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Introduction

After independence of Pakistan, Central Statistical Office (CSO) was setup by the Government of Pakistan in 1950 as an attached department of Economic Affairs Division. Since then statistical system was reviewed from time to time by both local and foreign consultants. In 1972 Central Statistical Office (CSO) was upgraded to a full-fledged Statistics Division. The Division was re-organized in 1981 and its technical wing (the then CSO) was converted into Federal Bureau of Statistics (FBS) as one of its attached departments. As a step forward Government of Pakistan has established Pakistan Bureau of Statistics, by merging Federal Bureau of Statistics, the Population Census Organization, the Agriculture Census Organization and the Technical wing of Statistics Division.

Statistics Division was created with the objective of bringing all the data generating system at federal level under one umbrella. This Organization was resultantly transferred to newly established Statistics Division in 1978 as an attached entity. Since then, four Agriculture Censuses have been conducted each in the years of 1980, 1990, 2000, 2010 and three Livestock Censuses each in the years of 1986, 1996, 2006 and four Agriculture Machinery Censuses have been conducted each in the years of 1974, 1984, 1994, 2004 till to-date. In addition, eight Mouza (Village) Censuses have been conducted each in the years of 1970, 1979, 1983, 1988, 1993, 1998, 2003 and 2008 (<http://www.pbs.gov.pk/agriculture-census-publications>).

Mechanism of data on the censuses / surveys relating to agriculture on decennial basis, namely:

1. Agriculture Census during the years ending with digit “zero”.
2. Agriculture Machinery Census during the years ending with digit “four”.
3. Livestock Census during the years ending with digit “six” along with a few surveys.
4. Mouza (Village) Census during the years ending with digit “eight”.

The data collected through the above mentioned censuses are presented in country and provincial reports. The country reports present data on country and provincial levels while the provincial reports present data for the province concerned and for it's all the districts.

Methodology

All the censuses of Agricultural Census Wing (ACW) cover four provinces, capital territory, Gilgit Baltistan and Azad State of Jammu and Kashmir. Direct interview method is adopted for the respondents scattered throughout the area covered under the censuses and the responses are recorded on the carefully prepared questionnaires and then computerized / tabulated as per tabulation plan prepared with consent of data users. Salient features about each of the census are as under:

1. **Agricultural Census:** It is conducted on sample basis. The sample design and sample size varies for different parts of the country. Provincial Revenue Departments act as the enumeration agency. Household is the source for provision of data.
2. **Agricultural Machinery Census:** This census is carried out on hundred per cent count basis for the agricultural machinery i.e. tractors, combine harvesters, bulldozers, important tractor drawn implements, tube wells, lift pumps, wells with pump, submersible pumps and modern irrigation systems (i.e. sprinkler and trickle / drip). However, the data on related parameters of farm mechanization are collected from the selected tractor, tube well, lift pump, well with pump and submersible pump owners on sample basis. Agricultural Extension Departments of the provinces act as the data collection agency.
3. **Livestock Census:** Livestock Census is also conducted on sample basis with different sampling plans for different areas of the country. Provincial Livestock and Dairy Development Departments perform the functions of data collection. Data is collected from the households.
4. **Mouza (Village) Census:** Mouza Census is carried out on hundred per cent count basis with the assistance of Provincial Revenue Departments. It was initially designed to update lists of mouzas / villages as per latest administrative order to be subsequently used as sampling frame. However, its scope improved overtime to cater for the community level data

encompassing the environment within which the rural communities operate and perform various agriculture related functions.

The planners and researchers may study various types of relationships and the changes occurring therein for their planning and research endeavors. The data are provided to the data users as per data dissemination policy of the PBS.

Agriculture Statistics

Agriculture constitutes the largest sector of our economy and majority of the population, directly or indirectly, dependent on this sector. It contributes about 24 percent of Gross Domestic Product (GDP) and accounts for half of employed labour force and is the largest source of foreign exchange earnings. It feeds whole rural and urban population. Realizing its importance, planners and policy makers are always keen to have reliable area and production statistics of agricultural crops well in time. Policy makers primarily need accurate and timely statistics for the important crops such as wheat, cotton, rice, sugarcane, maize etc. However, in recent years, due to persistent hikes in the prices of essential commodities like pulses, onions, potatoes, chilies and tomatoes these crops have also gained in economic importance.

Methodology of Crop Estimate

The 1st and 2nd Estimates of area sown under 12 major crops are arrived at through Sample Surveys undertaken by the Directorate of Crop Reporting Service. The final estimates of area sown under all crops are based on complete enumeration (Girdawari) of all Mouzas carried out by Patwaris of Revenue Department twice a year.

The information gathered by Patwaris is passed on by the Revenue Department to the Provincial Bureau of Statistics for preparation of computerized Jinswar statements. The acreage statistics included in the 1st and 2nd estimates are approved by the Secretary, Agriculture Department at his level.

The final acreage estimates based on the Girdawari are approved by the Provincial Agriculture Statistics Authorities.

CONCEPTS AND DEFINITIONS

Mouza / Deh: It is a territorial unit with a separate name, definite boundaries, and area precisely measured and divided into plots / khasras / survey numbers. Each mouza is a

revenue estate and has a cadastral map maintained in the land revenue record with a Hadbast Number except Sindh Province. Mouza, Deh, Village, Killi and Chak are the names commonly used for it. The term mouza / deh is widely used in the settled areas while the term village and or killi are used in the unsettled areas. There may be one or more settlements, abadies, basties, dhokes, goths, etc. in the territory of a mouza / deh. The mouzas / dehs may also have scattered inhabitation while there may be some mouzas without population as well. (<http://www.pbs.gov.pk/agriculture-census-publications>).

AGRICULTURAL CENSUS 2010

Main Variables

Total Area

- i. Farm area**
 - **Cultivated area**
 - Net sown area
 - Current fallow area
 - **Uncultivated area**
 - Culturable waste including water-logged & saline area
 - Banjar Jadeed
 - Banjar Qadeem
 - Private forest land
 - Area not available for cultivation
- ii. Non-farm area**
 - Area under abadi deh & urban built up
 - Area under roads, rails, canals, rivers & ravines
 - Govt. forest, parks, lakes, water, bodies, shallow lands, hills & Mountains
 - Undistributed govt. land including land acquired under land reforms
 - Uncultivated communal lands and collective pastures

Sampling Plan

The sampling plan for Agricultural Census 2010 includes different sample designs for different regions of the country in view of the varied local conditions. It was not different

from previous censuses, except for a few improvements. The entire country was divided into four distinct parts for the purpose of sampling, as described below:

Part 1: Rural settled areas of Khyber Pakhtunkhwa, Punjab and Sindh provinces: a three-stage weighted, stratified and systematic cluster sampling approach was used.

Part 2: Rural settled areas of Balochistan and all rural areas of Azad Jammu & Kashmir: a single-stage weighted and stratified sampling technique was used.

Part 3: Urban areas throughout the country: a two-stage sample design using stratified and systematic sampling was used.

Part 4: Rest of the country, comprising unsettled rural areas of Punjab, Balochistan and Khyber Pakhtunkhwa provinces and tribal areas (Agencies and FRs) including Gilgit Baltistan a single-stage stratified and systematic sampling was used. In all the areas, the sample size was determined at district / agency/ FR level. In urban areas, the sample size varied according to the size of populace in an urban unit. In areas of part 1, where three-stage sampling was used, Patwar Circles in the first stage and Mouzas in the second stage were selected with probability proportional to size (PPS), whereas a systematic selection of clusters of households (approximately 30 households in a cluster) was made for enumeration at the third stage. In the areas of part 2, Mouzas were selected with PPS and all the households in selected Mouzas were enumerated. For part 3, urban blocks were selected systematically and every fifth household was enumerated in each selected block. In part 4, the Mouzas were selected systematically and all the households in a selected Mouza were enumerated. For various stages of sampling, different up-to-date sampling frames were prepared to meet the requirements of sampling.

SAMPLING FRAMES

Updated sampling frames are the prerequisites of sampling to avoid introducing a bias in the selection of sampling units. For the purpose, different sampling frames were prepared involving great deal of effort and expense and were used for the proper selection of representative samples for Agricultural Census 2010. The sampling frames were:

1. **Mouza Lists:** Mouza lists were updated at district level for each Tehsil through Mouza Census 2008. For sampling purpose, these lists contained only rural, partly urban and Bechiragh (unpopulated) Mouzas arranged by Patwar Circles and Kanungo Circles showing Mouza-wise total area, cultivated area as per 2006-07 revenue records and number of households according to the population census 1998 in that Mouza. These lists excluded purely forest, under dam and urban Mouzas. As the Mouza lists were based on Patwar Circles, they also provided the frame of Patwar Circles, although implicitly. Subsequently, the lists of Mouzas of the selected Patwar Circles served as the sample frame for the selection of Mouzas.

2. **List of Urban Blocks:** A complete district-wise list of urban blocks of approximate size of 200 to 250 households per block.

3. **List of National Certainty Holdings (NCHs):** Lists of NCHs were prepared throughout the country at district level in all the Mouzas / Dehs / villages.

NCH lists included all government agriculture & livestock farms as well as all private farms of 100 acres or more land owned / operated may be at one place or scattered in different Mouzas / districts / even provinces.

4. **Complete List of Households:** A list of households in each selected Mouza showing total area, area owned and rented-in constituting their farm /holding was prepared by the enumerators during the field operation.

5. **List of Mouza Certainty Holdings (MCHs):** During preparation of household list in a selected Mouza, a list of livestock holders having 25 or more cattle and / or buffaloes; 25 or more camels; 50 or more sheep and / or goats was prepared and such households were treated as MCHs. In addition, from a complete list of households in a Mouza / Deh / village, those households farming 20 acres or more land as area owned and / or area rented-in were also segregated as MCHs. In selected urban blocks, households having / operating agricultural land or having any number of livestock were also treated as MCH. The nomads / gipsy / migratory people, if found in the boundary of selected Mouza / urban block during household listing or enumeration, were also treated as MCH.

SAMPLE SELECTION:

All the NCHs and MCHs were enumerated on 100 % basis and no further selection was made among such type of households. However, selection procedures adopted for Mouzas, urban blocks and common households at various sampling stages are given below:

First Stage: Selection of Patwar Circles

The number of Patwar Circles to be selected from each district was determined keeping in view the number of enumerators which could be made available, effectively trained and properly supervised, as well as the inherent variance of the population with respect to the main data items under study.

First of all, each Mouza was given a measure of size which was the geometric mean (G.M.) of its cultivated area and number of households as per Mouza lists mentioned above. This measure of size helped to arrive at the Mouza probability of selection which was separately calculated. This probability was equal to Mouza measure of size divided by total measure of size of the district multiplied by the number of Patwar Circles to be selected from the same district. Then, each Patwar Circle was assigned a probability by addition of the probability of selection of its Mouzas. The Patwar Circles falling in various Kanungo Circles were arranged by their cultivated area within the respective Kanungo Circles. The Patwar Circles with a probability higher than 0.890 were selected with certainty and sifted out from the list. The Patwar Circles having probability less than 0.020 were merged with the immediately above non-certainty, non-merged Patwar Circle(s) of the same Kanungo Circle such that after merger the collective probability of merged Patwar Circles was greater than 0.019. These merged Patwar Circles were retained in the list as a single unit with their collective probability for sampling purpose.

The non-certainty Patwar Circles were reassigned a probability by repeating the above mentioned process and more certainty Patwar Circles, if found, were again segregated, and the process continued till no certainty Patwar Circle was detected in the list. After segregating all certainty Patwar Circles, for non-certainty Patwar Circles a moving cumulative probability was worked out and shown against each Patwar Circle in a district. For carrying out the selection of Patwar Circles in a district, a random number over zero and up to 0.999 was selected. The first Patwar Circle with cumulative probability equal to or greater than the random number was considered selected. Similarly, the second Patwar Circle was selected by adding the number 1 to the random number; the third Patwar Circle was selected by adding 2 to the random number, and so on, until the predetermined number of Patwar Circles were selected from the district, in addition to the certainty Patwar Circles.

Second Stage: Selection of Mouzas

To equalize the enumeration workload in a Patwar Circle, it was decided to select two Mouzas per selected Patwar Circle. The Mouzas falling in certainty and selected Patwar

Circles were arranged in serpentine fashion, i.e., within the odd-numbered Kanungos, in descending order of cultivated area of the Mouzas, and within even numbered Kanungos in ascending order of cultivated area of the Mouzas. The method employed at the first stage was repeated at Patwar Circle level for segregating the certainty Mouzas and also for the selection of the non-certainty Mouzas. Like the Patwar Circles with small probability of selection, the Mouzas with small probabilities were merged together by applying the principle mentioned in the first stage and treated as one Mouza for sampling purposes. However, only two Mouzas from one Patwar Circle were selected whether the selected Mouza was certainty or non-certainty. In the case where only one Mouza was found in a Patwar Circle, the same Mouza was selected with probability 1. A list of selected Mouzas and systematically selected urban blocks (without any weight) was prepared carefully at the district level for further use.

Sub Stage: Sector Selection for Big Mouzas Only

According to the list of selected Mouzas, all Mouzas with 900 or more households were divided into sectors as described below:

During the field operation, listing and enumeration of so many households was expected to overburden the enumerators. Therefore, these selected Mouzas were termed as big Mouzas and a sub-stage of sector selection was introduced. Big Mouzas were divided into convenient number of sectors, each having approximately 300 – 500 households. The number of households in a sector was treated as the measure of size to work out the probability of selection of that sector which was subsequently incorporated in the probability of selection of that big Mouza and accordingly used for working out the census estimates. One sector from each big Mouza was selected with equal probability. The process of selecting a sector from big Mouzas could be treated as another stage in multistage sampling. For big Mouzas, a selected sector was treated as a full-fledged Mouza for settled areas and a full-fledged village / Killi / Basti for unsettled areas of the country.

Third Stage: Selection of Clusters of Households

A systematic selection of clusters of approximately 30 households, was made from list of households (Form-1) prepared by the enumerators during field operation. The number of clusters to be selected, with a minimum of two from each Mouza, was determined with regard to raising factor of the Mouza and the pre-fixed overall raising factor at cluster level for a particular Mouza. The limit of overall raising factor was fixed at 25 for all the rural settled areas. The ultimate sample of households selected for the census was as follows:

- i. The households in the selected clusters at final stage of selection.
- ii. In selected urban blocks, every fifth household.

iii. All the households located in the selected villages / Basties / Killies of unsettled areas, including the whole of Gilgit Baltistan.

iv. All households located in selected Mouzas of Azad Jammu & Kashmir and settled areas of Balochistan.

v. The households located in the selected Mouzas / urban blocks designated as Mouza Certainty Holdings.

vi. The households located anywhere in the country designated as National Certainty Holdings.

Total number of units and the units selected in the first, second and third stages for each of the province and at country level are given below in table below.

The socio-economic facilities available to inhabitants of a mouza / deh / village / killi are of two types i.e.(i) those which must be available in mouza and (ii) the other which may be available in mouza or located at some distance from the mouza. In case of the latter type, the distances have been taken in terms of kilometers. Both types of socio-economic facilities have been covered in the census and are given separately as below however those being covered for the first time in Mouza Census 2008 have been indicated with asterisk mark.

(i) Facilities Available in Mouza

- | | |
|--|--|
| 1. Status of Mouza | 12. Taste of Drinking Water |
| 2. Name and Number of Union Council* | 13. Water Treatment Facility* |
| 3. Number of Settlements, and their Names* | 14. Facility of Toilet* |
| 4. Important Crops of Mouza* | 15. Pacca Streets |
| 5. Sources of Irrigation | 16. Pacca Drains and Sewerage* Facilities |
| 6. Water Course Improvement Scheme | 17. Availability of Energy* |
| 7. Credit Facility by Gender* | 18. Media Facilities* |
| 8. Retail Market (Bazar)* | 19. Housing Condition (Pacca / Kacha)* |
| 9. Sources of Employment by Gender* | 20. Play Grounds & Sports Teams by Gender* |
| 10. Type of Industries* | 21. Social Organizations by Gender* |
| 11. Sources of Drinking Water | 22. Dispute Resolution Mechanism* |

ii) Facilities Available in Mouza or at Distance From Mouza

- | | |
|---|---|
| 1. Veterinary Health Coverage | 8. Diesel & Petrol Pump / Depot /Agency |
| 2. Cattle Market, Grain , Fruit & Vegetable Market & Wheat Procurement Centre | 9. CNG / LPG Availability* |
| 3. Agricultural Inputs (Fertilizers / Seeds / Pesticides) | 10. Metaled Road |
| 4. Commercial Banks and On-line Banking* | 11. Transport Facility* |
| 5. Post Office | 12. Telecommunication / Internet* |
| 6. Health Facilities | 13. Education Facility by Gender (Primary / Middle / High School & College and Vocational Centre) |
| 7. Availability of Electricity | 14. Police Station |

Total No. of Units and the Units Selected at the First, Second and Third Stages of Sampling						
Admn. Units		Pakistan	Khyber Pakhtunkhwa	Punjab	Sindh	Balochistan
Total units	Household in Selected Mouzas/Villages	2148339	402150	1559743	71029	115417
	Urban Blocks	27487	1908	17006	8019	554
	Mouza/Villages	53838	14700	26086	5717	7335
Sampled Units	Patwar/Circle	11298	1444	8006	1467	381
	Third Stage	Households	809808	139237	411743	163259
	Second Stage	Urban blocks	1893	196	1108	442
		Mouzas/Villages	9080	2201	3933	1589
First Stage	Patwar circle	3959	890	1940	774	355

PAKISTAN AGRICULTURAL MACHINERY CENSUS 2004

Main Variables

All Tractors, Private, Government, Tractors by made

Implements: Cultivators, Mould Board Ploughs, Disk Ploughs, Rotavator, Disk Harrow, Ridger, Sprayer (Tractor Mounted), Reaper, Thresher, Trolley

Tube well/Lift Pumps: Private, Government, Electric, and Diesel

Private Tube well: Centrifugal, Turbines, Wells with Pump, Submercible pumps, Private Lift Pump

Sample Design

An inventory of privately owned tractors / bulldozers / combine harvesters and tubewells / wells with pump / lift pumps / submercible pumps with some pertinent information was prepared on hundred per cent count basis. However, the detailed information about tractors / tractor owners and tubewells / wells with pump / lift pumps / submercible pumps was collected on sample basis from the Punjab (except Cholistan and De-Excluded areas of D.G.Khan and Rajanpur districts), Sind (except Tharparkar district) and settled areas of NWFP. A systematic sample of private tractors and tubewells / wells with pump / lift pumps / submercible pumps used for agricultural purposes was selected from each tehsil with random start. Every tenth listed tractor and tubewell / well with pump / lift pump / submercible pump was selected from the inventory prepared for the purpose. Whereas, the census was carried out on complete count basis in unsettled areas of NWFP, Cholistan and De-Excluded areas of D.G.Khan and Rajanpur districts in the Punjab, Tharparkar district of Sindh and whole of Balochistan.

The information on public agricultural machinery was collected through correspondence with all the federal agencies / provincial departments / institutions which make use of such machinery for agricultural purposes whereas, the data on privately owned Agricultural Machinery were collected through specially trained enumerators borrowed from the Provincial Governments.

Sample Size

The inventory of tractors / bulldozers / combine harvesters and tubewells /wells with pump / lift pumps / submercible pumps was prepared on Form-1 and Form-3, respectively. The

selected tractors and tubewells / wells with pump / lift pumps /submercible pumps in settled areas while all of them in unsettled areas of the country were enumerated on Form-2 and Form-4, respectively. The inventory and actual number of Form-2 and Form-4 completed during census are given as under:

PROFILE OF THE INVENTORY AND SAMPLE SIZE

Administrative units	Tractors/Buildozers/combine Harvesters						Tubewells/wells with pump/lift pumps/submerceblepumps					
	From-1/Form-1A(Inventroy of tractors/buildozers/combine harvestters)			Form-2(Tractors only)			From-3 (Inventroy of tubewells/wells with pump/lift pumps/submerceblepumps)			Form-4		
	Settled Area	Unsettled Area	Total	Settled Area	Unsettled Area	Total	Settled Area	Unsettled Area	Total	Settled Area	Unsettled Area	Total
Pakistan	394559	7104	401663	46266	7104	53370	916701	14347	931048	103992	14347	118339
NWFP/ KP	19904	4365	24269	1990	4365	6355	15085	6439	21524	1509	6439	7948
Punjab	331203	702	331905	33307	702	34009	837745	159	837904	84109	159	84268
Sindh	36245		36245	3762		3762	50683		50683	5186		5180
Balochistan	7307	2037	9244	7207	2037	9244	13188	7749	20937	13188	7749	20937

Note: In De-Excluded areas of D.G.Khan and Rajanpur districts of Punjab, Tharparkar District of Sindh and whole of Balochistan complete enumeration was undertaken like that of unsettled areas of the country.

QUESTIONNAIRES / FORMS

Form-1

- Used for preparing inventory of privately owned tractors / bulldozers /combine harvesters with details on type of ownership, make, model, year of manufacture, purchase and number & type of tractor drawn implements.

Form-1 (A) - Used for preparing inventory of government tractors / bulldozers /combine harvesters and implements maintained for agricultural purposes.

Form-2

- Detailed questionnaire used for ascertaining information about tractor sand tractor owners.

Form-3

- Used for preparing inventory of privately owned tubewells / wells withpump / lift pumps /submercible pumps with details on type of ownership, type of pump, year of installation, delivery & suction capacity, motive power, etc.

Form-3 (A) - Used for preparing inventory of privately owned modern irrigation systems (MISs) with type of system, year of installation, cultivated area and area irrigated.

Form-4

- Detailed questionnaire used for ascertaining information about owners as well as tubewells / wells with pump / lift pumps / submersible pumps.

Pakistan Live Stock Census 2006

List of Main variables:

1. Milk and Meat Animals

- 1.1 Total Cattle
 - o Bullocks (3 years & above)
 - o Cows (3 years & above)
 - o Cows in Milk
 - o Young stock (below 3 years), male, female
- 1.2 Total Buffaloes (3 years & above) male, female
 - o Young stock (below 3 years), male, female
- 1.3 Total Sheep (1 years & above) male, female
 - o Young stock (below 1 years)
- 1.4 Total Goats (1 years & above) male, female
 - o Young stock (below 1 years)

2. Draft Animals

- o Camels
- o Horses
- o Mules
- o Asses

Sampling Plan

Initially, the sampling plan was finalized and the sampling frames were developed using available resources / information. In order to minimize the sampling problems, different sample designs were used for different parts of the country on the basis of local conditions and type of information available for selecting the sample. The sampling frames developed are briefly given as under:

- i) A complete and upto date list of mouzas / dehs falling in all settled rural areas separately for each district alongwith number of households residing in each mouza / deh according to 1998 Population Census.
- ii) A complete and upto date list of villages / basties / killies of each un-settled district / agency / F.R. of all the unsettled rural areas.

iii) A complete list of urban blocks of all small / medium urban areas separately for each district as maintained and updated by Federal Bureau of Statistics.

iv) Lists of blocks of big urban areas segregated into four categories according to livestock concentration.

v) A complete list of National Certainty Holdings (NCHs) from all over the country including all Government, Semi-government, Army livestock and dairy farms, and all big private livestock holdings having 50 or more heads of cattle / buffaloes or both, 200 (500 in case of Balochistan) or more heads of sheep / goats or both or 25 or more heads of camels.

vi) Lists of Mouza Certainty Holdings (MCHs) from all the mouzas / dehs / blocks (except unsettled rural and big urban areas) selected in first stage, including livestock holdings having 25 or more cattle / buffaloes or both, 50 (100 in case of Balochistan) or more sheep / goats or both or 25 or more camels.

10. All the listed National Certainty Holdings (NCHs) and Mouza Certainty Holdings (MCHs) were enumerated on 100 per cent basis. For all other frames, the criterion for selection of mouzas / villages / blocks as well as households is discussed on next pages

(i) Selection of Mouzas / Villages / Blocks

11. In rural settled areas of the country, mouzas / dehs were selected through weighted systematic random sampling technique from each district by adopting the principal of probability proportional to size according to the number of households in each mouza / deh as per 1998 Population Census. In case of small / medium urban and unsettled rural areas, simple systematic random sampling technique was used to select villages / basties / killies / blocks separately from each of the district. In big urban areas like Islamabad / Rawalpindi, Lahore, Gujranwala, Faisalabad, Multan, Sargodha, Sialkot, Bahawalpur, Karachi, Hyderabad, Peshawar and Quetta, the blocks were grouped into four categories according to the density of livestock population therein to stratify the blocks and then a sample of blocks was selected systematically from each stratum at different rates of selection.

12. The number of mouzas /villages / blocks to be selected from a district was pre-determined based on the availability of enumerating work force, contribution in overall livestock population and extent of variations in major census items as ascertained during the last livestock census.

13. Prior to census enumeration, the first stage units were selected using specially prepared software for the purpose. These lists were then sent to District Census Officers to identify and re-arrange the sample units according to their administrative set up (i.e. by Veterinary Hospitals and Veterinary Centres) and also to facilitate subsequent equitable distribution of enumeration and supervision work. These re-arranged lists of first stage sample units were further used for assignment of census work to the enumeration and supervisory staff of the concerned Veterinary Hospitals and Veterinary Centers of each district / agency / F.R.

Summary of sample households is given in table below;

Name of Area	Total No. of Villages	Sample Villages	Total Urban Blocks	Sample Urban Blocks	Total Listed HHs	Selected HHs	Fraction (%)
Pakistan	55626	8661	26427	1586	3853086	1003015	26
KPK	14855	1936	1913	270	676366	148994	22
Punjab	27049	4326	14878	882	2224267	487989	22
Sindh	6005	1111	9023	330	728887	309890	43
Balochistan	7717	1288	613	104	223566	56242	25

NEW DEVELOPMENTS REGARDING AGRICULTURAL STATISTICS IN PAKISTAN

- i. Updation of Area Sampling Frame
- ii. Proposal regarding emergence of Agricultural Censuses/Surveys

i. Updation of Area Sampling Frame

Pakistan Bureau of Statistics (PBS) has developed its own area sampling frame for both Urban and Rural domain. Each city/town is divided into enumeration blocks. Each enumeration block is comprised of 200 to 250 households on the average with well-defined boundaries and maps. The list of urban enumeration blocks as updated from field on the prescribed proforma by Quick Count Technique for urban domain in 2013 and the updated list of villages/mouzas/dehs or its part (block), based on House Listing 2011 for conduct of Population Census are taken as sampling frames. However the work regarding updation of rural blocks/villages through Quick Count Technique is under

process. Enumeration blocks are considered as Primary Sampling Units (PSUs) for urban and rural domains respectively. The summary of total (approximate) enumeration blocks in the area sampling frame is tabulated below;

Summary of Blocks				
S.No	Name of Province	Urban	Rural	Total
1	Khyber PK	2886	16247	19133
2	Punjab	22415	59926	82341
3	Sindh	20791	16941	37732
4	Balochistan	1519	8159	9678
5	Islamabad	590	201	791
6	FATA	43	3756	3799
7	Gilgit/Baltistan	146	1066	1212
8	AJ&K	404	3513	3917
Grand Total		48794	109809	158603

ii. **Proposal regarding emergence of Agricultural Censuses/Surveys**

Pakistan Bureau of Statistics (PBS) is intend to conduct one combine Agricultural Census/Survey by emerging all three previously existing Census including Agricultural, Agricultural Machinery and Live Stock Census. For this purpose development of combine set of five questionnaires is under process. All the duplications of queries in the previous questionnaires are being removed for optimization of information and reduction of survey cost/time.

Two/Three stage sample design is being proposed;

First Stage: Mouzas/Blocks will be selected in first stage using probability proportional to size (PPS) technique. Cultivated area in each Mouza/Block will be used as measure of size. In each selected Mouza/Block, complete list will be prepared during field operation.

Second Stage: In second stage 16 households will be selected systematically after excluding NCH and MCH from the selected mouzas/blocks.

Only agriculture households will be considered for detailed interviews. Households will be selected for detailed interview by using systematic random sampling after excluding NCH

and MCH and special features will be considered separately. List frame will be used for selection of villages in un-settled areas and for urban blocks. Urban blocks will be treated separately only for livestock concentration areas.

Administrative Setup for Field Operation

Pakistan Bureau of Statistics (PBS) has a network of 34 Regional & Field Offices spread over the whole country. These Regional & Field Offices are supervised by directorate office of field services Islamabad. Each office has regular skilled enumerators which can be deputed in other field offices as per work load and demand.

Major Challenges/ Questions:

1. **Area Sampling Frame** consists of approximately 160 thousand enumeration blocks updated through, Quick Count Record (QCR) Technique. Is the survey design based on QCR information as baseline information is appropriate? How the first stage sample weight would be calculated/adjusted when major differences appear between frame and actual listing information?
2. **Survey-cum-Census:** If complete count information is not available for all the previous agricultural censuses which are basically surveys/partial censuses, then how much this will affect the sample design of the upcoming census/surveys?
3. **Emergence of all three Agricultural Censuses;** is this a good idea? What would be the gain and what would be the loss?
4. **If estimated sample size exceeds from the total population** then how this over sampling can be controlled?
5. **If the distribution among PSUs of the variable** being used as measure of size is highly skewed then how an appropriate allocation technique can be decided?
6. **Sample Take from a PSU at second Stage;** what should be the appropriate sample take from a PSU at second stage?
7. **If there is no Census/Survey** relating to Horticulture, Fishing and Aquaculture previously conducted and Statistics relating to these sectors entirely depend upon the revenue department/administration then what Steps should be taken to initiate a survey?