Food and Agriculture Organization of the United Nations

SUSTAINABLE DEVELOPMENT GOALS

ASIA AND PACIFIC COMMISSION ON AGRICULTURAL STATISTICS

30TH SESSION

19–24 May 2024

Kathmandu (Nepal)

BETTER PRODUCTION

BETTER NUTRITION

BETTER ENVIRONMENT

BETTER LIFE

- Metadata and Introduction

- History, new Dimensions and Objectives of Agricultural Census

- Complete and Sample Based Enumeration

- Sample Design for 7th Agricultural Census

- Stratification and Sampling Frames

- Main Indicators and Key Variables

- IT Intervention and Software Applications

- Training Plan

- Field Operation Methodology

- Recommendations and Discussion Points

Lead Ministry/Agency	Pakistan Bureau of Statistics (PBS), Ministry of Planning Development and Special Initiatives, Pakistan
Key Data User/Ministry	PBS, Federal Ministries of Finance, NFS&R, FBR, SBP, NARC, provincial governments, national and international agencies
Legislative/Policy Mandate	General Statistics (Reorganization) Act, 2011 empowers PBS to conduct various censuses & surveys
Sub-Sectors Coverage	Agriculture lands, crops, livestock, machinery, domestic poultry
Data Collection Duration/Period	Decennial but in future may be quinquennial
Reference period	Agriculture year and day of enumeration
Methodological approach (classical, modular, etc.)	Mixture of sample and complete enumeration using modular approach
Sources of Census Frames	Mouza Census 2020 and PHC 2023
Data Collection Method (CAPI, PAPI, etc.)	CAPI and CATI but a few cases may be using PAPI
Use of Technology (IT)	Digital census using digital maps, high resolution imagery 03. & 0.98 m, and geotagging of each agricultural HH, data synching

5th Largest Country by **Population**
33rd Largest Country by **Land Area**

Total Area: 79.61 million hectares
Reported Area: 57.95 m hectares
Arable Land: 30.93 m hectare
Cultivated Area: 21.99 m hectare
Cropped Area: 23.85 m hectare

Quick Facts

- **2nd Highest Mountain Peak** K2
- **Coastline of 1046 km** support Fisheries
- **4%** of Land Area is covered by **Forest**
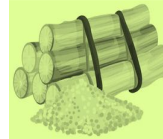- Among **top 20** Producers of Mango, Orange, Potato, Onion, Maize, Apricot

	Milk	5th Largest Producer in the World
	Dates	6th Largest Producer in the World
	Sugarcane	7th Largest Producer in the World
	Cotton	7th Largest Producer in the World
	Wheat	8th Largest Producer in the World
	Rice	10th Largest Producer in the World
	Meat	13th Largest Producer in the World

- 40 million structures were geotagged

- Number of HHs: **30.34 million**

- Average HH size: **6.30**

- Urban Population: **39%**

- Rural Population: **61%**

- Livelihood of rural population (61%) of the country depends upon agriculture directly or indirectly

- Urban population also depends upon agriculture for availability of food as **wheat and rice** are the main food crops

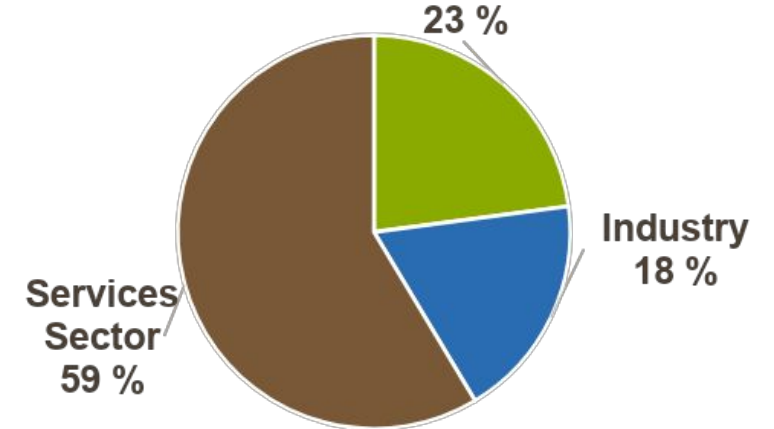According to final approved results of 7th Population and Housing Census

Total Population of Pakistan is **241.49 Million** with a growth rate of 2.55 %
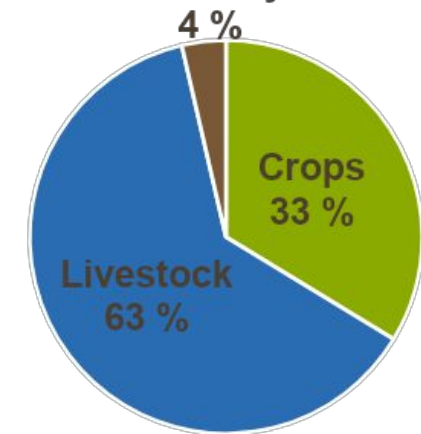
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- Agriculture contribution to **GDP 23%**

- Share of crops in agriculture is 33%, livestock is 63 %

- Livestock contributes 14% in GDP independently

- Provides employment to the **37%** of labour force

- Main food crops are wheat and rice to provide food security to the populace of Pakistan

- Main cash crops are cotton, sugarcane, and maize in addition to other crops including fruits etc.

- Cash crops as well as surplus food crops are source of income for farmers

- Development of agriculture sector directly affects the country's development

Contribution in GDP 2022-23

- Agriculture 23 %
- Industry 18 %
- Services Sector 59 %

Share in Agriculture

- Fishing & Forestry 4 %
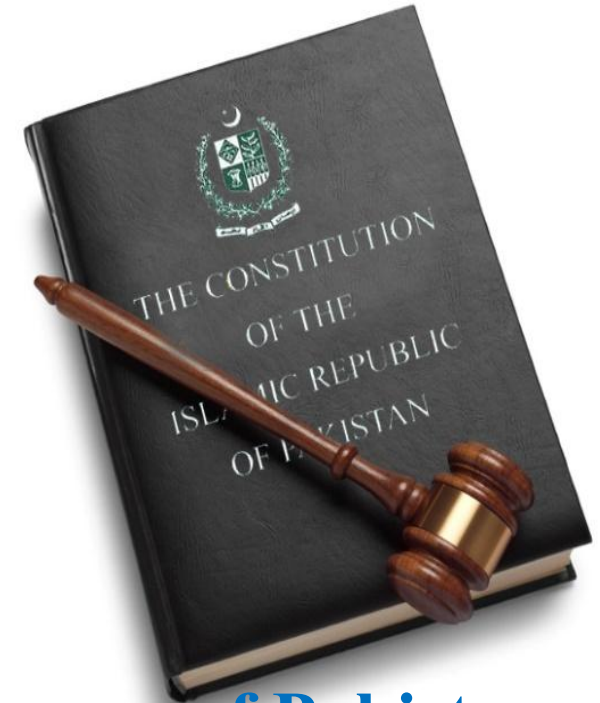- Crops 33 %
- Livestock 63 %

Pakistan Bureau of Statistics (PBS) was established with the enactment of

General Statistics (Reorganization) Act, 2011

PBS created by merger of four organizations namely:-

- **Federal Bureau of Statistics (FBS)**
- **Population Census Organization (PCO)**
- **Agricultural Census Organization (ACO)**
- **Technical Wing of Statistics Division (TW)**

Act, 2011 **empowers PBS** to conduct the **Agricultural Census of Pakistan**

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24 Agriculture Related Censuses have been conducted so far

Six Agricultural Censuses, (1960, 1972, 1980, 1990, 2000, 2010)

Four Livestock Censuses, (1976, 1986, 1996, 2006)

Five Agricultural Machinery Censuses (1968, 1975, 1984, 1994, 2004) and

Nine Mouza (Village) Censuses (1971, 1979, 1983, 1988, 1993, 1998, 2003, 2008, and 2020)

Moreover various allied surveys were also conducted such as survey on:

- **Milk production**
- **Milk processing industries**
- **Slaughtering**
- **Commercial Poultry**
- **Wool Production**
- **Migratory herds**

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- PBS introduced **innovation** for agriculture related censuses

- WCA-2020 recommends to collect data on agricultural lands, crops, orchards, irrigation, livestock population, modern farming practices in one go through Agricultural Census

- **Governing Council of PBS decided** to merge the three past agriculture related censuses to save the time, cost, and resources

- **There were two Big Challenges** for PBS to implement the decision:

  (i) **Merger of three questionnaires**

  (ii) **New Sample Design** to get reliable estimates as the merged censuses were also sample based

- New questionnaires have been developed with the support of various stakeholders including FAO by sacrificing minimum information of merged censuses which will be covered in surveys

- **Consultative meetings** were convened during 2020 and 2021 COVID times

- Past Agricultural, Livestock, and Agricultural Machinery Censuses were sample based having independent sample designs and methodologies

- After merger of three censuses, new sample design has been developed with the support of FAO with special emphasis on cultivated area and livestock

- The 7th Agricultural Census will be conducted under modified objectives

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- **Main Objectives** of the 7th Agricultural Census are:

  ✔ Provide information about **agrarian structure*** of the country to provide baseline data for food security and better livelihood of the population

  ✔ To provide estimates for **food and cash crops****, for informed decision making

  ✔ Provide estimates of **livestock population** with age and breed distribution

  ✔ **Area wise milk & meat** production for efficient **trade planning**

  ✔ Modern farming practices **to enhance the productivity**

  *Structural data includes number and size of holdings, land tenure, land use, cropped area, irrigation, livestock numbers, farm mechanization, etc.

  **Crops: Wheat, Rice, and vegetables are food crops, while Sugarcane, Cotton, and Maize are the cash crops.

- **WCA 2020**, says that Agricultural census may be conducted by **complete enumeration** as well as by a **large sample enumeration** of agricultural holdings

- **Either one or mixed** approaches are adopted by countries considering local **budgetary and technical** matters during **WCA 2010 programme**

- 7th Agricultural Census of Pakistan has been planned as **combination** of **complete and sample enumeration**

- **Mouza Census 2020** has been conducted with complete enumeration as part of 7th Agricultural Census and **community level rural statistics** have been collected to assess the facilities available to the farming community as per **guidelines of WCA 2020**

- Mouza Census also provides latest **updated sampling frame** for rural Mouzas/villages

- The big holdings called **National Certainty Holdings (NCH)** will be enumerated on 100% count basis while other HHs will be enumerated on sample basis

- **National Certainty Holdings (NCH):** are the farmers having at least 100 acres of land (1 acre = 0.4047 hectare), OR 50 cows or buffaloes or both, OR 200 goats or sheep or both, OR 25 camels

- The **NCH will be completely enumerated** throughout the country

- In selected Mouza or block, the **Mouza Certainty Holdings (MCH):** are the farmers having at least 20 acres of land, OR 20 cows or buffaloes or both, OR 50 goats or sheep or both, OR 20 camels.

- The **MCH will be completely enumerated** in the selected Mouza / block

- Rest of the HHs will be enumerated after selection of **land operators and livestock holders**

- Sample selection and estimation **at district level** for each district

- **Two and three stage sample designs** with customized approach

- **First Stage:** (i) Rural Mouzas (villages) selection using stratification and PPS techniques through Pareto sampling

  (ii) Urban blocks selection using stratified and simple random sampling

- **Second Stage:** HHs selection using systematic random sampling in the selected rural Mouzas. Take all for agriculture HHs is urban blocks

- **Third Stage:** if any selected big Mouza/village comprises of more than one EAs, then one enumeration block [EA] is selected using multivariate PPS

◻ Stratification in each district for **rural and urban parts** separately

◻ **Rural Mouzas** are **stratified into two groups**:

(i) having **cultivated area**

(ii) having **no cultivated area** (mostly unsettled Mouzas)

◻ Mouzas with cultivated area are stratified as per **livestock concentration**

◻ **Urban blocks** are stratified using **population census data** according to prevalence of **HHs rearing livestock**

◻ Proportional allocation of sample size for each stratum

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(i)   Mouzas without cultivated Area: Z1

(ii)   Mouzas with cultivated area: Z2

Mouzas with cultivated area (Z2) are stratified

Types of Animals	Category of Livestock Concentration			
	1	2	3	4
Cows/ Buffaloes	Nil	1-100	101-250	251 more
Sheep/Goats	Nil	1-200	201-500	501 more
Camels	Nil	1-25	26-100	101 more

Stratum L1: Mouzas having at least one type of animals in category 4.
Stratum L2: Mouzas having no animal in 4 but at least one type of animals in category 3.
Stratum L3: Mouzas having neither category 4 nor 3 but at least one type of animals in 2.
Stratum L4: Mouza without livestock as indicated category 1.

Allocation into Stratum

Mouza (Village)	Cow/Buffalo	Sheep/Goat	Camel	Stratum Classification
A	4	2	1	"Max"=4 | L1
B	2	3	1	"Max"=3 | L2
C	4	4	1	"Max"=4 | L1
D	4	4	1	"Max"=4 | L1
E	2	2	1	"Max"=2 | L3
F	4	4	1	"Max"=4 | L1
G	4	4	1	"Max"=4 | L1

Finally: Z1: Mouzas without cultivated area: 670

Z2: L4=380, L3=12545, L2=12402, L1=19755

Total Rural Mouzas in stratum Z1 + Z2 = 45752

- Information from PHC 2023 has been used to identify the urban blocks having livestock rearing activities. Five strata have been devised:

  Stratum 1: 1-9 livestock rearing households in a block.
  Stratum 2: 10 and above livestock rearing households in a block.
  Stratum 3: 1-9 households in a block reporting self agriculture.
  Stratum 4: 10 and above households in a block reporting self-agriculture.
  Stratum 5: It includes blocks having absence of livestock from which no block was selected.

- St-1, St-2, St-3, and St-4 have been considered and sample blocks have been allocated by using power allocation using 0.5 alpha quotient

- Approximately 27000 out of 66000 urban blocks falls in St-5

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- Area frame of **enumeration blocks** in urban and rural areas updated during PHC 2023
- Rural area frame of **rural Mouzas (villages)** prepared in Mouza Census 2020
- Rural Mouzas with cultivated area and without cultivated area
- Lists of big agriculture holdings called **NCH** for complete enumeration
- Lists of big holdings in selected Mouza called **MCH** for complete enumeration
- Lists of HHs in the selected Mouza/block **reporting agricultural land**
- Lists of HHs in the selected Mouza/block reporting **livestock only**
- Lists of HHs in the selected Mouza/block reporting agricultural machinery only
- **Nomads/Gypsy** considered for complete enumeration

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- Total sample of PSUs is **11054 EAs:**
  - ▪ 20% (8997) of rural Mouzas/villages have been selected
  - ▪ 3% (2057) urban blocks are selected being agriculture as rare activity
- Listing of all the HHs within selected EA will be completed in all respect
- Total SSUs are only agricultural HHs operating land, livestock, machinery
- HHs selection using systematic random sampling
  - For **land operators** with or without livestock and machinery: **60 HHs**
  - For only **Livestock holders** with or without machinery: **20 HHs**
  - For only Machinery owners and Nomads/Gypsy: **take all**
- **For urban areas: take all for only agriculture HHs**
- Overall sample of HHs in a EA: about **80-100 HHs** including NCH & MCH
- **At country level**: about **one million HHs** will be enumerated

o Number and Area of **Farms, Tenure Classification, and Farm Fragmentation**

o **Irrigation** Status of Farms and **Sources of Irrigation**

o Land Use and Cropping Intensities

o Farms Reporting Orchards and Orchard Area

o Irrigated and unirrigated area of each crop

o Different **Kharif Crops and Rabi Crops** Area

o Oilseeds Area, Fodder Area and Vegetables (including Potatoes) Area

o Farms Reporting Use of Greenhouse Technology (**Tunnel Farming)**

o **Agricultural Credit** By Source

o All Farms Reporting **Use of Tractors**, Draught Animals For Cultivation by Size of Farm

o Livestock Population (District Wise)

- **Large ruminants (cows, buffaloes, camels)**
- **Small ruminants (goats, sheep)**

✔ By Age and Sex,

✔ By Breed,

✔ Milk Production

- **Domestic Poultry**

o Animal Health And **Domestic Slaughtering**

o Agricultural Machinery

- **Tractors and Tubewells**
- **Bulldozers, Combine Harvesters**
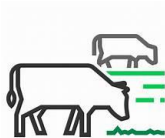- **Agricultural Implements (tractor drawn and self propelled)**

Basic Information

Head of HH, Father of Head, Tribe, Contact and address

Agricultural Land

Land Occupancy (Acre, Kanal)

Livestock

Cows & Buffaloes, Sheep & Goats, Yak/Dzo/Dzomo, Camels,

Horses, Donkeys, Mules

Domestic Poultry

Chickens, Ducks

Agricultural Machinery

Tractors, Combine Harvesters, Bulldozers, Tubewells etc.

NCH and MCH Households (Big Holdings)

Moreover, Summary on Households having Land, Livestock and Machinery will also be available

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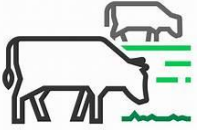
Basic Household Section

- **Identification & Basic Information** (Head, Contact, Household Type)

- **Respondent & Verification** (Respondent, Interviewer, Verification)

Agricultural Land Section

- **Farm Size & Fragmentation** (Farm Area, Farm Fragmentation, Tenure Classification etc.)

- **Land Utilization** (Cultivated & Uncultivated Area, Cropped Area, Farm Forest etc.)

- **Irrigation Details** (Canal, Tubewell, Stream, Modern Irrigation System, and Barani etc.)

- **Orchard Area & Trees** (Area and Number of Fruit & Non-Fruit Trees)

- **Crops in the Agriculture Year** (Area Under Rabi and Kharif Crops)

Livestock Section

- **Cows & Buffalos** (Number, Breed, Sex, Age, Milk Production)

- **Sheep & Goats** (Number, Breed, Sex, Age, Milk Production of Goat)

- **Camels, Horses, Donkey & Mules** (Number, Breed, Sex, Age, Milk Production of Camels)

- **Yak / Dzo / Dzomo** (Number, Sex, Age, Milk Production)

- **Veterinary Treatment of Animals** (Vaccination, illness, Domestic Slaughtering)

Agricultural Machinery & Income Section

- **Agricultural Machinery** (Use, Ownership, Types of Tractors & implements, Tubewells etc)

- **Agricultural Loans and Sources of Income** (Sources of Agricultural Loans and Income)

- **Census Support Centres** established at each district equipped with furniture, fixtures, internet devices, and IT equipment
- **Census District Coordinators** from PBS have been appointed at each district
- Deputy Commissioner has been nominated as **District Focal Person**
- Manuals of Instructions (Subject, IT(Software), FOP)
- **Training Venues** established with laptop, multimedia, sound system etc.
- **HR Module** has been developed and implemented for field force
- **NCH web application** developed and launched for recording NCH
- GIS based **Digital Maps** of EAs will be used to identify the blocks
- **Monitoring Dashboards** to monitor the enumeration process
- Online **data synching** from field to main server

Tablet Data Collection Applications

Listing Application
Enumerator, the primary user of this application to **list all households.**

Enumeration Application
...umerator, the primary user of this application to **collect detail data**, supervisor will use this app to perform quality check.

Key Features of Tablet Data Collection Applications

- **Geo-Tagging of Each Household**

- **Offline / Online Support**

- **Using Satellite Imagery**

Given the **Nature, Timeliness and the Scope**, it is difficult to manage Census Activities without providing a **Digital Solution** for **Effective Implementation & Control**. Therefore, All Administrative Tasks are Systematically Managed in Respective Modules.

- **Mobile Device Management (MDM) Module**

- **HR & Task Assignment Module**

- **Inventory Management Module**

- **Training Management Module**

- **Complaint Management System**

- **Centralized Communication System**

- **GIS & Dashboard based Monitoring System**

- PBS prepared an **application portal** for updation of records of big holding called **NCH (National Certainty Holdings)**

- PBS has planned **Process Reengineering Strategy** to enumerate the NCH throughout the country prior to actual field operation using various strategies:

i.   Big holdings will be enumerated **one month before** the field operation

ii.   **Self enumeration for NCH** through web portal

iii.   Questionnaires will also be sent **through mail** and enumerator will collect

iv.   **CATI approach** for NCH

v.   Last option is during actual field enumeration **by the supervisors**

vi.   **Regular updation** mechanism in future

Saving / Cutting Cost by Re-Using 7th Population & Housing Census Items:

- **Re-Using Census Tablets:** Save Cost and Time in Procuring

- **Re-Using Satellite Imagery**: help identifying actual on-ground structures and ensure enhanced coverage

- **Re-Using Oracle Exadata**: for enhanced database operations

- **Re-Using Internet Devices**: Re-Using 700+ Internet Devices for District Focal Persons

- **Re-Using Census Support Center Equipment**: laptops, printers, office furniture

- **Re-Using Key Census Concept and Standards**: Using Key Success Stories (Things to Replicate), Lessons Learnt (Mistake to Avoid), Software Concepts, and Design Patterns and Workflows, Execution Strategies to support PBS Staff for effectively managing and carrying out Integrated activities of the Agricultural Census.

For execution of Field Activities and Technical Support of 7th Agricultural Census 2024, **16 Working Groups** have been constituted, and tasked to manage designated areas.

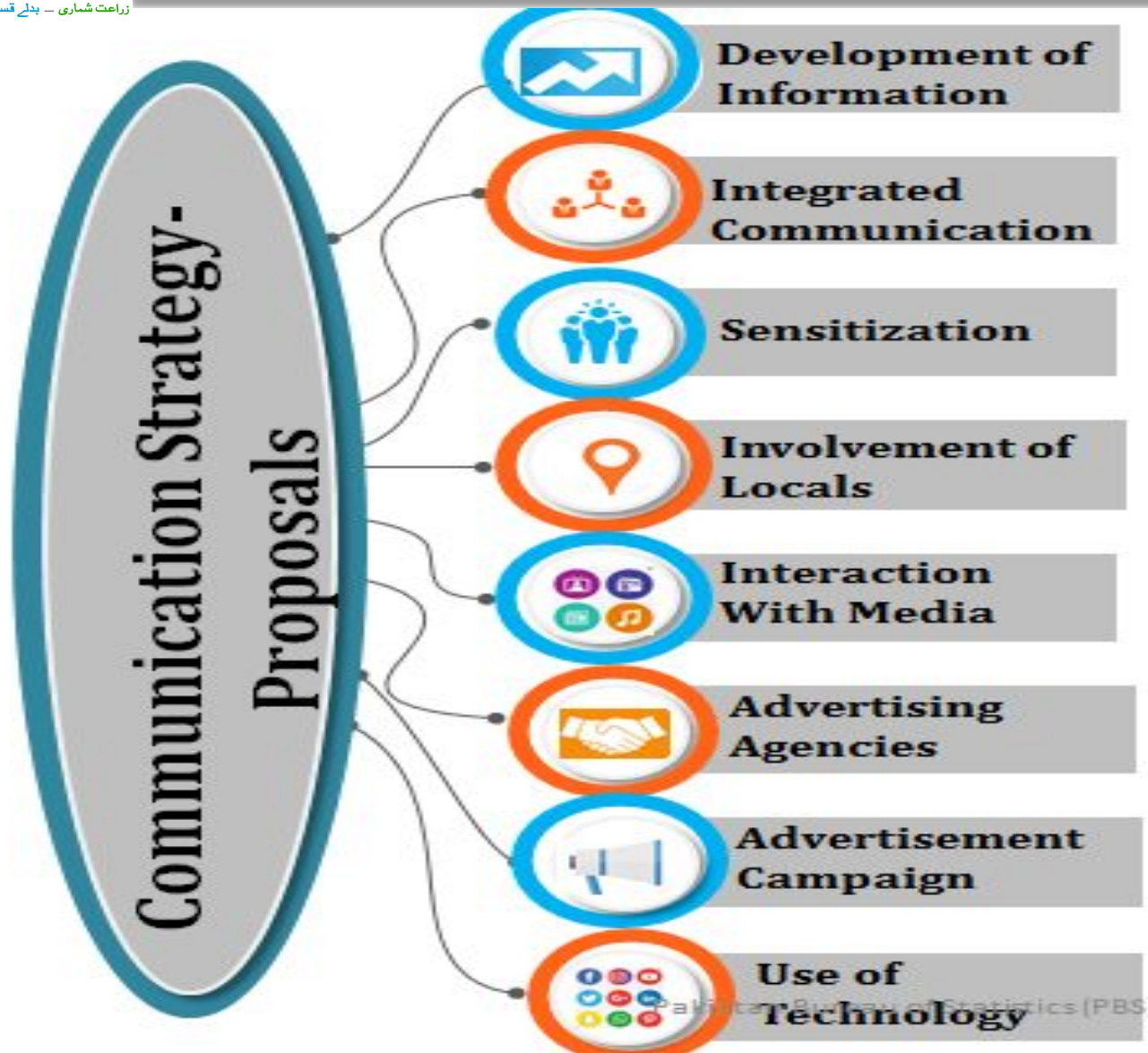|			
Admin and Logistic	**Field Support**	**Training Management**	**Support team for Administrative Module**
Operational Software	**Call Center**	**Advocacy**	**Data Center**
Internal Coordination	**Area Frame**	**Quality Assurance / Trend Analysis Teams**	**Media**
Data Quality Assurance & Tabulation	**Security and Coordination**	**Lessons Learnt**	**Tablet Management**

- Discussion amongst **Super Trainers** (completed)

- **Brain Storming** Session among domain experts and Super Trainers

- Two Tier Training i.e.

  - Tier-I: Training of **Census Master Trainers (300)**

  - Tier-II: **Supervisors & Enumerators (7031)**

- Extensive trainings with technological interventions: **audio/ Video clips, simulation exercises** to ensure uniformity in whole country

- Involvement of Academia/ Universities for Trainings, Monitoring & Evaluation

- For **11054 EAs,** total **7031 enumerators and supervisors** have been deployed from Provincial Governments
- **Two EAs** have been assigned to one enumerator
- Listing of all HHs in **5 days in one EA**
- Enumeration of selected HHs in **15 days in one EA**
- One supervisor will work in **10-15 EAs**
- PBS Coordinators **at District level** will provide technical, logistic, and IT related support and guidance
- Deputy Commissioner will **supervise census activities**
- Agricultural Census Monitoring Committee **(ACMC)** will monitor from National Census Coordination Centre **(N3C)** at national level from PBS, HQs, Islamabad
- **P3C** from provinces to monitor provincial activities

Communication Strategy- Proposals

- **Development of Information** — Slogan, Logo, Jingle, TVC, Posters, Flyers, Banners, Uniform, merchandising

- **Integrated Communication** — Integrated communication Approach- with other Census activities

- **Sensitization** — Sensitization of Elected representatives of Assemblies / Public Leaders / academicians and other stakeholders

- **Involvement of Locals** — Involvement of Minbar Masjid/ Hujra-Bethak/ Regional local Notables

- **Interaction With Media** — Press Briefing, News Tickers, panel discussions, interviews, informative news articles etc.

- **Advertising Agencies** — Acquiring services of Advertising agencies as per policy of Press Information Department

- **Advertisement Campaign** — Advertisement Campaign (Electronic, Print & other Media)

- **Use of Technology** — YouTube, Facebook, Twitter, Website, WhatsApp, SMS

- Advertisements in **Print media**

- **Social media** handles of PBS

- **Standees & Banners** at PBS offices, DC/AC Offices and District Offices of Agriculture, Livestock, CRS, BoS Departments

- 4-5 Banners in each **selected Mouza/ Deh/village**

- Announcements in each **selected Mouza/ Deh/village**

- **Media / NEWS/ Press releases** at National, Provincial and Local levels

- **Phase Wise Communication Strategy** has been devised

facebook.com/PBSofficialpak

twitter.com/PBSofficialpak

instagram.com/pbsofficialpak/

linkedin.com/company/pbsofficialpak

@PBSofficialpak

@PBSofficialpak

- FAO recommends to prepare a frame as **Core Module** and then **Supplementary Modules** out of core module for various surveys
- PBS will also conduct independent separate surveys
- Accordingly, PBS has planned surveys out of core module of 7th Agricultural Census like:
- Milk Production Survey (part of census)
- Survey on SDG Indicators (help of FAO)
- Agriculture Input Output Survey (PBS need)
- Survey on Migratory Herds
- Wool Production Survey
- Rural Credit Survey

Independent Surveys on:
- Fish Farms
- Commercial Poultry Farms
- Commercial Slaughtering

- Countries may collect **community level data** to assess the facilities available to the farming community, during updation of rural area frame, if possible

- For sample based census, **enumeration of big holdings** may be adopted to reduce the variation as well as to **cover the more land area with less HHs**

- **Digitization of maps** of EAs may be adopted, if possible, to increase the efficiency of data collection due to accurate identification of EAs and monitoring movement of enumerators

- Working of data collection software may also be managed for offline mode (without internet) to complete the field operation in time

PBS is going to conduct first time Agricultural Census after merger of agricultural, livestock, and agricultural machinery censuses. Therefore, please advise PBS:

1. Whether **is it right step** of PBS to save the resources as any agriculture HH usually have all three components of crops, livestock, and machinery?

2. Will the **new sample design work efficiently** in actual census?

3. Whether PBS will get accurate estimates for number of farms, farm area, cropped area, livestock population, machinery etc. in one go as proposed?

4. PBS may be provided guidelines if some country has adopted such type of approach

With provinces on 4 October 2019 at Islamabad

Online Meeting with provinces for questionnaire on 17.06.21 during Covid

Mouza Census 2020 meeting at PBS office, Lahore

Online Meeting with provinces on frame on 06.07.21 during Covid