, and analysis of the census. Data Processing Centre under Support Services Wing of Pakistan Bureau of Statistics mandated to provide support functions by developing software applications and programs to carry out Data Processing for Census -2023 with the collaboration of **NTC** (Data infrastructure (Storage and computing facilities)) and the same Model was used for Post Enumeration Survey (PES). The role of data centers in a census extends beyond data collection and processing; they are essential for ensuring the accuracy and reliability of census results, which have far-reaching implications for policy and resource allocation.

Main Functions of Data Processing Centers

- Data Storage
- Data Security
- Data Processing
- Data Backup and Disaster Recovery
- Scalability

- Connectivity
- Data Access and Reporting
- Monitoring and Management
- Compliance and Privacy
- Integration

3.3 Hardware (Tablets and Allied Accessories)

The first ever Digital Census activity will be performed using android-based smart devices equipped with House Listing and Enumeration Application synchronized with Global Positioning System (GPS) and Geographic Information System (GIS). NADRA is responsible for provision of Tablet device and allied accessories like SIM etc besides that NADRA do have the mandate of, IT support to field staff, hosting of census software solutions at infrastructure provided by NTC and Syncing of data and data security. After acquiring the tablets from NADRA, the Tablet hardening had been accomplished by NADRA in PBS Premises along with involvement of PBS. Tablet Hardening is the process of applying all necessary security measurement to each tablet. The tablet hardening process is used to ensure the edge-to-edge security of each tablet acquired by NADRA. PBS (Requirement implementation Testing) and NADRA (all functional & non-functional testing) are the main stakeholders for performing testing of Census Software. The testing includes testing of Software Requirements, Software Design, Phase Testing and Acceptance Testing Penetration testing, Load balancing, Data security, DR Switching etc. The specification for used tablets in Census and PES are annexed at VI

3.4 PES Software Modules

All the census software modules were also used for the PES excluding some of them not required for the survey. PBS considered and tried their level best to meet the international standards in implementation the best practices and digital processes. Keeping consistency in view, PES was also conducted on the same digitized process as adopted for the actual digital census-2023. PES was based on a short questionnaire and sample based selected blocks / geographical regions. The same digital census process was followed in the PES data collection while software were customized and backend Database was separated from Census Database. Both the Databases were interlinked on the basis of matching criteria in order to compare the two datasets and checking the

data quality. In census, one enumerator was assigned two blocks but in PES, being sample based, single enumerator was assigned a single block to complete the work within stipulated time.

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3.5 Development of Census Software

For successful conduct of Digital Census in Pakistan**,** by using modern technologies there was need to develop software modules for each step of digital census. Every Software Modules contain instructions, processing logic for which PBS consultation with NADRA finalized following sixteen software modules for 7th Population and Housing Census.

S. No	Modules Name	S. No	Modules Name
1	HR and Task Assignment	9	Self-Enumeration Application
2	Inventory Management System	10	Trend Analysis/Supervisor Dashboard
3	Area Frame Updation Application	11	Data Dissemination Dashboard
4	CATI Interface	12	Data Cleaning Module
5	Complaint Management System	13	Tabulation/Reporting Module
6	Listing Application	14	Training Management System
7	Enumeration Application	15	GIS Based Monitoring Dashboard
8	Centralized Communication Application	16	Mobile Device Management Module

As Post Enumeration Survey was conducted to evaluate the coverage of census, 2023 after detailed meetings and deliberations with NADRA keeping in view the objective of PES, PES committee finalized that there were need of basic software modules to finalized the Post Enumeration Survey. Only data collection modules were customized (Listing and Enumeration

app), further remaining modules have more or less same functionalities. Following Modules were utilized by PBS in PES.

S. No	Modules Name	S. No	Modules Name
1	HR and Task Assignment	5	Listing Application
2	Inventory Management System	6	Enumeration Application
3	CATI Interface	7	Tabulation/Reporting Module
4	Complaint Management System	8	Mobile Device Management Module

3.6 Administrative Software Modules

Administrative software modules for a Population and Housing Census (PHC) are specialized components within a census management system designed to facilitate the planning, execution, and analysis of the census. In census -2023 PBS used four administrative modules. Post Enumeration Survey (PES) has an important feature of all the administrative modules from ERP (Enterprise Resource Planning). Given the Nature, Timeliness and the Scope of PES, it is difficult to manage post enumeration Census Activities without providing a Digital Solution for Effective Implementation & Control. Therefore, according to the requirement of PES only two main administrative modules were used to systematically managed the task.

3.6.1 Human Resource (HR) and Task Assignment Module

The most important Module of PES is HR and Task Assignment module which is linked with the inventory module as well as TMS and tablet-based house listing and enumeration applications because all the blocks assignment to enumerators are handled by this module. All the users and the assignments, as well as edit, assignment of blocks are core functions of this module.

3.6.2 Inventory Management Module

Inventory Management module comprises of functionalities like enrollment of hardware devices (especially tablets) using barcode scanner, boxing and dispatching of tablets and hardware devices, receiving and verification of tablets, transfers from one station to another, issuance and return of hardware devices, role-based user management and it should also generate statistical reports on different levels for ease of analysis. Inventory management system is one of the important modules of ERP. At the time of tablet allocation, enumerator info was retrieved and verified from HR and Task assignment system.

3.7 Mobile Device Management (MDM)

MDM provides the facility like auto update of software whenever required in online mode. The enumerators who are working in offline mode has to come in network coverage area in order to auto update the application through Remote Device Control System

- Pre-Load Data (Map and Imagery)
- Security Policy Implementation
- Device Customization
- Automatic Application & Feature Updation
- Enumerator & Device Tracking, Exception and Crash Reporting
- Security Alert and Flag Generation
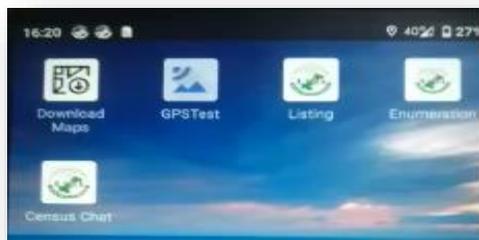
3.8 Data Collection Software Modules

The tablet based data collection using listing and enumeration operational software having application with CNIC scanning facility was used for Post Enumeration Survey (PES) ensuring real time data collection and monitoring. Both of these applications are working in offline as well as online mode. These applications were used applying SUPARCO as well as GIS maps for blocks imagery along with geotagging and location taking facility in both online and offline modes. Both software modules have post sync edit and delete options as well as in pre sync edit and delete options.

3.8.1 Listing Application

The android based listing application is pushed for house listing including structures under use of economic activity and residential purpose using MDM. The house listing application has been used by enumerators in order to list the structures during Post Enumeration Survey (PES). Tablet based listing application has the facility of geotagging and obtaining the location in both online and offline modes. Only five questions were asked as part of the application's design, which followed PES's objectives.

3.8.2 Enumeration Application

Android based enumeration application has been used to collect data from listed households which have been listed during house listing operation. All the information has been taken from respondents by the enumerators. For ensuring the quality of data, PBS deputed staff/PBS Monitors asked questions from the respondent of the same household being enumerated by enumerator in the same block assigned to the enumerator, and compare both the responses for quality assurance.

3.9 Data Quality Assurance

Data Quality is the ultimate target of PBS. To maintain the data quality, different data checks were implemented in the applications such as edit checks, skipping pattern checks, and validation checks on the database for getting the options available against the question being asked to maintain the internal consistency of data. Computer Assisted Telephone Interviewing (CATI) is another important feature in order to check data quality assurance

3.10 Technical Support During PES

For smooth execution of the census process and addressing any issues or questions that raised during the field operation of digital census-2023, PBS established a call center with the collaboration of NTC for readdressed of grievances of enumerators, supervisors, respondents and general public. PBS utilized the same model during the PES.

The following technical assistance is provided by NADRA during the field activities of the 7th Population and Housing Census and same technical support is provided during PES:

- Conduction of digital census of both house listing and enumeration applications.24/7 support to all the field staff post census activity for installation and login in network coverage issues.

- Provision of continuous 24/7 support to the field staff during ongoing digital census throughout the country.

- the support has been given to the field staff for login and network connectivity.

- Backup and recovery in case of tablet malfunctioning by uploading recent backup data on new tablets.

- Resolution of complaints through Complaint Management System.
- Provision of support to enumerators in case of any issues like data not importing due to network unavailability.

3.11 Call Centers & SMS Gateway

Call Center with latest concepts & technologies was established at PBS HQ where 50 well trained Call Agents were working round the clock. Call Center being used for following purposes:

- Complaints Registration and Resolution
- Quality Assurance through CATI approach
- Provide Assistance and Query Handling
- Coordination SMS Gateway / Service
- Login Credential Forwarding to Enumerator to Use Tablet Applications
- Self-Enumeration Portal SMS Forwarding (PIN, UTN, Verification)
- Complaints Related SMS (on Complaint Register and Resolve)

3.11.1 Complaint Management System

A systematic approach to manage all steps of Complaint Resolution Life Cycles for any type of complaint. Toll Free **UAN 0800-57574** available to call and report an issue. Complaints might be related to:

- Field Enumeration Staff Complaints
- Census Support Center Complaints
- General Public Complaints
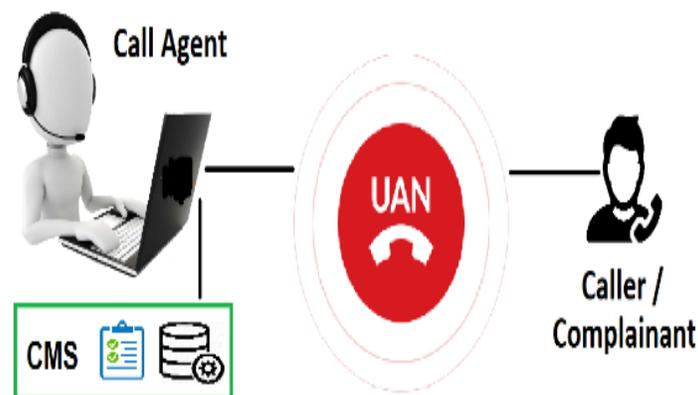
The call agent collect data from caller and register a complaint, system categorize / prioritize certain complaints based on nature of the issue then a ticket generated and forwarded to Complaints Management System (CMS). Complaint was marked to relevant person/team/ department. Resolution team/individual managed and coordinated for that issue to resolved.
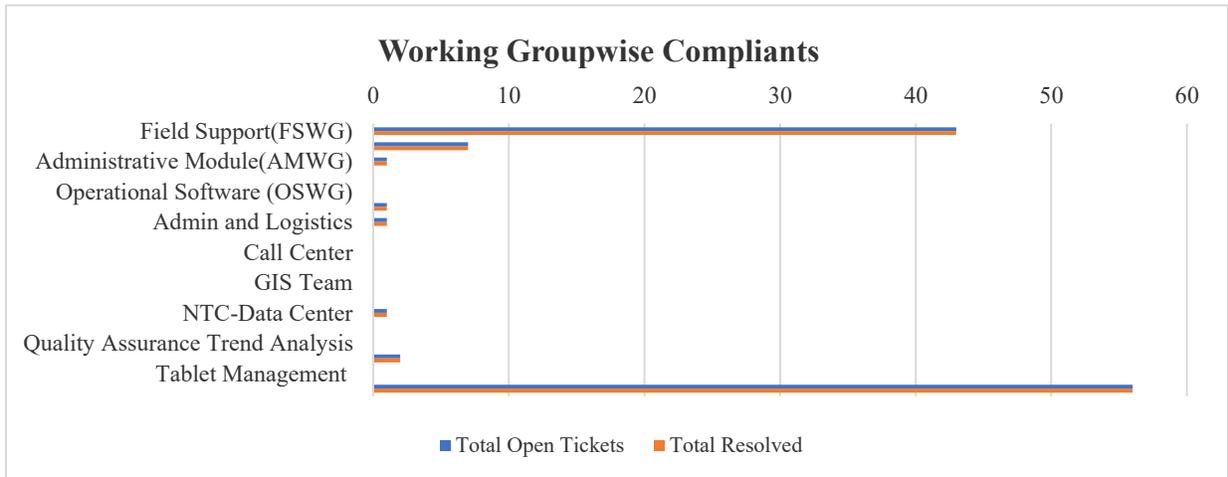
3.12 Guidelines and User Manual

Providing technical support and guidelines to the enumerators and supervisors, a full fledge IT Manual was prepared and pushed on their tablets so that they can use the tablets and applications installed in tablets. Similarly, the instructions to the concerned enumerators, were provided from time to time through SMS

3.13 Confidentiality and Data Privacy

Data security is the most important tool in any organization and to achieve it Virtual Private Network (VPN) was implemented in the enumerator tablets. Further administrative software ERP Modules could only be accessible using VPN Intranet and all the data were synced to the server with full security and privacy.

CHAPTER-4: TRAINING AND FIELD OPERATION

4.1 Field Staff Engagement

After completion of the Census-2023, PBS identified enumerators for PES from the workforce of the census based on their efficiency and hard work. Since the enumerators had already received training and worked practically during the Digital Census-2023, so they were well versed with the census procedures and data collection techniques. This prior experience made them more efficient in conducting the PES. However, it was assured that the enumerators were not assigned the same block for PES, where they had worked for Census-2023 field activities, so that independent enumerators could do the PES.

4.2 Training

Training is the most important aspect of any census or survey. Although the enumerators and supervisors, who already worked for the census-2023, were deployed for the PES but in other than their previous blocks and areas where they worked for the actual census. However, their refresher course was required to revise the concepts and   for streamline the whole process of PES in the same way and method throughout the country. Keeping in view the objectives of the PES, the training material was prepared properly. Manual of instructions was developed for Master Trainers and Enumerators of PES, which provided a concise and easy to follow guidelines for them to understand the objectives, methodology, and techniques of the PES. The manual included special instructions for PES, best practices, and examples to help trainers to convey the knowledge and necessary information effectively to the enumerators. Further, detailed presentations for enumerators were also designed to provide a comprehensive overview of the PES, covering topics such as objectives, data collection procedures, structure of the questionnaire, software applications and relevant technical details.

4.3 Training of Master Trainers

The initial round of training for the PES was one day session for Master Trainers conducted by a Super Trainer from the PBS, HQs. The purpose of this training was to train **40** individuals as Master Trainers in all the four provinces and ICT. During the training, the Super Trainer provided comprehensive instructions to the Master Trainers on various aspects of the PES.

Considering that the Master Trainers were already involved in the Census-2023 activities, the training focused on building their skills and knowledge specifically related to the objectives of the PES. As such, the training covered the different topics comprehensively viz methodology, post enumeration survey techniques, data collection and management, quality assurance, and specific procedures or protocols required to be followed for accurate data collection during the field operation of the PES. After completion of the training, the Master Trainers further disseminated the ascertained insights by conducting subsequent training sessions for **2500 Enumerators** involved in the PES.

4.4 Training of Enumerators

In the second tier of the training for the PES, **2500 Enumerators** at **41 venues** in four provinces and ICT were trained by the Master Trainers. The training was provided to the enumerators with necessary skills and knowledge required in the PES field operation, through an overview and refresher session. As the selected Enumerators had previously participated in Census-2023 field activities, the refresher overview was to emphasize the purpose and objectives for conducting the PES and its unique requirements for the data collection process as per the approved PES questionnaire. The details of the training of enumerators are presented in Table-5.

Table-5: Detail of Training of Enumerators

Province	Number of Trainers	Number of Enumerators	Number of Venues
Punjab	13	1057	15
Sindh	14	851	13
Khyber Pakhtunkhwa	7	380	7
Balochistan	5	169	5
ICT	1	50	1
Total	**40**	**2500**	**41**

4.5 Field Operation for PES

The duration of field operation for PES was 12 days, i.e., 8th to 19th July, 2023. The PES field operation started on 8th July 2023, with clear instructions to enumerators for listing and enumeration to be done separately. The first three days of PES field activities were reserved for listing, while the remaining 9 days for enumeration. For complete and accurate coverage, SUPARCO maps of the blocks were provided to the enumerators in their Tablets as well as in the hard form. All the enumerators were instructed to number each and every structure with PES (e.g, PES 001, PES 002 …..and so on) in each selected block independently of the numbers of the census. One enumerator completed PES in only one block.

4.6 Security of Field Staff

During the PES field activities, man to man security was provided to the enumerators, for their protection as well as better response from the respondents who were reluctant to trust enumerators due to some isolated incidents reported in the media. During the main census field operation, the lack of security was one of the main reasons of non-response and less coverage. Therefore, in PES it was ensured that man to man security must be provided to the field staff for better results.

4.7 Monitoring Mechanism for PES Field Activity

For thorough and reliable data collection, fieldwork operations must be well monitored. PBS, therefore, devised a robust monitoring mechanism for PES that helped to identify and address immediately any issues or challenges faced during the PES field operation. Monitoring mechanism was totally different from 7th Population and Housing Census.

The committee for PES decided that for an intensive monitoring at district and tehsil level, PBS staff who were already on the ground for field operation of census-2023 would perform the oversight responsibilities of supervisors at district level during the field activities of PES. A dedicated team of 51 monitors from regional and field offices of PBS were deployed at each district selected for PES. In addition to this, PBS head quarter also deputed at staff of 56 monitors for targeted monitoring at vulnerable districts all over the country to oversee the enumeration staff with clear TORs and monitoring Performa for daily progress. Summary of PBS monitoring teams is provided in Table-6.
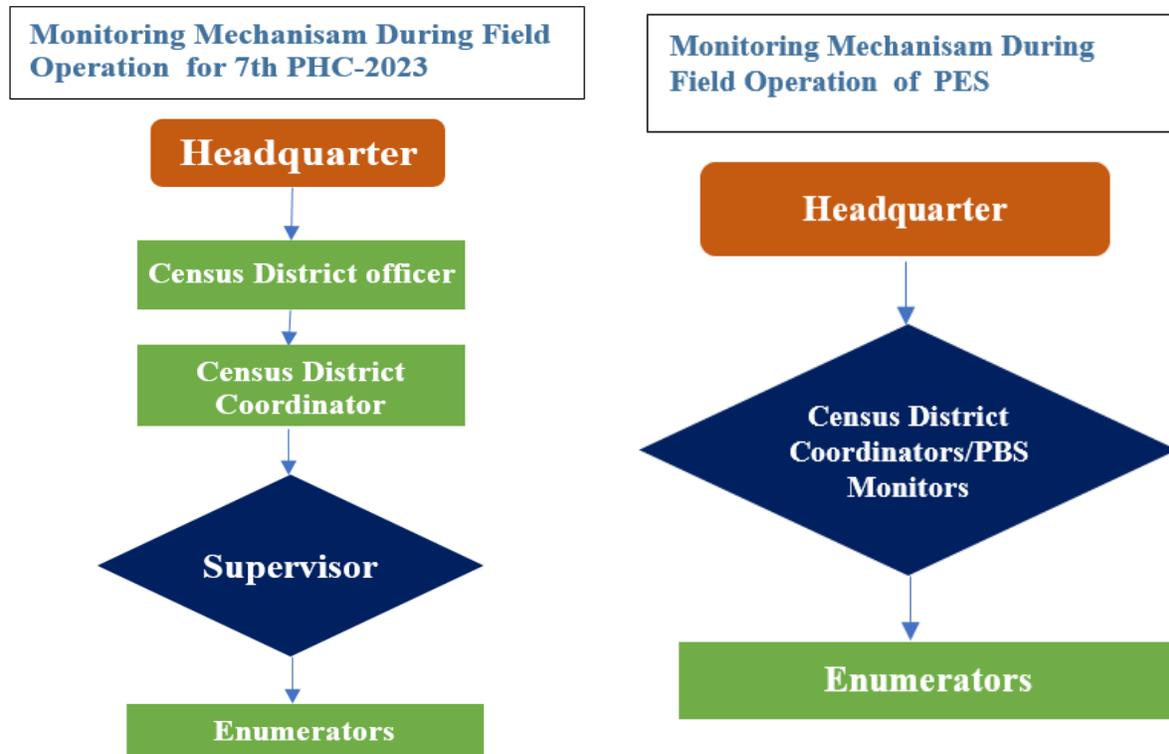
4.8 SOPs for Field Monitoring of PES

The major roles and responsibilities of PBS staff deputed for Field Monitoring of PES were devised which are listed here.

i. Visit at least three blocks in a day to check enumeration work of PES.

ii. Data collection of ten households of each block visited as per performa.

iii. Check and review the overall working of Enumerators.

iv. Verify the data collected through monitoring Performa with respective enumerator's data collected through tablet in the field or calling at CSC in the evening.

v. Report immediately to Field Services Section in case of variation in data collection.

vi. Ensure that all the structures and households have been listed and enumerated along with block boundaries, have been covered accordingly.

vii. Submit daily progress report to Field Services Section at PBS HQ.

viii. Not to disclose information of any person or any housing unit to any person, government functionary, court, etc., except by authorized officers, as required under the General Statistics (Reorganization) Act, 2011.

Table-6: Summary of PBS Monitoring Teams

PROVINCE	DIVISION	DISTRICT MONITORING OFFICERS	MONITORING OFFICERS FROM PBS,HQ
GRAND TOTAL		**51**	**44**
PUNJAB	**TOTAL**	**13**	
	BAHAWALPUR	2	
	D.G KHAN	1	
	FAISALABAD	1	
	GUJRANWALA	1	
	GUJRAT	1	
	LAHORE	1	
	MULTAN	1	
	RAWALPINDI	2	
	SAHIWAL	1	
	SARGODHA	2	
SINDH	**TOTAL**	**16**	**17**
	LARKANA	1	1
	SUKKUR	1	1
	SHAHEED BENAZIR ABAD	4	2
	HYDERABAD	2	4
	MIRPURKHAS	1	1
	KARACHI	7	8
BALOCHISTAN	TOTAL	**8**	**12**
	KALAT	1	1
	LORALAI	1	2
	MEKRAN	1	1
	NASIRABAD	2	2
	QUETTA	1	2
	RAKHSHAN	1	2
	SIBI	1	1
	ZHOB		1

PROVINCE	DIVISION	MONITORING OFFICERS FROM REGIONAL/FIELD OFFICES	MONITORING OFFICERS FROM PBS,HQ
ICT	ICT	1	12
KHYBER PAKHTUNKHWA	**TOTAL**	**13**	**3**
	BANNU	1	
	DERA ISMAIL KHAN	2	
	HAZARA	1	1
	KOHAT	2	
	MALAKAND	1	2
	MARDAN	1	
	PESHAWAR	5	

4.9   SOPs for Quick Count

   i.   Visit the assigned block area, count the structures and houses quickly and fill the proforma provided **Annex-VII.**

   ii.   Enumerate 05 HHs from each block for which Quick Count has been taken and fill proforma **Annex-VIII.**

   iii.   Note CNIC number of head of HHs and mobile number (Compulsory).

   iv.   Send the report immediately after visiting the block to the PBS HQs on daily basis.

   v.   Ensure that the structures in the block have been marked with PES number.

CHAPTER-5: ANALYSIS OF PES RESULTS

5.1 Framework of Analysis

i. After conducting a fresh and complete household listing of the selected blocks in the PES survey, the total population count for each block was determined. This process involves meticulously accounting for all residents within these selected blocks, ensuring an accurate and up-to-date representation of the population in each block. Let P_{ijklm} be the population of ith household in j^{th} block of kth district from l^{th} stratum in m^{th} province. After a fresh and complete household listing of selected blocks for the PES survey, the total population P_{PES} in PES is determined as.

$$P_{PES} = \sum_{m=1}^{5}\sum_{l=1}^{3}\sum_{k=1}^{u}\sum_{j=1}^{t}\sum_{i=1}^{s} P_{ijklm} \tag{1}$$

where 's' is the number of households in a block, 't' is number of blocks in a district, 'u' is the number of districts in l^{th} stratum (maximum stratum are 3) of mth province (four provinces and 5th Islamabad). Similar to (1) the total number of households H_{PES} of PES are,

$$H_{PES} = \sum_{m=1}^{5}\sum_{l=1}^{3}\sum_{k=1}^{u}\sum_{j=1}^{t} H_{jklm} \tag{2}$$

where H_{jklm} is the number of households in j^{th} block of kth district under l^{th} stratum of the mth province.

ii. To ascertain the total population of the designated blocks, an approach was adopted where the unenumerated households, both in urban and rural regions, are multiplied by the corresponding 2023 Census household size specific to each district. Let η_j be the households left unenumerated in j^{th} block during the course of PES and Q_k be the household size of the corresponding k^{th} district in Census 2023 with respect to urban or rural region. Then the revised expression for the P_{PES} will be:

$$P_{PES} = \sum_{m=1}^{5}\sum_{l=1}^{3}\sum_{k=1}^{u}\sum_{j=1}^{t}\left(\left(\sum_{i=1}^{s}P_{ijklm}\right)+\eta_j Q_k\right) \qquad (3)$$

iii. This method offers a powerful approach to calculate the weighted population difference within the specific blocks under consideration. By comparing the population figures of the PES and the Census against each sample block, we can compute the deviation. This deviation, whether positive or negative, will represent the degree of under or over-coverage.

Let P_{Cj} represents the Population of Census 2023 and $P_{PES\,j}$ gives the population count of jth block enumerated during PES. If ΔP_j be the population difference of both PES and Census 2023, then over and under enumeration can be presented as:

$$\Delta P_j = P_{PES\,j} - P_{Cj} \qquad (4)$$

If $\quad \Delta P_j > 0 \qquad\qquad$ *Under enumeration in j^{th} block of Census* 2023 and

If $\quad \Delta P_j < 0 \qquad\qquad$ *Over enumeration in j^{th} block of Census* 2023

iv. Sampling weights or raising factors for the 2500 Primary Sampling Units (PSUs) were utilized. These weights played a crucial role in our analysis, as they were multiplied by the population difference ΔP_j for each selected j^{th} block. This step is vital as it allows to incorporate the impact of the population difference in calculations effectively. Moreover, the weighted population differences were further utilized, ensuring their contribution to the accuracy and robustness of subsequent analysis.

Let w_j be the weight of jth block. The weighted impact of jth block can be

$$Imp_j = w_j \Delta P_j \qquad (5)$$

v. The impact of the weighted population difference for all blocks Imp_j within a district will be meticulously aggregated. Furthermore, these weighted population differences will be summed up to the district and stratum level, facilitating a comprehensive understanding of the overall impact across different subgroups or regions. This approach ensures that we capture the cumulative weighted effect of population differences and this allows us to draw more meaningful insights from our analysis at both the district and stratum levels.

Let Imp_k denotes the district level impact calculated by accumulating weighted impact of 't' number of blocks selected in k^{th} district. The stratum level weighted impact Imp_l accumulated through u number of districts selected in a stratum. Hence,

$$Imp_k = \sum_{j=1}^{t} w_j \Delta P_j \tag{6}$$

$$Imp_l = \sum_{k=1}^{u}\sum_{j=1}^{t} w_j \Delta P_j \tag{7}$$

vi. To distribute the weighted population impact of selected districts within a stratum, a proportional allocation approach was employed. This means that the impact has been distributed among all other districts in the same stratum in proportion to their respective population increases since Census 2017. The proportion for each district will be calculated by dividing its individual population increase by the total increase in population for the entire stratum. This method ensures a fair and balanced distribution of the impact, taking into account the population dynamics of each district within the stratum. Let D_k be the difference/increase in population of kth district from Census 2017 to Census 2023 and let SD_l be the total increase in the population of all districts falling in the lth stratum. Hence, the proportion of each district ρ_k will be:

$$\rho_k = {D_k}\Big/{SD_l} \tag{8}$$

Where, $SD_l = \sum_{k=1}^{u} D_k$ and $D_k = P_{C2023} - P_{C2017}$ is the population increase in district k from Census 2017 to Census 2023. Hence distributed stratum impact of population for district k using (7) and (8) will be:

$$\delta_k = \frac{D_k}{SD_l}\sum_{k=1}^{u}\sum_{j=1}^{t} w_j \Delta P_j$$

$$\delta_k = \rho_k Imp_l \tag{9}$$

vii.   Subsequently, the impact of the weighted difference in population for each district (calculated in step vi) was undergone further distribution among the respective Tehsils within that district. This distribution was carried out in proportion to the increase in population experienced by each Tehsil. Let D_h be the difference/increase in population of hth *Tehsil* from Census 2017 to Census 2013 and let SD_k be the total population increase in tehsils of a district. Hence, the proportion of each tehsil ρ_h will be:

$$\rho_h = D_h \Big/ SD_k \tag{10}$$

Where, $SD_k = \sum_{h=1}^{v} D_h$ and $D_h = P_{C2023} - P_{C2017}$ is the population increase in h^{th} tehsil in a district k. Hence distributed district impact of population for tehsil h using (9) and (10) will be:

$$\delta_h = \frac{D_h}{SD_k} \frac{D_k}{SD_l} \sum_{k=1}^{u} \sum_{j=1}^{t} w_j \Delta P_j$$

$$\delta_h = \rho_h \delta_k \tag{11}$$

viii.   Furthermore, the impact of the weighted difference in population for each Tehsil (calculated in step vii) will be subsequently proportionally distributed among each individual block within that Tehsil. This distribution will be based on the population proportion of each block to the total population of respective tehsil.

The population proportion ρ_j for j^{th} block will be

$$\rho_j = \frac{\sum_{j=1}^{t} \sum_{i=1}^{s} P_{ij}}{\sum_{h=1}^{v} \sum_{j=1}^{t} \sum_{i=1}^{s} P_{ijh}} \tag{12}$$

Hence distributed tehsil impact of population for block j using (11) and (12) will be:

$$\delta_j = \frac{\sum\limits_{j=1}^{t}\sum\limits_{i=1}^{s} P_{ij}}{\sum\limits_{h=1}^{v}\sum\limits_{j=1}^{t}\sum\limits_{i=1}^{s} P_{ijh}} \frac{D_h}{SD_k} \frac{D_k}{SD_l} \sum\limits_{k=1}^{u}\sum\limits_{j=1}^{t} w_j \Delta P_j$$

$$\delta_j = \rho_j \delta_h \tag{13}$$

ix. In each block, the population was initially distributed between male and female residents based on the Male-to-Female ratio at the respective stratum level, as obtained from the Census data. This distribution was added to the existing population figures in the block. However, if there is an absence of either male or female population in a specific census block, the population impact was only be allocated to the existing population of the available gender (either male or female).

Let R_j be the sex ratio of the jth block. The Stratum population impact will be distributed among district, tehsil or block as per sex ratio of the region. For example, the Stratum impact of kth district considering the sex ratio using (9) will be:

$$\delta_{Gk} = \rho_k Imp_l \times R_j \tag{14}$$

x. Regarding the "BAI CHARAG" block, where no households are recorded in the 2023 census frame, the weighted impact of population will indeed be considered as zero. Given the absence of household data, any population-related calculations or impacts will not be applicable to this block.

xi. The impact of the number of households will be estimated at the final stage when the population at the block level is being calculated. This estimation will be carried out using the following formula:

Using (13), where δ_j be the estimated weighted impact/change in population of jth block and let H_j be the household size of jth block in Census 2023. The impact of Households in j^{th} block will be ΔH_j where,

$$\Delta H_j \approx \left(\frac{\delta_j}{H_j} \right) \qquad \approx \rightarrow Round\ down$$

Hence adjusted Households size HH_{ADj} for j^{th} block will be

$$HH_{ADj} = HH_{Cj} - \Delta H_j \tag{15}$$

Where HH_{Cj} will be the actual number of households of Census 2023 in j^{th} block. Similarly, someone can count the adjusted households at tehsil, district, stratum and province.

xii.   A data file containing all the necessary variables required for the computation of coverage error will be provided.

xiii.   ***Special Instructions for Stratum 1 of Sindh (Karachi Division)***

Stratum 1 of Province Sindh comprises seven districts within the Karachi division. This stratum is considered self-weighting, meaning that each district within the Karachi division will have its distinct impact, which will be proportionally allocated among all the Tehsils present in each respective district. By employing this approach, we ensure that the impact of population differences is appropriately distributed, taking into account the variations in population dynamics at both the district and Tehsil levels. This enables us to conduct a precise and comprehensive analysis while maintaining the integrity of the data for each geographical unit involved.

xiv   The Net Coverage Rate will be meticulously computed at multiple levels, including the stratum, province, and national level. This comprehensive analysis will provide valuable insights into the coverage accuracy at various scales, allowing us to assess the representativeness and completeness of the data both regionally and nationally.

$$Net\,Coverage\,Rate\,(NCR) = \frac{w_t\left(P_{PES} - P_{C2023}\right)}{P_{C2023}} \times 100$$

where, P_{PES} = Population of PES 2023

P_{C2023} = Population of Census 2023

w_t is the weight of the geographical area (Province, District etc.)

5.2 Design Implementation and Data Quality Assurance of PES

The Post Enumeration Survey (PES) is crucial for assessing the accuracy and completeness of a census globally. It helps to identify any potential undercounting or over counting of population and housing units. PES ensures the reliability of census data and enhances data-driven decision-making.

A two-stage stratified sampling design was used in the Post Enumeration Survey (PES). The districts of each province were divided into strata based on several demographic characteristics. Punjab, Sindh, and Khyber Pakhtunkhwa were divided into three strata, Baluchistan into two, while Islamabad was treated as an independent stratum, excluding AJK and GB. Out of 133 districts, 48 were selected for PES in the first stage, and subsequently, 2500 blocks were chosen as primary sampling units (PSUs) in the second stage. These blocks were then fully listed and enumeration process were conducted between 8th and 19th July 2023 as part of the PES timeline. During this survey operation, 710,458 households were listed.

The short questionnaires used in PES consisted of two forms (Listing and Enumeration) through CAPI (Computer-Assisted Personal Interviewing). The PES questionnaire included common demographic information parameters such as age, sex, marital status, and relationship with the head of the household. After developing and finalizing the PES questionnaire, PBS trained 40 Master Trainers, who then conducted one-day training sessions for 2500 enumerators throughout Pakistan at division level. These enumerators were shortlist by PBS from the main rollout of Census 2023 from 121,000 enumeration workforce. The selected enumerators were very well-versed in their roles during the main course of Census operation 2023.

In order to successfully conduct First Ever Digital PES, a complete ERP Solution fully connected with the centralized Database was used. All the ERP Modules including House Listing application and Enumeration Application were pushed on fully secured tablets using MDM (Mobile Device Management) for field activities by the enumerators. Listing and Enumeration Application was equipped with SUPARCO and OSM Imagery for Geo-tagging facility. Human Resource Management Module, Inventory Management Module and Training Management Module at district level were used to support PES activities. For quality assurance of data, CATI module was also used. Monitoring and Supervisor Dashboards were provided for real-time monitoring, transparency, quick access and verification of enumerator field activity. It is also pertinent to mention that PBS Call Center has been extensively used with Complaint Management System (CMS) for early resolution and rectification of technical problems and complaints. NADRA and PBS support centers were providing 24/7 technical support to enumerators and field staff.

After successful data collection and cleaning the detailed analysis were performed to check the coverage (under/over) of the Census 2023. Weights were developed for the selected

enumerated blocks in PES and then a weighted impact (Net Coverage Error) were calculated from these blocks and further the impact was applied to the district, tehsil and at block level in a Province on demographic and statistical grounds. Furthermore, the demographic characteristics of survey population were also compared with Census 2023. Adjustments estimates were developed using PES as well as demographic analysis of the previous Censuses and Surveys as per international best practices[8] [9] [10].

Net Coverage Error rate was calculated to evaluate the accuracy of census by assessing the extent of both under coverage (missed population) and over coverage (duplicate or false enumerations) in the collected data. On the basis of PES and demographic analysis the estimates for population adjustments were developed. On the basis of adjustment estimates, population count was adjusted at block level to remove the impact of omission error throughout Pakistan. Furthermore, the standard error of these estimates along with confidence intervals were developed to validate the results and have reliability of estimates.

Table-7: Standard Error, Confidence Interval and Co-efficient of Variation by Province

PROVINCE WISE				
Province	**Net Coverage Error (NCE)**	**Std. Err.**	**[95% Conf. Interval]**	
Balochistan*	33.36%	7.30%	19.05%	47.67%
Khyber Pakhtunkhwa	-2.47%	1.95%	-6.30%	1.36%
Punjab+ICT	0.96%	0.08%	0.80%	1.13%
Sindh	4.11%	1.27%	1.62%	6.60%
Pakistan	4.05%	0.83%	2.43%	5.67%
(* Standard Error inflate due to variation in Balochistan data)				

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[8] https://www.census.gov/programs-surveys/decennial-census/about/coverage-measurement.html
[9] https://www150.statcan.gc.ca/n1/pub/11-522-x/2001001/session11/6266-eng.pdf
[10] https://www.abs.gov.au/census/about-census/census-post-enumeration-survey

Table-8: Standard Error, Confidence Interval and Co-efficient of Variation by Province and Region

PROVINCE WISE (RURAL/URBAN)					
Province	**Rural/ Urban**	**Net Coverage Error**	**Std. Err.**	**[95% Conf. Interval]**	
Balochistan	Rural	24.96%	8.95%	7.41%	42.51%
	Urban	54.06%	11.23%	32.05%	76.08%
Khyber Pakhtunkhwa	Rural	-2.08%	1.81%	-5.64%	1.48%
	Urban	-4.75%	8.12%	-20.67%	11.17%
Punjab + ICT	Rural	0.58%	0.08%	0.42%	0.73%
	Urban	1.52%	0.16%	1.20%	1.84%
Sindh	Rural	5.99%	1.31%	3.43%	8.56%
	Urban	2.34%	2.14%	-1.86%	6.53%
Pakistan	Rural	3.50%	1.05%	1.44%	5.55%
	Urban	4.95%	1.34%	2.32%	7.58%

FINAL RESULTS

TABLE 1 : HOUSEHOLDS, POPULATION, HOUSEHOLD SIZE AND ANNUAL GROWTH RATE

Area	Households	Population 2023	Average Household Size	Population 2017	Growth Rate
PAKISTAN					
ALL	38,340,566	241,499,431	6.30	207,684,626	2.55
RURAL	23,323,551	147,748,707	6.33	132,013,789	1.90
URBAN	15,017,015	93,750,724	6.24	75,670,837	3.65
KHYBER PAKHTUNKHWA					
ALL	5,883,007	40,856,097	6.94	35,501,964	2.38
RURAL	4,969,183	34,724,801	6.99	29,626,670	2.69
URBAN	913,824	6,131,296	6.71	5,875,294	0.72
PUNJAB					
ALL	19,855,902	127,688,922	6.43	109,989,655	2.53
RURAL	11,719,520	75,715,270	6.46	69,442,450	1.46
URBAN	8,136,382	51,973,652	6.39	40,547,205	4.24
SINDH					
ALL	9,871,620	55,696,147	5.64	47,854,510	2.57
RURAL	4,744,589	25,771,071	5.43	23,021,876	1.90
URBAN	5,127,031	29,925,076	5.84	24,832,634	3.17
BALOCHISTAN					
ALL	2,318,519	14,894,402	6.42	12,335,129	3.20
RURAL	1,664,015	10,282,574	6.18	8,928,428	2.39
URBAN	654,504	4,611,828	7.05	3,406,701	5.19
ISLAMABAD CAPITAL TERRITORY					
ALL	411,518	2,363,863	5.74	2,003,368	2.80
RURAL	226,244	1,254,991	5.55	994,365	3.97
URBAN	185,274	1,108,872	5.99	1,009,003	1.59

CHAPTER-6: LESSON LEARNED

After the most recent census, the Post Enumeration Survey (PES) exercise was carried out as per best international practices and approval of CCI. During the PES, PBS learned multiple valuable lessons. Although these lessons might not be the answer to all problems, but they will still be useful for future PES results that are better. Some important lessons are as follows.

- In population and housing census, geographic maps serve as an indispensable tool for enumerators, data collectors, and supervisors. Clear and detailed maps make it easier for enumerators to accurately locate households and census areas. This in turn minimizes the risk of enumeration errors, such as omitting households or double counting. Pakistan Bureau of Statistics learned that the quality of digitized maps should be enhanced with more clear block boundaries.

- More emphasis on training and clarity of concepts like collective residence and its procedure of coverage. Training must be conducted in less tier so that exact communication of massage/concept may be ensured. It is also learned that the over and under enumeration relates to many reason but one of the important is not clarity of concepts and slackness on the part of enumerators. Therefore, training should be more extensive   for clarity of concepts.

- Furthermore, conduct of census in the month of Ramadhan also reason of incomplete coverage and due to which extension were granted during the field work of 7th Population and Housing Census. Therefore, census must be conducted in the normal months excluding (monsoon, religious festival etc) to avoid the issues faced during census-2023.

- Another significant lesson was learnt by PBS is that Long questionnaires have a negative effect on the quality of the data. Census Questionnaire should be precise considering the specific objective of census.

- Publicity campaign up to low level through Minber Masjid, Hujra Baithak, Maximum use of loud speakers, Involvement of local influential like street bureaucracy, Imam masjid, etc must be ensured before the start of census activity. People are more likely to participate if they see that respected members of their community endorse the census.

ACRONYMS

NSO	National Statistical Organization
PBS	Pakistan Bureau of Statistics
PHS	Population & Housing census
GIS	Geographic Information System
N3C	National Census Coordination Center
CSC	Census Support Center
CC	Call Center
CCI	Council of Common Interest
CAC	Census Advisory Committee
MT	Master Trainer
ToT	Training of Trainer
TOE	Training of Enumerator
MDM	Mobile Device Management
VPN	Virtual Private Network
PES	Post Enumeration Survey
PDS&I	Planning Development & Special Initiative
CCM	Census Coverage Measurement
CAPI	Computer- Assisted Personal Interviewing
SUPARCO	Space and Upper Atmosphere Research Commission
OSM	Order and Service Management
CMS	Computer Management System
CCS	Census Coverage Survey
MIC	Ministry of Internal Affairs and Communication
EB	Enumerator Block
PSU	Primary Sampling Unit
PPS	Probability Proportional to Size
HH	Household
OSM	Open Street Map
CMC	Census Monitoring Committee
NADRA	National Database and Registration Authority
CNIC	Computerized National Identity Card
TMS	Training Management System
HR	Human Resource
QA	Quality Assurance
CDO	Census District Officer
NTC	National Telecom Corporation
UTN	Unique Token Number

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Government of Pakistan
Ministry of Planning Development & Special Initiatives
Pakistan Bureau of Statistics
*****

No.PBS.IBD.1(12)/2017- Coord-.   Islamabad, the 2nd February, 2023.

OFFICE ORDER

With the approval of Chief Statistician, Pakistan Bureau of Statistics, **Technical/Expert Committee on Census-2023** is hereby constituted with the following composition and Terms of Reference (TORs):

Sr. No.	Name & Designation	Status
1.	Dr. G.M. Arif	Chairman
2.	Dr. Muhammad Iqbal	Member
3.	Syed Muhammad Arif	Member
4.	Dr. Mehtab S. Kareem	Member
5.	Mr. Fazlullah Qureshi, Ex-Secretary	Member
6.	Dr. Durr-e-Nayab	Member
7.	Dr. Naeem Uz Zafar, Chief Statistician, PBS	Member
8.	Mr. Muhammad Sarwar Gondal, Member (SS/RM), PBS	Member/Secretary
9.	Mr. Ayazuddin, Member (C&S), PBS	Member
10.	Ms. Rabia Awan, DDG (CP&C, CPMU), PBS	Member
11.	Dr. Ayesha Sheraz, Director, NIPS	Member
12.	Any other Member co-opted by the Committee	

Terms of Reference (TORs): -

    I.   Devise strategy for the overall successful and credible Census-2023 field Operation.

    II.   Fortnightly review of the census activities and suggestions for their smooth and timely completion.

    III.   Periodic review of results with provincial and district stakeholders.

    IV.   Communication strategy for ensuring credibility of the census results.
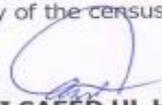
(QAZI SAEED UL HASSAN)
Deputy Director (Admn)

Distribution:-

    1. Chairman of the Committee.
    2. All Member of the Committee.

Copy for information:-

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    ii.   SPS to Secretary, PD&SI, Islamabad
    iii.   PS to Chief Statistician, PBS, Islamabad
    iv.   Office Copy.

Government of Pakistan
Ministry of Planning Development & Special Initiatives
Pakistan Bureau of Statistics
*****

No.PBS.IBD.1(12)/2014- Coord-.197   Islamabad, the 24th May, 2023.

OFFICE ORDER

In continuation of this office order of even number dated 06.04.2023, 11.04.2023 and 15.05.2023, with the approval of Chief Statistician, Pakistan Bureau of Statistics, the committee has been re-constituted for **"Trend Analysis of Census Data for 7th Population and Housing Census (Digital Census)"**. The composition of committee is as under:

S.#	Name & Designation	Status
1.	Dr. Zeba A. Sathar, Demographer, Country Director, Population Council, Islamabad	Chairperson
2.	Dr. Naeem-Uz-Zafar, Chief Statistician, PBS, Islamabad	Member
3.	Mr. Tasadduq Hussain, Joint Secretary (PBS), PD&SI, Islamabad.	Member
4.	Mr. Muhammad Sarwar Gondal, Member (SS/RM), PBS, Islamabad.	Member
5.	Mr. Ayazuddin, Member (C&S), PBS, Islamabad.	Member
6.	Ms. Rabia Awan, DDG (CP&C/CPMU), PBS, Islamabad.	Member/ Secretary
7.	Dr. Syed Muhammad Arif (Retd), Professor, University of Balochistan.	Member
8.	Dr. Durr-e-Nayab, Demographer, Joint Director/ Director Research, PIDE.	Member
9.	Dr. Sanam Wagma Khattak, Demographer, University of Peshawar.	Member
10.	Dr. Ayesha Shiraz, Director, NIPS	Member
11.	Dr. Syed Haider Shah, Dean Faculty of Basic and Applied Sciences, Director QEC, University of Loralai,	Member
12.	Dr. Asim Bashir Khan, Development Economist, Demographer & Public Policy Expert, IBA Karachi	Member
13.	Dr. Jamal Abdul Nasir, Chairperson & Associate Professor, GCU, Lahore	Member
14.	Any other Member co-opted by the Committee	-

Terms of Reference (TORs): -

I.   The committee will analyze the data of the problematic areas after complete enumeration of the field operation of 7th Population and Housing Census-2023 through demographic and other techniques and decide on its suitability for publication/placing before the competent forum for approval.

II.   The committee will also suggest alternate statistical techniques/methods and corrective measures in case the data of any specific area/region is found significantly deviated from the expected values which will be derived based on some other relevant available information with Surveys such as LFS, PSLM and Population and Housing Census previously conducted in the country.

(QAZI SAEED UL HASSAN)
Deputy Director (Admn)

Distribution:-

1. Chairperson of the Committee.
2. All Member of the Committee.
3. Office Copy.

Government of Pakistan
Ministry of Planning Development & Special Initiatives
Pakistan Bureau of Statistics
*****

No.PBS.IBD.1(12)/2017- Coord-   Islamabad, the 25ᵗʰ July, 2023

OFFICE ORDER

In continuation of office order of even number dated 13ᵗʰ June, 2023. With the approval of Chief Statistician, Pakistan Bureau of Statistics, the TORs of the committee for **"Conduct of Post Enumeration Survey (PES)"** has been revised/extended. However, the composition of the Committee remains same and is as under:-

Sl. No.	Name & Designation	Status
1	Mr. Ayazuddin, Member (C&S)	Chairman
2	Dr. Amjad Javaid Sandho, DG (ADMN)	Member
3	Ms. Rabia Awan, DDG (CP&C /CPMU)	Member
4	Mr. Muhammad Bashir Janjua, JCC (ADMN)	Member
5	Ms. Sobia Munawar, Director (DP)	Member
6	Mr. Yasir Ishfaq, Director (DP)	Member
7	Mr. Rafique Hussain Talpur, Director (FS)	Member
8	Ms. Rumana Sadaf, CSO (SD)	Member
9	Dr. Arshad Mehmood, CSO (CP&C)	Member / Secretary
10	Mr. Saeed Ahmed, ACC (DD&SS)	Member
11	Any co-opted member from NADRA	Member

2.   **TOR of the Committee is given below: -**

    i)   Finalization of suitable sample size for PES.
    ii)   Finalization of questionnaire for PES.
    iii) Modalities and timelines for conduct of field operation.
    iv)   Estimation methodology for finalization of results of Census considering PES.
    v)   Finalization of data cleaning mechanism of Census-2023.
    vi)   Review and finalization of Tabulation and results of Census-2023.
          The Committee will devise recommendations and present a complete report.

(QAZI SAEED UL HASSAN)
Deputy Director (Admn)

Distribution:-

    1.   Chairman of the Committee.
    2.   All Member of the Committee.
    3.   Office Copy.

Copy for information:-

    i.   PS to Chief Statistician, PBS, Islamabad.
    ii.   APS to Member (SS/RM), PBS, Islamabad.

Sub-Committee/ Working Group for Post Enumeration Survey		
S. No	**Name**	**Designation**
1	Ms. Rabia Awan	DDG(CPMU/CP&C)
2	Dr. Waseem Abbas	Director
2	Ms. Rumana Sadaf	CSO(Sample Design)
3	Mr. Saqib Sultan Khawar	SO(CPMU)
4	Ms. Madiha Amjad	SO(Sample Design)
5	Mr.Arsalan Bashir	Data Processing Officer (DP Center)

Annex-II

حکومت پاکستان ادارہ شماریات

ساتویں خانہ و مردم شماری 2023

(فہرست خانہ جات PES فارم-3)

موضع/دیہہ/آخری علاقے کا نام۔۔۔۔۔۔۔۔۔۔ علاقہ/محلہ/اگلی/علاقے کا نام۔۔۔۔۔۔۔۔۔۔ بلاک کوڈ

بصیغہ راز

8۔ سربراہ گھرانہ کا موبائل نمبر	7۔ فون/موبائل نمبر	6۔ نیم سربراہ گھرانہ/ عارضی رہائش گاہ	5۔ دیگر کا سلسلہ ہد نمبر	4۔ مکان کی نوعیت	3۔ عمارت کے حصے (اس) کی نوعیت	2۔ عمارت کا سلسلہ ہد نمبر	1۔ عمارت کی نوعیت
گھرانے کے سربراہ کی دستیابی کی صورت میں اس کا موبائل/فون نمبر درج کریں۔	گھرانے کے سربراہ یا کسی دستیاب فرد کا فون یا موبائل نمبر کی صورت میں اس کے سربراہ فون یا موبائل نمبر درج کریں۔	گھرانے کے سربراہ کا نام، فون/موبائل نمبر کی صورت میں اس کے سربراہ/فون کا نام درج کریں۔	کالم نمبر 3 میں درج شدہ خانہ میں کوئی رہائشی گھر کا سلسلہ ہد نمبر جن مردوں میں لکھیں اس خانہ کے لیے "0" درج کریں۔	کالم نمبر 1 میں کالم 7 کی صورت میں گھر کا سلسلہ ہد نمبر درج کریں۔	عمارت کے ہر حصے کو جو کہ رہائشی یا غیر خدمات کے لیے استعمال ہوتی ہے علیحدہ علیحدہ سلسلہ درج کریں۔ (لازمی نمبر درج کریں)	عمارت کا سلسلہ ہد نمبر تجویز ہر سوں میں درج کریں۔ اگر کوئی عمارت ، جھونپڑی، جھگی، مندرہ وغیرہ رہائشی کے لیے استعمال ہوتی ہو تو اسے بھی شامل کریں۔	1۔ رہائشی 2۔ نیم رہائشی (رہائشی) 3۔ غیر رہائشی 4۔ نیم (غیر)(غیر رہائشی) 5۔ رہائشی 6۔ نیم (غیر)(رہائشی) 7۔ غیر ، جگی، جھونپڑی ، نیم 8۔ زیر تعمیر

نوٹ: فہرست خانہ جات کی تیاری کے دوران خالی یا زیر تعمیر گھر اگر مردم شماری کے دوران آباد ہو گیا ہو تو کالم نمبر 5 میں بلاک کے آخری گھرانے کا نمبر درج کریں۔ اور کالم نمبر 6 میں نئے سربراہ گھرانہ کا نام لکھیں۔

فہرست خانہ جات کی تیاری کے بعد اگر آباد گھر خالی ہو گیا ہو تو کالم نمبر 6 میں " • " درج کریں۔

کالم نمبر (3) میں عمارت کے یونٹ کی مناسبت سے کوڈ صحیح کریں۔

کالم سوال نمبر(3): 1۔ گھر، 2۔ یتیم خانہ/ اولڈ ہوم/ ، 3۔ ہاسٹل، 4۔ ہوٹل، 5۔ جیل، 6۔ ہسپتال، 7۔ مدرسہ، 8۔ سکول، 9۔ کالج، 10۔ یونیورسٹی، 11۔ مسجد / عبادت گاہ، 12۔ دکان ریٹیل، 13۔ دکان ہول سیل، 14۔ دکان خدمات، 15۔ دکان پیداوار، 16۔ کارخانہ، 17۔ نیم سرکاری دفتر، 18۔ سرکاری دفتر، 19۔ ڈاک خانہ، 20۔ بینک، 21۔ خانہ، 22۔ پارہ، 23۔ الحاق/زیرہ، 24۔ دیگر۔

حکومت پاکستان

پی۔ای۔ایس۔ فارم 4

ساتویں خانہ و مردم شماری (Digital Census)

پاکستان بیورو آف سٹیٹسٹکس

ادارہ شماریات

بصیغہ راز

بلاک کوڈ			
ضلع مردم شماری	چارج	سرکل	بلاک

صفحہ نمبر

گھرانہ نمبر:

گھرانے کی قسم
1. عام گھرانہ
2. ادارہ کی گھرانہ
3. بے گھر/خانہ بدوش گھرانہ

بنیادی سوالات

جواب دہندہ	ہم عمر کے لئے				نمبر شمار
جواب دہندہ کا نام	5	4	3	2	1

شناختی کارڈ نمبر:

اگر گھرانہ کا فرد نہیں ہے تو کوڈ _____ اندراج کریں۔

موبائل نمبر:

خلاصہ
مرد
عورت
خواجہ سرا
ٹوٹل

پوسٹ انیومریشن سروے فارم (اجتماعی گھرانوں کے لئے)

ادارے کا نام _____

ٹوٹل	خواجہ سرا	عورتیں	مرد	گھرانہ کا سیریل نمبر

STRATIFICATION

KPK		
Stratum-I	**Stratum-II**	**Stratum-III**
Peshawar	Bajaur District	**Orakzai District**
Lower Chitral	**Upper Chitral District**	**South Waziristan District**
Haripur	Lower Dir District	Kurram District
Shangla	Malakand Protected Area	North Waziristan District
Torghar	Upper Dir District	
Mohmand	Buner District	
Batagram		
Swat		
Swabi		
Khyber		
Lakki Marwat		
Karak		
Mardan		
Mansehra		
Charsadda		
Nowshera		
Bannu		
Kohat		
Tank		
Dera Ismail Khan		
Abbottabad		
Hangu		
9 out of 22	**1 out of 6**	**2 out of 4**

PUNJAB		
Stratum-I	**Stratum-II**	**Stratum-III**
Jhang	Layyah	Dera Ghazi Khan
Toba Tek Singh	Muzaffargarh	Nankana Sahib
Lodhran	**Faisalabad**	Vehari
Attock	**Gujrat**	**Bahawalnagar**
Jhelum	Khanewal	**Rahim Yar Khan**
Rawalpindi	Mianwali	**Gujranwala**
Bahawalpur	Mandi Bahauddin	Kasur
Chiniot	Sialkot	**Bhakkar**
Sahiwal	**Lahore**	**Rajanpur**
Hafizabad	Sheikhupura	
Narowal	**Chakwal**	
Multan	Okara	
	Pakpattan	
	Khushab	
	Sargodha	
3 out of 12	**5 out of 15**	**5 out of 9**
	Islamabad	

SINDH		
Stratum-I	**Stratum-II**	**Stratum-III**
Korangi	**Sanghar**	**Sujawal**
Karachi Central	**Tando Muhammad Khan**	Khairpur
Keamari	Ghotki	Tharparkar
Malir	Badin	**Umer Kot**
	Dadu	Larkana
Karachi East	Tando Allahyar	Shikarpur
Karachi West	**Naushahro Feroze**	**Kashmore**
Karachi South	Matiari	Jacobabad
	Thatta	**Sukkur**
	Shaheed Benazirabad	
	Kambar Shahdad Kot	
	Jamshoro	
	Mirpur Khas	
	Hyderabad	
7 out of 7	**5 out of 14**	**4 out of 9**

BALOCHISTAN	
Stratum-I	**Stratum-II**
Chagai	**Quetta**
Nushki	**Pishin**
Kharan	Killa Abdullah
Washuk	Chaman
Kohlu	Loralai
Dera Bugti	**Duki**
Kachhi	Barkhan
Jaffarabad	**Musakhel**
Nasirabad	Killa Saifullah
Jhal Magsi	**Zhob**
Sohbatpur	Sherani
Kalat	Sibi
Mastung	**Harnai**
Khuzdar	Ziarat
Awaran	
Lasbela	
Surab	
Kech	
Gwadar	
Panjgur	
6 out of 20	**6 out of 14**

Name of 48 Selected Districts and Sample Size

S.No	Province/Districts	Rural	Urban	Total
	Khyber Pakhtunkhwa	**287**	**93**	**380**
1	Abbottabad	34	8	42
2	Bannu	26	1	27
3	Dera Ismail Khan	33	9	42
4	Kohat	20	6	26
5	Mardan	42	10	52
6	Mohmand	15	0	15
7	Orakzai	7	0	7
8	Peshawar	38	46	84
9	South Waziristan	22	0	22
10	Swat	32	13	45
11	Torghar	11	0	11
12	Upper Chitral	7		7
	PUNJAB	**471**	**586**	**1057**
1	Bahawalnagar	29	32	61
2	Bhakkar	30	6	36
3	Chakwal	28	7	35
4	Faisalabad	65	78	143
5	Gujranwala	38	46	84
6	Gujrat	25	34	59
7	Lahore	0	186	186
8	Multan	39	52	91
9	Rahim Yar Khan	70	20	90
10	Rajanpur	29	9	38

11	Rawalpindi	45	66	111
12	Sahiwal	38	12	50
13	Sargodha	35	38	73
	ISLAMABAD	**23**	**22**	**45**
1	Islamabad	23	22	45

S.No	Province/Districts	Rural	Urban	Total
	SINDH	**313**	**538**	**851**
1	Dadu	35	12	47
2	Hyderabad	22	49	71
3	Karachi Central	0	66	66
3	Karachi East	0	69	69
3	Karachi South	0	62	62
3	Karachi West	6	51	57
4	Kashmore	24	11	35
3	Keamari	4	45	49
3	Korangi	0	61	61
3	Malir	27	27	54
5	Naushahro Feroze	39	13	52
6	Sanghar	34	14	48
7	Sujawal	36	9	45
8	Sukkur	25	29	54
9	Tando Muhammad Khan	29	9	38
10	Umer Kot	32	11	43
	BALOCHISTAN	**124**	**43**	**167**
1	Chagai	5	0	5
2	Duki	6	0	6
3	Harnai	3	1	4
4	Kachhi	11	1	12
5	Kharan	6	1	7
6	Khuzdar	37	5	42

7	Musakhel	4	0	4
8	Panjgur	5	1	6
9	Pishin	20	5	25
10	Quetta	16	28	44
11	Sohbatpur	4	0	4
12	Zhob	7	1	8
	Grand Total	**1218**	**1282**	**2500**

Annex-VI

Tablet Specifications

- CPU: 2.0G Hz Octa core 64bit

- RAM/ROM: 8GB+128GB EMCP

- Display: 8-inch   IPS/AFFS 1200x1920

- Industrial 1000 NIT (CD/M2)   Sunlight Readable

- Touch Panel: Capacitive / frosted tempered film

- Support glove touch/spray/A-Capacitive Pen

- Basic Function: 2G/3G/4G/BT/GPS/WIFI/FM/Axis

- GPS: GPS + Glonass + AGPS (Optional Beidou)

- Sensors: Motion, Gravity, Gyro, Acceleration, Opto, Proximity, Rotation Vector

- Camera: 13 MP (AF) with flash led (Rear)MP Sub Camera (Front)

- WIFI/BT: Dual band (2.4 GHz/5Ghz) 802.11a/b/g/n MAC/BB/RFBT v4.0 (LE)

- Battery: 18,600 mAh

- SD Card: up to 128GB Micro SD Card

- Protection: IP67

- Rugged: -20 to 55º C Operating Temperature

- Class 6 (IEC 60529) Waterproof

- Class 6 (IEC 60529) Dustproof

- MIL-STD 810G/Method 516.6 drop proof

- 5% to 95% RH (Relative Humidity)

- Max 15,000 feet operating altitude

- QR/Barcode Reading: Integrated QR/PDF417 reader

CPU	2.0G Hz Octa core 64-bit
RAM/ROM	8GB + 128GB EMCP
DISPLAY	8-inch IPS/AFFS 1200x1920 Industrial 1000 NIT (CD/M2) Sunlight Readable
TOUCH PANEL	Capacitive/ frosted tempered film Support glove touch/spray/A-Capacitive Pen
BASIC FUNCTION	2G/3G/4G/BT/GPS/WIFI/FM/Axis
GPS	GPS + Glonass + AGPS (Optional Beidou)
SENSORS	Motion, Gravity, Gyro, Acceleration, Opto, Proximity, Rotation Vector
CAMERA	13 MP (AF) with flash led (Rear) 5MP Sub Camera (Front)
WIFI/BT	Dual Band (2.4 GHz/5Ghz) 802.11a/b/g/n MAC/BB/RF

Annex-VII

Government of Pakistan
Pakistan Bureau of Statistics
Post Enumeratin Survey

Field Monitoring Quick Count Proforma
(To be submitted by officers/officials deputed for PES Monitoring)

Province/Region:_____   Division/District:_____   Census District Name/ Code: _____   Name of Monitoring Officer:_____

Date	Block Code	Number of Sturctures	Number of Houses	Sturctures markeds (Y/N)	Remarks

Signature:_____

Annex-VIII

Government of Pakistan   An
Pakistan Bureau of Statistics
Post Enumeratin Survey

Field Monitoring Proforma (Summary)
(To be submitted by officers/officials deputed for PES Monitoring)

Province/Region: _____   Division/District:_____   Census District Name/ Code: _____   Name of Monitoring Officer:_____

Date	Total Block	Listing Completed Blocks	5% of listing Completed Blocks	Verified No. of blocks listing Completed	Status Completed (Y/N)

Signature:_____

PAKISTAN
SELECTED STRATUM FOR DISTRICTS