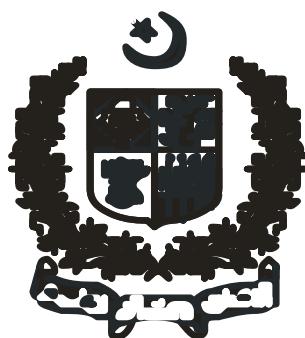


PAKISTAN LIVESTOCK CENSUS 2006



**GOVERNMENT OF PAKISTAN
STATISTICS DIVISION
AGRICULTURAL CENSUS ORGANIZATION**

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COUNTRY MAP



COMPARATIVE STATUS OF LIVESTOCK CENSUS 1996 AND 2006

| Type of Animal | Livestock Census | | Per Cent Variation in 2006 over 1996 |
|------------------------------------|------------------|------------|--------------------------------------|
| | 1996 | 2006 | |
| A. MILK AND MEAT ANIMALS | | | |
| (i) Total Cattle | 20,424,458 | 29,558,812 | (+) 44.7 |
| Bullocks (3 years & above) | 3,669,885 | 4,146,859 | (+) 13.0 |
| Cows (3 years & above) | 10,020,935 | 15,156,583 | (+) 51.2 |
| In-milk Cows | 6,326,144 | 8,720,361 | (+) 37.8 |
| Youngstock (below 3 years) | 6,733,642 | 10,255,372 | (+) 52.3 |
| Male | 3,568,181 | 5,374,016 | (+) 50.6 |
| Female | 3,165,461 | 4,881,356 | (+) 54.2 |
| (ii) Total Buffaloes | 20,272,873 | 27,334,985 | (+) 34.8 |
| Male Buffaloes (3 years & above) | 360,855 | 609,956 | (+) 69.0 |
| Female Buffaloes (3 years & above) | 12,211,116 | 15,562,548 | (+) 27.4 |
| In-milk Buffaloes | 7,809,518 | 10,222,233 | (+) 30.9 |
| Youngstock (below 3 years) | 7,700,894 | 11,162,485 | (+) 45.0 |
| Male | 3,286,239 | 4,705,721 | (+) 43.2 |
| Female | 4,414,655 | 6,456,764 | (+) 46.3 |
| (iii) Total Sheep | 23,543,973 | 26,487,741 | (+) 12.5 |
| Male (1 year & above) | 3,410,993 | 4,364,563 | (+) 28.0 |
| Female (1 year & above) | 13,290,153 | 13,755,025 | (+) 03.5 |
| Youngstock (below 1 year) | 6,842,827 | 8,368,155 | (+) 22.3 |
| (iv) Total Goats | 41,169,309 | 53,786,988 | (+) 30.6 |
| Male (1 year & above) | 5,217,345 | 6,616,711 | (+) 26.8 |
| Female (1 year & above) | 22,357,285 | 31,171,164 | (+) 39.4 |
| Youngstock (below 1 year) | 13,594,679 | 15,999,121 | (+) 17.7 |
| B. DRAFT ANIMALS | | | |
| (i) Camels | 815,290 | 920,868 | (+) 13.0 |
| (ii) Horses | 333,944 | 344,253 | (+) 03.1 |
| (iii) Mules | 131,848 | 155,698 | (+) 18.1 |
| (iv) Asses | 3,559,011 | 4,268,472 | (+) 19.9 |
| C. DOMESTIC POULTRY | 64,264,814 | 73,647,888 | (+) 14.6 |

PREFACE

Agricultural Census Organization conducted its fourth decennial Livestock Census throughout the country during 2006 fulfilling its functional responsibilities entrusted through the Agricultural Census Act (No.XLI) of 1958. Three previous Livestock Censuses were carried out in the years 1976, 1986 and 1996. The data collected is presented in three volumes.

A comprehensive scenario on livestock for the country and provinces is presented in Volume-I, while for each province and its districts in Volume-II (Four Parts). The statistics on milk production, commercial poultry and number of animals slaughtered are presented in Volume-III (Special Report).

This report consists of two sections. In the first section, salient aspects of the census have been briefly described while the data tabulations are given in the second section comprising of 26 statistical tables.

I am personally grateful to Dr.Hans-Siegfried Grunwaldt, the eminent German Expert on agricultural statistics and Mr.Hans Wagner, FAO's Representative, based in Bangkok for sparing time to evaluate the report and give their expert opinion (Appendix-III) on the contents of this report.

I hope that this report will become a useful source of statistical information for research workers, planners, administrators and all other interested in the policy formulation on livestock husbandry.

In this humble effort, the services rendered for data collection by the respective provincial Livestock & Dairy Development Departments are appreciated and duly acknowledged. Without their active assistance and cooperation, the census field operation for data collection would not have been possible.

I would like to highlight the hard work and dedication of the staff and officers of Agricultural Census Organization and also of Data Processing Centres of FBS, Lahore & Islamabad for making this meticulous task a reality in a short time span.

LIAQAT ALI SHAH HAMDANI
Agricultural Census Commissioner

Lahore
December, 2006

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MAIN FINDINGS

Livestock Census 2006 revealed that during the reference period there were 29.56 million cattle, 27.33 million buffaloes, 26.49 million sheep and 53.79 million goats in Pakistan. Besides that there were 0.92 million camels, 0.34 million horses, 0.16 million mules and 4.27 million asses. The province-wise distribution of animals is given as below:-

LIVESTOCK POPULATION AS PER LIVESTOCK CENSUS 2006

| Country / Province | Cattle | Buffaloes | Sheep | Goats | Camels | Horses | Mules | Asses |
|---------------------------|---------------|------------------|--------------|--------------|---------------|---------------|--------------|--------------|
| In Million | | | | | | | | |
| Pakistan | 29.56 | 27.33 | 26.49 | 53.79 | 0.92 | 0.34 | 0.16 | 4.27 |
| Per Cent Distribution | | | | | | | | |
| NWFP | 20 | 7 | 13 | 18 | 7 | 22 | 43 | 13 |
| Punjab | 49 | 65 | 24 | 37 | 22 | 47 | 41 | 52 |
| Sindh | 23 | 27 | 15 | 23 | 30 | 13 | 12 | 24 |
| Balochistan | 8 | 1 | 48 | 22 | 41 | 18 | 4 | 11 |

The table shows that cattle happened to be the dominant animal among large ruminants while goat was dominant among small ruminants in the country. Among the draft / traction animals, the population of asses was reportedly far ahead of other types of animals. The population of livestock varied by province however in the inter-provincial comparison the number of cattle, buffaloes, goats, horses and asses exceeded in the Punjab while of sheep and camels in Balochistan and of mules in the NWFP. A comparison of the Livestock Censuses of 1996 and 2006 is given as under:-

Cattle

The cattle population had increased by 44.7 per cent from 20.4 million in 1996 to 29.6 million in 2006. The break-up with regard to bullocks and cows, 3 years of age and above, and youngstock below 3 years of age is depicted in the table given on next page:-

**COMPARISON OF THE CATTLE POPULATION AS REPORTED
IN 1996 AND 2006 LIVESTOCK CENSUSES**

| Cattle | Livestock Census | | % Variation |
|----------------------------|-------------------------|-------------|--------------------|
| | 1996 | 2006 | |
| Total | 20,424,458 | 29,558,812 | (+) 44.7 |
| Bullocks (3 years & above) | 3,669,885 | 4,146,859 | (+) 13.0 |
| Cows (3 years & above) | 10,020,935 | 15,156,583 | (+) 51.2 |
| In-milk Cows | 6,326,144 | 8,720,361 | (+) 37.8 |
| Youngstock (below 3 years) | 6,733,642 | 10,255,372 | (+) 52.3 |
| Male | 3,568,181 | 5,374,016 | (+) 50.6 |
| Female | 3,165,461 | 4,881,356 | (+) 54.2 |

The population of bullocks, 3 years and above age, had increased by 13.0 per cent from 1996 to 2006 period, whereas the population of cows, 3 years and above age, increased by 51.2 per cent, of in-milk cows by 37.8 per cent and of youngstock by 52.3 per cent.

Buffaloes

According to the Livestock Census 2006, the population of buffaloes stood at 27.3 million at the country level which was 34.8 per cent higher than that of 1996 Livestock Census. Further break-up of the animals have been given in the following table:-

**COMPARISON OF THE BUFFALOES POPULATION AS REPORTED
IN 1996 AND 2006 LIVESTOCK CENSUSES**

| Buffaloes | Livestock Census | | % Variation |
|------------------------------------|-------------------------|-------------|--------------------|
| | 1996 | 2006 | |
| Total | 20,272,873 | 27,334,985 | (+) 34.8 |
| Male Buffaloes (3 years & above) | 360,855 | 609,956 | (+) 69.0 |
| Female Buffaloes (3 years & above) | 12,211,116 | 15,562,548 | (+) 27.4 |
| In-milk Buffaloes | 7,809,518 | 10,222,233 | (+) 30.9 |
| Youngstock (below 3 years) | 7,700,894 | 11,162,485 | (+) 45.0 |
| Male | 3,286,239 | 4,705,721 | (+) 43.2 |
| Female | 4,414,655 | 6,456,764 | (+) 46.3 |

The male buffaloes, 3 years and above age, had reportedly increased by 69.0 per cent, the female buffaloes, 3 years and above age, by 27.4 per cent, in-milk buffaloes by 30.9 per cent and the youngstock by 45.0 per cent during the period from 1996 to 2006.

Sheep

As shown in the table below, the population of sheep according to Livestock Census 2006 stood at 26.5 million in Pakistan which was 12.5 per cent higher as compared to that of Livestock Census 1996.

COMPARISON OF THE SHEEP POPULATION AS REPORTED IN 1996 AND 2006 LIVESTOCK CENSUSES

| Sheep | Livestock Census | | % Variation |
|--------------|-------------------------|-------------|--------------------|
| | 1996 | 2006 | |
| Total | 23,543,973 | 26,487,741 | (+) 12.5 |
| Male Sheep | 3,410,993 | 4,364,563 | (+) 28.0 |
| Female Sheep | 13,290,153 | 13,755,025 | (+) 03.5 |
| Youngstock | 6,842,827 | 8,368,155 | (+) 22.3 |

Similarly, the male sheep in 2006 Livestock Census was higher by 28.0 per cent, female sheep by 3.5 per cent and youngstock by 22.3 per cent in comparison with 1996 Livestock Census.

Goats

Table given below shows, the comparison of goats in Pakistan as ascertained through Livestock Censuses of 2006 and 1996.

COMPARISON OF THE GOATS POPULATION AS REPORTED IN 1996 AND 2006 LIVESTOCK CENSUSES

| Goats | Livestock Census | | % Variation |
|--------------|-------------------------|-------------|--------------------|
| | 1996 | 2006 | |
| Total | 41,169,309 | 53,786,988 | (+) 30.6 |
| Male Goat | 5,217,345 | 6,616,711 | (+) 26.8 |
| Female Goat | 22,357,285 | 31,171,164 | (+) 39.4 |
| Youngstock | 13,594,679 | 15,999,121 | (+) 17.7 |

It is evident from the table that the population of goats had increased by 30.6 per cent during the inter-census period. Whereas the population of male goats observed an increase by 26.8 per cent, female goats by 39.4 per cent and youngstock by 17.7 per cent during this period.

Draft Animals

The Livestock Census 2006 in comparison with that of Livestock Census 1996 is given in the table below:-

**COMPARISON OF THE DRAFT ANIMALS AS REPORTED
IN 1996 AND 2006 LIVESTOCK CENSUSES**

| Draft Animal | Livestock Census | | % Variation |
|--------------|------------------|-----------|-------------|
| | 1996 | 2006 | |
| Camels | 815,290 | 920,868 | (+) 13.0 |
| Horses | 333,944 | 344,253 | (+) 03.1 |
| Mules | 131,848 | 155,698 | (+) 18.1 |
| Asses | 3,559,011 | 4,268,472 | (+) 19.9 |

Table shows that population of camels had gone up by 13.0 per cent from 0.82 million in 1996 to 0.92 million in 2006 while the number of horses had increased by 3.1 per cent from 0.33 million in 1996 to 0.34 million in 2006. Similarly, the mules population increased by 18.1 per cent in 2006 over 1996 from 0.13 million to 0.16 million while the number of asses had increased by 19.9 per cent during the inter-census period from 3.56 million in 1996 to 4.27 million in 2006.

INTRODUCTION

1. Agricultural Census Organization conducted the fourth nationwide Livestock Census (2006) covering Azad Jammu & Kashmir and Northern Areas as well. Three previous censuses were conducted in 1976, 1986 and 1996 respectively. This organization conducts such censuses to fulfill the legal obligations entrusted vide Agricultural Census Act 1958.
2. Previously the need for data pertaining to livestock sector was catered by quinquennial livestock censuses conducted by Provincial Land Revenue Departments. The history goes back to pre-partition years and the practice continued even after independence. After establishment of this organization in 1958 statistics pertaining to livestock sector were part of reports of Agricultural Censuses which were conducted in 1960 and 1972. Afterwards it was felt that because of rapidly changing livestock scenario an exclusive full-fledged Census of Livestock may be conducted between the intervening period of decennially conducted Agricultural Censuses.
3. Over the years, the livestock sector has emerged as a leading sub-sector of the agriculture sector in Pakistan. It contributed over 11 per cent to the GDP during 2005-06 which is more than the aggregated contribution of entire crop sector (10.3 per cent) of the country. Livestock production is one of the major activities as about 30-35 million people of rural areas are engaged in raising livestock and deriving 30-40 per cent of their incomes. Besides its importance and share in the national economy, the history of livestock raising is embedded in the rural life since inception of our civilization. It is still a sign of prestige for the people associated with agriculture sector. It is an integral part of socio-economic activities of the rural areas and plays a very supportive role in mitigating the effects of poverty by providing essential items of daily use.
4. In view of the importance of livestock in the economy as well as in the life of a common man, it is common political target to increase production of milk, meat and poultry to meet rising domestic demand of ever increasing population and produce exportable surplus as well. The efforts and planning for the purpose will precisely create job opportunities, which would have a multiplier effect on the economy. Going forward for a meaningful planning and execution of the livestock development activities, the role

of accurate and upto date statistics need no further emphasis. To meet out this data need, the current decennial census fourth in succession was planned and executed in phases according to the peculiar conditions of the country.

Objectives

- i) To provide current estimates of commercially important livestock and poultry birds by age, sex and breed.
- ii) To develop basic information on composition of livestock herds.
- iii) To ascertain the number of livestock holders reporting animals and poultry birds.
- iv) To provide estimates of animals vaccinated, fallen sick, treated, purchased, sold and died.
- v) To ascertain the number of work animals by type of work.
- vi) To estimate milk production and the number of animals slaughtered.

Geographic Coverage, Type and Scope

5. The geographic coverage was extended to the entire rural and urban areas of NWFP, Punjab (including Capital Territory), Sindh and Balochistan. Similarly, the census provided coverage to the entire State of Azad Jammu & Kashmir and Northern Areas.

6. All the mouzas / dehs scattered all over the country were enumerated on sample basis except Tharparkar district of Sindh and Greater Cholistan area of Punjab where census was conducted on hundred per cent count basis in view of the peculiar situation of the area with respect to livestock.

7. Scope of the census was restricted to the head count of cattle, buffaloes, sheep and goats by age, sex and breed distribution. In addition to this, information regarding number of livestock holders possessing animals as well as poultry birds was also ascertained. The data for camels was collected by age and sex distribution. However for horses, mules, asses, and domestic poultry birds the provision could only be made for age distribution. The commercial poultry (poultry and quail) farms were

enumerated to ascertain data by type of farming. The data on number of animals slaughtered inside the recognized slaughter houses was collected through a specially designed survey. In addition, this census also entailed a milk production survey to determine total production of milk per day from cows, buffaloes and goats.

Reference Period

8. Reference period for the data on number of livestock was the period of its enumeration. The enumeration work was completed in five phases ranging from September, 2005 to July, 2006. The data on some census items were with reference to the previous twelve months from the period of enumeration. Phase-wise details of the enumeration period are as under:-

| Areas Covered | Enumeration Period |
|----------------------|---------------------------|
|----------------------|---------------------------|

Phase - I

Punjab:

Kasur, Okara, Lodhran, Vehari, Sahiwal, Pak Pattan, Khanewal, Bahawalpur, Bahawalnagar, Rahim Yar Khan, Cholistan.

15.09.2005
to
05.11.2005

Sindh:

Badin, Thatta, Tando Allah Yar, Mirpur Khas, Umer Kot, Tharparkar, Sanghar, Khairpur, Nawab Shah, Naushehra Feroze.

Phase - II

Punjab:

Islamabad, Rawalpindi, Attock, Jhelum, Chakwal, Gujranwala, Hafizabad, Gujrat, Mandi Baha-ud-Din, Sialkot, Narowal, Lahore, Sheikhupura, Nankana Sahib, Faisalabad, Toba Tek Singh, Jhang, Sargodha, Khushab, Mianwali, Bhakkar, Multan, Dera Ghazi Khan, DE-EX. Area of Dera Ghazi Khan, Rajanpur, DE-EX. Area of Rajanpur, Layyah, Muzaffargarh.

08.12.2005
to
23.01.2006

Sindh:

Hyderabad, Dadu, Jamshoro, Matiari, Tando M.Khan, Sukkur, Ghotki, Larkana, Shahdad kot, Shikarpur, Jacobabad, Kashmore, Karachi.

Phase - III

N.W.F.P.

Peshawar, Nowshehra, Charsadda, Mardan, Swabi, Kohat, Karak, D.I.Khan, Tank, Bannu, Laki Marwat, F.R.Peshawar, F.R.Kohat, F.R.D.I.Khan, F.R.Bannu, F.R.Tank, F.R.Laki Marwat, Khyber Agency, Mohmand Agency, North Waziristan Agency, South Waziristan Agency.

09.03.2006
to
30.04.2006

Balochistan:

Chagai, Sibi, Kohlu, Musa Khel, Barkhan, Jafarabad, Naseerabad, Bolan, Jhal Magsi, Lasbella, Khuzdar, Awaran, Kharan, Kech(Turbat), Gawadar, Panjgoor.

Phase - IV

N.W.F.P.

Hangu, F.R.Kurrum, Kurrum Agency, Aurakzai Agency.

15.05.2006
to
20.06.2006

Balochistan:

Quetta, Pishin, Killah Abdullah, Ziarat, Loralai, Killah Saifullah, Zhob, Mastung, Kalat

Azad Jammu & Kashmir :

Muzaffarabad, Mirpur, Bhimber, Kotli, Bagh, Poonch, Palandri, Neelum.

Phase - V

N.W.F.P.

Abbottabad, Haripur, Mansehra, Battagaram, Kohistan, Swat, Shanglapar, Bunner, Chitral, Upper Dir, Lower Dir, F.R.Mansehra, Malakand Agency, Bajour Agency.

03.07.2006
to
31.07.2006

Northern Areas:

Gilgit, Ghizer, Diamir, Skardu, Ghanche.

Note:- Dera Bugti district of Balochistan province could not be covered despite repeated efforts due to law and order situation. However, the data available in Livestock Census 1996 was projected to arrive at the corresponding data for 2006 on the basis of average increase observed in the districts of Sibi and Kohlu.

Sampling Plan

9. 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 unsettled 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 principle 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 Centres of each district / agency / F.R.

14. The total number of mouzas / villages and urban blocks, selected number of mouzas / villages and urban block, and their sampling fractions with respect to each province and at country level are given at the next page:-

FIRST STAGE SAMPLE SIZE

| Country / Province | Rural Areas | | | Urban Areas | | | Sampling Fraction for Rural & Urban Areas (%) |
|--------------------|-------------------------|----------------------------|-----------------------|--------------------|-----------------------|-----------------------|---|
| | Total Mouzas / Villages | Selected Mouzas / Villages | Sampling Fraction (%) | Total Urban Blocks | Selected Urban Blocks | Sampling Fraction (%) | |
| Pakistan | 55,626 | 8,661 | 16 | 26,427 | 1,586 | 6 | 13 |
| NWFP | 14,855 | 1,936 | 13 | 1,913 | 270 | 14 | 13 |
| Punjab | 27,049 | 4,326 | 16 | 14,878 | 882 | 6 | 12 |
| Sindh | 6,005 | 1,111 | 19 | 9,023 | 330 | 4 | 10 |
| Balochistan | 7,717 | 1,288 | 17 | 613 | 104 | 17 | 17 |

(ii) Selection of Households

15. From the selected mouzas / dehs / blocks of rural settled and small / medium urban areas, all the listed Mouza Certainty Holdings (MCHs) were enumerated on 100 per cent basis and from the remaining households a systematic sample was selected for enumeration. The rate of household selection from each mouza / deh depended on the number of total households therein, where as in the case of blocks of small / medium urban areas, a uniform selection rate was adopted (every 5th household) due to the fact that Federal Bureau of Statistics maintains strictness of parameters for determining the size of each urban block. In order to select sample of households the rows of blank listing sheets (Form-1) were pre-marked manually according to a pre-determined selection rate to facilitate selection and enumeration simultaneously.

16. In the case of unsettled rural areas and big urban areas, all the households of the selected villages / basties / killies / blocks were enumerated on 100 per cent basis. Nomadic households happened to be in the selected mouzas / villages / blocks during census enumeration were also enumerated on complete count basis. Similarly, in Tharparkar district of Sindh and Greater Cholistan area of Punjab complete enumeration was resorted at due to their peculiar situation with regard to livestock.

17. The total number of households listed during the census, number of households actually enumerated and their sampling fraction for both, rural and urban areas, with respect to each province and at country level are given as below:-

SECOND STAGE SAMPLE SIZE

| Country / Province | Total Listed Households | Selected Households | Sampling Fraction (%) |
|---------------------------|--------------------------------|----------------------------|------------------------------|
| Pakistan | 3,853,086 | 1,003,015 | 26 |
| NWFP | 676,366 | 148,994 | 22 |
| Punjab | 2224,267 | 487,989 | 22 |
| Sindh | 728,887 | 309,890 | 43 |
| Balochistan | 223,566 | 56,242 | 25 |

Main Census Questionnaire

18. The main census questionnaire (Form-2) comprised of 8 parts, 95 questions and 538 census items. The questionnaire was arranged candidly such that the information could be collected by advancing in logical sequence of questions. A brief description of all the eight parts of the questionnaire is as follow:

- Part-I: It was designed to collect information about cattle and buffaloes by sex, breed and age distribution. This part contained thirty questions. It also provided details for reporting twelve breeds of cattle and four breeds of buffaloes.
- Part-2: This part was meant for collection of data about Artificial Insemination of cows and buffaloes in the census year. It contained three questions.
- Part-3: This part consisted of thirteen questions about sheep and goats. It provided information about eighteen breeds of sheep and thirteen breeds of goats by age and sex.
- Part-4: It was developed to collect information about horses, mules and asses by age while camels by sex and age distribution. It contained sixteen questions.
- Part-5: This part was anticipated to collect information about work animals into three categories based on their predominant use for cultivation, other agricultural work and non-agricultural work during the census year. It contained eight questions.
- Part-6: Sixth part uncovered information about domestic poultry. It had six questions about poultry birds.

Part-7: This part was planned to collect information about the provision of veterinary cover and factors of change in the inventory of livestock population during the last twelve months and had fourteen questions.

Part-8: It was meant for ascertaining Yak population by sex and age. It had five questions.

19. This questionnaire was finalized in consultation with the Advisory Committee of Livestock Census 2006 and applied to all parts of the country. To avoid confusion in understanding questions, each question was explained carefully in a specially prepared instruction manual for guidance of the enumerators. The questionnaire was pre-coded and formatted in consultation with the Data Processing Centre of FBS, Lahore to suit the data processing requirements.

20. It was apprehended that the Urdu version of this questionnaire would pose difficulties in comprehension to the enumerators and respondents of Sindh province and thus may lead to problems in data collection. Therefore, Sindhi version of this questionnaire was developed and used in Sindh province.

Field Organization and Training

21. The Executive District Officer (Agriculture / Livestock) or District Officer (Livestock) or Assistant Director (Livestock) of each district / agency / F.R. be followed in the entire text was contacted to get cooperation for carrying out census work and designated as the District Census Officer for making census arrangements, carry out supervision and ensure completion of enumeration work in the district. Mainly, the staff of the provincial Livestock and Dairy Development Departments was engaged to carry out enumeration work. However, wherever there was shortage, the staff of Agriculture Extension and Education Departments was used for census work. In big urban areas, the staff of Federal Bureau of Statistics was engaged under the immediate supervision of their officers. The number of officers / officials of the above mentioned provincial departments and of Federal Bureau of Statistics engaged for the census field operation of each province are given at next page:-

STAFF ENGAGED IN CENSUS FIELD OPERATION

| Country / Province | District Census Officers | Supervisory Officers | Enumeration Staff |
|---------------------------|---------------------------------|-----------------------------|--------------------------|
| Pakistan | 125 | 1236 | 6312 |
| NWFP | 38 | 196 | 1139 |
| Punjab | 37 | 654 | 3142 |
| Sindh | 23 | 273 | 1288 |
| Balochistan | 27 | 113 | 743 |

22. To begin with, meetings were arranged at the district headquarters with the officers of all concerned departments. Senior officers of Agricultural Census Organization attended these meetings and briefed the participants of meetings about the enumeration procedure in the field and all other census related matters. Subsequently, the enumerators and their supervisors of each district were provided intensive classroom and field training related to census work by the Census Master Trainers (CMTs) of Agricultural Census Organization. Such that the enumerators became fully conversant with every question of the census questionnaires. Classroom training lasted for two days lectures and the field training for one day doing census related work in any nearby mouza / village / block, followed by revision and review of the entire training. Subsequently, the enumerators were provided kit bags containing blank census documents and related census material of their assigned mouzas / villages / blocks and advised to start census work. Simultaneously, they were directed to assemble at mutually agreed dates and places for review meetings alongwith their filled-in forms after a few days for quality checking of the census work done by them and to provide further guidance to improve upon the enumeration.

Enumeration Procedure

23. On reaching the assigned mouza / village / block, the enumerators were directed to prepare a sketch map of the mouza / village / block and to number the residential structures, enlist the households and enumerate only the selected households. The enumerators marked a systematically advancing number on the main door or prominent place of each and every structure. The number of households

residing therein was mentioned as denominator of the structure number. The enumerator, after consulting any available member of the household residing in the structure, entered name of the head of household in Form-1 (listing sheet) against that structure and household number. As the pre-selected serial number was marked on the blank Form-1 (listing sheet), the households systematically happening to be listed on the pre-selected serial numbers were interviewed and a Form-2 (main census questionnaire) was filled for all such households. The enumerators were advised, time and again, to ensure systematic numbering of structures and listing of households to avoid meditated occurrence of households on the pre-selected serial numbers and also to move systematically leaving no structure un-numbered and sparing no household un-listed.

24. The enumerators were specially advised to enumerate the nomadic households as MCHs at the spot wherever they come across through out the selected mouza / village / block during census work. Through out the enumeration, the Census Master Trainers (CMTs) of Agricultural Census Organization remained in each of the district for guidance, supervision and monitoring. To further fortify the supervision of census work, the officers of Agricultural Census Organization continuously visited the area during census enumeration.

25. The enumerators were required to fill-in and mail a pre-addressed and pre-paid progress card (Form-4) on weekly basis to the headquarter of Agricultural Census Organization, Lahore indicating the progress of work and problems, if any. Similarly, the Census Master Trainers (CMTs) were required to fill-in and post Form-4/A on weekly basis to headquarter of Agricultural Census Organization, Lahore indicating the progress of census work being carried out under their assigned jurisdiction and problems, if any, faced by them. At the headquarter of Agricultural Census Organization, a control room was established to carefully examine each of the progress card (Form-4) and Form-4/A received from the field under supervision of a senior officer and to immediately respond and meet out the exigencies, then and there. In addition to the above mentioned system of monitoring / supervision, telephonic contact with the District Census Officers / Veterinary Officers as well as Census Master Trainers (CMTs)

was maintained through out the census field operation to ascertain information relating to monitoring and supervision for quick and timely attending of problems.

26. The enumerators after completion of their work, handed over census documents to their immediate supervisors who checked them at the spot about completeness of work and quality of the filled questionnaires. Thereafter, these documents were dispatched to ACO office, Lahore.

Data Processing

27. The data processing was carried out jointly by Agricultural Census Organization and Data Processing Centre of Federal Bureau of Statistics, Lahore. The document control, coding and manual editing was done by Agricultural Census Organization while data entry by Data Processing Centre, Lahore as well as Islamabad. However, the entire computer edit corrections work was carried out by the DPC, Lahore in see-saw fashion with ACO. The data processing steps are briefly mentioned here under:

28. The census documents received from the field were carefully checked in the Control Section to ensure that the documents for all the units selected for enumeration had been received. A control register was prepared showing the number of households expected to be enumerated in each selected unit with the help of listing sheet received with the documents. The number of filled-in questionnaires received was checked with the control register. All cases of over and under receipts were thoroughly investigated and reconciled. The Control Section also kept a meticulous record of the movement of all census documents through various stages of processing.

29. The census questionnaire was fully pre-coded. However, it was necessary to code for the administrative unit and check the mouza serial number given by the enumerators on the questionnaires in the field. This was done in Coding Section.

30. In order to ensure that data on various items reported by a household are apparently coherent, their inter-matching was made in the light of already known relationships. In addition, the various totals and sub-totals made in the field needed to

be checked. For the purpose, a set of editing instructions was developed and manual editing was accordingly carried out during which, inter alia, the illegible entries were also made legible to facilitate data entry work. In order to ensure that the data were correctly entered in computer and editing checks fully and accurately applied during manual editing, the same editing instructions were repeated on computer and corrections carried out during each and every computer edit till data of every district became error free.

Estimation of Census Results

31. For estimation of the sample observations to population level in a district, pre-determined raising factors applicable to the information collected from households were calculated according to the sampling plan already discussed. These raising factors were applied through computer programmes to arrive at the population level estimates at district level. However, the provincial and national estimates were arrived at by simple addition of respective estimates of the district level.

Census Tabulation

32. Soon after finalization of census tabulation plan in consultation with the Sub-Committee specially constituted for the purpose by the Advisory Committee, a system for processing the data on computer was developed. On receipt of the census data, the computer programmes were tested on specially prepared test deck to ensure that they were trouble-free. As soon as the error free data for the district(s) were ready on computer, the tabulations for that district(s) were obtained by employing the tabulation specifications and raising factors already developed through the specially designed software. In this way, all twenty-six tables presenting the census data at district, province and national levels were prepared.

Quality of Data

33. In order to further safeguard the data against errors, the census tabulations were cross checked, inter as well as intra, for quality. The tabulations were also compared with the corresponding historical data of the same series and also with that of the other organizations, if available. This examination led to the investigation of

errors which could not be detected or corrected during editing or errors which might have crept in during coding, data entry, validation and tabulation. All such errors and inconsistencies in all the tables were detected and probed backward for diagnosing and correcting the discrepancies wherever required.

Post Enumeration Survey

34. A post enumeration survey (PES) was also conducted through out the country. The post enumeration survey is an important tool in overall methodology to measure the extent of response variation existing in the census results, these variations happen to occur due to non-sampling errors in every census on account of various limitations.

35. A three-stage sample plan was adopted for this survey. Sample size however was the modest due to shortage of time. In the first stage, out of ninety five settled districts of Pakistan forty districts were randomly selected with proportional allocation from settled districts of all the provinces. Fifteen districts from the Punjab, nine from Sindh and eight each from NWFP and Balochistan were selected.

36. In the second stage, five per cent mouzas were randomly selected from already selected settled mouzas for census with proportional allocation from the forty selected districts of all the provinces. In all, 206 mouzas were selected for PES out of 3768 mouzas.

37. In the third stage, ten households from the already enumerated households were selected from each selected mouza using stratified random sampling. The households enumerated during the census were stratified as follows:

- Stratum I Households having neither cows and / or buffaloes nor sheep and / or goats.
- Stratum II Households having upto 9 cows and / or buffaloes or upto 49 sheep and / or goats.
- Stratum III Households having 10 to 29 cows and / or buffaloes or 50 to 99 sheep and / or goats.
- Stratum IV Households having 30 and above cows and / or buffaloes or 100 and above sheep and / or goats.

38. It was ensured that a maximum of two households from the first stratum and a minimum of two households from the fourth stratum were taken subject to their availability. As such ten households for re-enumeration were selected from each of the selected mouzas for PES. The work for selected mouzas of one district was allotted to one enumerator. CMTs of this organization worked as enumerators in PES. The completed PES documents were collected in the office and comparison was made between re-enumerated (PES) data and information collected during the census.

39. The difference in the census and PES could partly be due to changes taking place during the census and PES interviewing periods. To overcome this issue, the PES questionnaire was designed such that the changes taken place due to time laps and those on account of errors during census may be accounted for separately for all enumerated households.

40. The province-wise results in percentage for number of different animals over (+) or under (-) enumerated are given below:

OVER / UNDER ENUMERATION BY TYPE OF ANIMAL AND BY PROVINCE

| Type of Animal | Pakistan | N.W.F.P. | Punjab | Sindh | Balochistan |
|----------------|----------|----------|----------|----------|-------------|
| Cattle | (+) 3.54 | (+) 2.85 | (+) 2.35 | (+) 3.39 | (+) 05.01 |
| Buffaloes | (+) 3.52 | (+) 5.54 | (+) 1.76 | (+) 4.35 | (+) 15.95 |
| Sheep | (+) 3.56 | (+) 4.30 | (+) 1.09 | (+) 3.63 | (+) 03.82 |
| Goats | (+) 4.12 | (+) 2.08 | (+) 1.02 | (-) 1.51 | (+) 05.89 |

Publication of Census Data

41. The census data have been tabulated at district, province and country levels and are being published in the following reports:

| | | |
|-------|---|---|
| Vol.1 | Pakistan Report | Containing tabulations at country and province levels. |
| Vol.2 | Provincial Reports (one report for each province and separate reports for Azad Jammu & Kashmir and Northern Areas) | Containing tabulations at province / AJ&K / Northern Areas and district levels. |
| Vol.3 | Special Report | Containing data on milk production, commercial poultry and number of animals slaughtered for meat at country, province and district levels. |

Remarks to Quality of Data

42. Like every large scale data collection exercise, this census also has some inevitable limitations. The users of the data should therefore, keep in mind these remarks and draw inferences accordingly. The limitations are given as under:

- i) This census was based on sample enumeration therefore its results are subjected to sampling errors. In addition, prevalence of non-sampling errors may not be ruled out although maximum efforts were made right from the beginning to the end to keep vigilance and take corrective measures.
- ii) The data were collected through the provincial livestock departments who are responsible for livestock development and other livestock related activities therefore, the chances of enumerators bias might had prevailed. Similarly, as the respondents provided information based on their memory, the data might have been subjected to memory bias particularly for the large livestock holdings. Therefore, these data may not be used to prepare animals inventory sheets at district, province and country levels like the recorded data.
- iii) It was observed that the enumerators found it difficult to demarcate, precisely, the selected mouzas and villages on the ground. This is likely to lead to the exclusion of minor populated parts of the mouzas / villages. Similarly, the possibilities of escapage from enumeration of distant

households from the main inhabited chunk may not be ruled out in case of scattered inhabitation.

- iv) Mouzas / villages / blocks being the sampling units, the entire livestock found on the territory of selected mouzas / villages / blocks during the enumeration period, was required to be enumerated. But, livestock not associated with any household of the selected mouza / village / block and / or located away from the residential area might not had been fully counted in the census.
- v) Since the enumeration was based on the de facto status, the livestock was to be counted wherever located, irrespective of the place of residence of its owner. As such livestock belonging to one administrative unit could have been reported in another unit.
- vi) Livestock in transit through trucks or moving on foot through un-usual routes, or found in livestock markets during enumeration period might had escaped enumeration.
- vii) In some areas of NWFP and Balochistan bordering with Afghanistan, the law and order conditions were not normal during enumeration. Therefore, the quality of enumeration is feared to have been affected adversely.

DEFINITIONS AND EXPLANATIONS

1. CENSUS means the Livestock Census 2006.
2. MOUZA / DEH is a demarcated territorial unit for which separate revenue record including a cadastral map is maintained by the Revenue Department.
3. VILLAGE / BASTI / KILLI means as chunk of houses known by a certain name.
4. SAMPLE MOUZA / DEH / VILLAGE / KILLI is a unit selected by means of the sampling method for census enumeration. In settled areas, the term mouza / deh has been used for the sampling unit, whereas for un-settled areas, the term village / basti / killi has been used. In case of, both, settled and unsettled areas, the term mouza / village has been used.
5. BLOCK means a chunk of residential / commercial locality of an urban area / city demarcated in terms of roads, streets, etc. having about 300 households. All urban areas of the country have been sub-divided into blocks by Federal Bureau of Statistics. Their maps and descriptions are maintained and useful enough for on the ground identification. In case of collective use for settled / unsettled areas and blocks, the term mouza / village / block has been used in write up of this report.
6. HOUSE means any structure which is made up of any material but in use for human habitation.
7. HOUSEHOLD means a person or a group of persons living together and eating from the same kitchen whether or not related to each other.
8. CATTLE are the collective name given to bovine animals and include bullocks, cows and their youngstock.
9. BUFFALOES have been used as the collective name for male buffaloes, female buffaloes and their youngstock.
10. BULL FOR BREEDING means the bullocks / male buffaloes kept primarily for breeding.
11. BULLOCKS / MALE BUFFALOES FOR WORK means those bullocks / male buffaloes which are of three years and above age, and primarily kept for work on the field and / or transport purposes.

12. MILCH ANIMAL means the in-milk and dry cows / buffaloes kept mainly for milk.
13. COWS / BUFFALOES / GOATS IN-MILK stand for those cows / buffaloes / goats which are in-milk on the day of census enumeration.
14. DRY COWS / BUFFALOES / GOATS stand for those cows / buffaloes / goats which were reported dry after having been in-milk on the day of census enumeration.
15. YOUNGSTOCK includes males / females below three years in case of cattle / buffaloes / camels / horses / mules / asses and below one year in case of sheep / goats.
16. HORSES have been used as collective name of horses and mares.
17. ASSES have been used as collective name of male asses and female asses.
18. POULTRY includes hens, cocks, chicks, ducks, drakes and ducklings.
19. ANIMAL VACCINATED refers to the animal which has been provided any preventive treatment against any of the disease(s) / worm(s) at least once during the period under reference either from Vet.Hospital / Vet.Centre and /or privately.
20. ANIMAL FALLEN SICK means that animal which has suffered from any disease / illness at least once during the period under reference.
21. ANIMAL TREATED stands for the animal which has been treated during the period under reference at least once against one or more disease(s) / illness(es) from any of the Vet. Hospital / Vet. Centre and or any qualified Vet. Doctor / Vet. Assistant officially and / or privately regardless of the fate of animal.
22. ANIMAL PURCHASED stands for the animal which has been bought during the period under reference. The animal(s) gifted in and taken for rearing on share or contract basis are also included.
23. ANIMAL SOLD means that animal which has been sold during the period under reference. The animal(s) gifted out, given for rearing on share basis and stolen are also included.
24. ANIMAL DIED refer to the animal which expired during the period under reference due to any disease / illness and or accident. The animal slaughtered on account of severe disease / illness / accident has also been treated as died.

NOTES ON TABLES

- 1) In certain cases the figures may not add up to their totals and percentages to hundred due to rounding effect.
- 2) The term "Household Reporting" has been used in some tables to indicate the estimated number of households which reported some value of the item under consideration meaning thereby that for the remaining households the value of the item concerned was nil.
- 3) The data on number of bulls / male buffaloes for breeding and for work may have been affected due to dual use and thus the dual counting. Therefore, the respective data given in the Report be used with caution.
- 4) The data on animals treated may exceed in some cases than that for animals fallen sick due to the response error caused on account of considering the practice of de-worming of animals, etc. as the animals treated.
- 5) Tab.9, col.8 & col.10 do not match with the youngstock born indicated in Tab.23, col.7 & col.9, respectively due to reporting error. Similarly, Tab.10, Col.8 & 10 do not match with the youngstock born indicated in Tab.24, col.7 & col.9, respectively.
- 6) The data on youngstock born of sheep and goats given in Tab.25, col.5 and col.9 do not match with similar data indicated in Tab.12, col.7 and, Tab.13, Col.7, respectively due to reporting error.
- 7) "YAK" is found at high altitude in mountainous areas therefore, Tab.26 (presenting data on YAK) is given only in the reports on Pakistan, NWFP and Northern Areas.
- 8) The data for Dera Bugti district of Balochistan province for Livestock Census 1996 have been projected to arrive at the corresponding data for Livestock Census 2006 in each table on the basis of average increase observed from 1996 to 2006 in the districts of Sibi and Kohlu.
- 9) In Table-15, Cholistani breed has been indicated separately for Pakistan and Punjab. It represents data ascertained under Others Column for Cholistan.

