Technical Report

NATIONAL SAMPLE CENSUS OF AGRICULTURE

NEPAL, 1991/92

RELIABILITY OF DATA

HIS MAJESTY'S GOVERNMENT
NATIONAL PLANNING COMMISSION SECRETARIAT
CENTRAL BUREAU OF STATISTICS

KATHMANDU, NEPAL
FEBRUARY, 1994

Ambika Bagal

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PREFACE

This report provides detailed technical documentation on the National Sample Census of Agriculture, 1991/92 and an evaluation of the reliability of the census data. The report has two main objectives: to provide users with an understanding of the reliability of the census data to assist in the interpretation and analysis of the census results; and to assist in the design of future agricultural censuses and surveys.

Part 1 provides an outline of the statistical methodology used in conducting the census. Detailed sampling specifications are given in Appendices 1 and 2 - Appendix 1 contains sampling details for each district, while Appendix 2 provides full sample design and estimation specifications.

Part 2 discusses the sampling errors on the census estimates. A brief overview of sampling errors and their measurement and interpretation are provided, together with an overall assessment of the reliability of the census data from a sampling error point of view. Some observations on the efficiency of the sample design based on an evaluation of the sampling errors are also provided. Tables showing sampling errors for a selection of census estimates are provided in Appendix 3. Sampling errors are given for each development region, ecological belt and district, as well as at the national level. Tables are also provided showing a number of sample design parameters, which will be useful in the design of future agricultural surveys and censuses (Appendix 4).

Part 3 provides a general assessment of the overall quality of the census data. Some comparisons are made between the Agricultural Census data and data from the 1991 Population Census, the previous Agricultural Census, and other sources. Tables summarizing these comparisons are shown in Appendices 5, 6 and 7. Some general observations on the analysis of a small post enumeration survey are also provided.

The National Sample Census of Agriculture, 1991/92 was the fourth decennial census of agriculture in Nepal. Previous censuses were undertaken in 1961/62, 1971/72 and 1981/82. The census enumeration work was conducted between January and June 1992. Data were collected in respect of the twelve month reference period January to December 1991.

Detailed results of the census are contained in a series of 85 reports which have been published by the Central Bureau of Statistics. In addition to the national level report, reports have also been issued for each ecological belt, development region and district. A publication showing the highlights of the census with some commentary and graphical presentations has also been released.

CBS was assisted in its work on the 1991/92 Agricultural Census by the UNDP/FAO project National Sample Census of Agriculture, 1991/92 - Project NEP/88/024. I am thankful to FAO for its help in carrying out the project and to Mr. J. A. Colwell, Data Analysis Adviser, who assisted in the preparation of this report. I would also like to express my appreciation for the financial and technical assistance provided by UNDP.

K.R. Sharma
Director General a.i.
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PART 1

OUTLINE OF CENSUS METHODOLOGY

Scope and coverage

The Agricultural Census covered the whole of Nepal, including urban areas. Only agricultural holdings operated by households were included. Agricultural activities undertaken by government organizations, businesses, etc. were excluded.

Statistical unit

The main statistical unit in the Agricultural Census was the agricultural holding. An agricultural holding was defined as an economic unit of agricultural production under a single management comprising all livestock and poultry kept, and all land used wholly or partly for agricultural production purposes.

A holding was considered to be an agricultural unit satisfying any one of the following conditions:

- having area under crops greater than or equal to a quarter of a ropani (or four annas) or one matomuri in Hill or Mountain districts (0.01272 hectares), or greater than or equal to eight dhur (0.01355 hectares) in the Terai; or
- keeping two or more head of cattle or buffaloes; or
- keeping five or more head of sheep or goats; or
- keeping 20 or more poultry; or
- keeping any combination of livestock considered equivalent to two head of cattle or buffaloes (e.g. 1 cattle and 4 sheep).

The agricultural holding was usually the same as the household (a group of persons living and eating together). In rare cases, one household may comprise more than one holding or, alternatively, one holding may be operated jointly by more than one household.

The census methodology used involved identifying agricultural holdings on the basis of the place of residence of the person operating the holding; i.e. the holder. The land operated by an agricultural holding comprised all land under the control of the holding, regardless of location, and may therefore include land in different wards or districts.

Basic sampling methodology

The basic sampling methodology used was two stage sampling as follows:

- first stage: selection of a stratified sample of enumeration areas (EAs) with probability proportional to expected number of holdings (stratified PPS sampling);
- second stage: within selected EAs, the selection of a sample of agricultural holdings using stratified systematic random sampling.

The sample design was such that all holdings in a given district had the same chance of selection in the sample.

Creation of EA sampling frame

A number of questions on agriculture and livestock were included in the 1991 Population Census to enable households operating as agricultural holdings to be identified. A list of all agricultural holdings with their area of holding was then compiled. The holding lists were then aggregated to form a list of wards, containing information for each ward on the

number of agricultural holdings in the ward and the total area of all agricultural holdings in the ward.

Enumeration areas for use as the first stage selection unit were defined as wards or, in cases where wards contained less than 30 holdings, combinations of wards. A list of enumeration areas was formed containing information on holding numbers and area of holding, as for the ward list. The information on holding numbers was used as the measure of size for the PPS sample selection of EAs for inclusion in the census.

Sample size and allocation

The primary objective of the census was for census data to be published by district, and this needed to be reflected in the sample design. One approach considered was for each district to have the same sample size, as was done for the 1981/82 Sample Census of Agriculture. However, not all districts have the same importance from an agricultural production point of view and it was considered better to have larger samples in the more important districts.

To measure the importance of each district, the total area under eight major crops was determined; i.e. paddy, wheat, maize, millet, barley, sugarcane, oilseed and potato. Districts were stratified into four groups according to this criterion. Group 1 represented the 10 least important districts, Groups 2 and 3 the next most important 15 and 25 districts respectively, and Group 4 comprised the 25 most important agricultural districts.

The number of EAs per district selected in each group was as follows:

- Group I : 50 EAs per district (total 500 EAs).
- Group II : 60 EAs per district (total 900 EAs).
- Group III: 70 EAs per district (total 1,750 EAs).
- Group IV : 80 EAs per district (total 2,000 EAs).

Manang District was completely enumerated because it had only a small number of holdings.

The target number of holdings sampled from each selected EA was set at 25. The actual number sampled varied between 20 and 30 and was determined in such a way as to ensure equal probability of selection for all holdings in a district (see Appendix 2 for details).

Sampling details for each district are given in Appendix 1. Altogether, 5,100 EAs were selected. The final sample of holdings for the country as a whole was 122,270 (or 4.47 percent of all holdings).

The number of sample holdings and the percentage of holdings sampled in each development region and ecological belt was as follows:

Development regions

Eastern	- 27,033	(4.25%)
Central	- 32,703	(3.82%)
Western	- 26,284	(4.32%)
Mid-western	- 22,914	(6.17%)
Far Western	- 13,336	(5.05%)

Ecological belts

Mountain	- 20,938	(8.03%)
Hill	- 62,917	(4.63%)
Terai	- 38,415	(3.44%)

Sample selection procedure

Within each district, EAs were ordered according to total area of holdings (from the biggest to the smallest). The sample of EAs was selected systematically using the PPS sampling methodology. A computer program was prepared to do the sample selection - for each district, the required number of EAs to be selected and an appropriate random start were entered, and the sample of EAs was selected and printed. Details of the EA sample

selection procedure are given in Appendix 2.

To select the sample of holdings in each selected EA, enumerators visited each selected EA to compile a complete list of all holdings in the EA. Holdings were then divided into the following strata:

- holdings operating less than 5 bigha / 10 ropani of land;
- holdings operating 5 bigha / 10 ropani or more of land but less than 10 bigha / 20 ropani of land;
- holdings operating 10 bigha / 20 ropani or more of land;
- holdings having no land but keeping livestock.

Holdings in the EA were numbered sequentially throughout the first stratum and then continuing on throughout the other three strata. The number of holdings to be sampled in the EA was determined in accordance with the procedures laid down in Appendix 2. The sample of holdings was then selected using systematic sampling. A sampling interval was calculated by dividing the number of holdings listed by the sample size to be taken. A random start was then taken (a random number between 1 and the sampling interval). The sample of holdings was then selected by applying the random start and sampling interval throughout the list of holdings beginning with the first stratum and continuing throughout the remaining three strata.

Census content

Census concepts, questionnaires and procedures were developed in accordance with FAO guidelines as set out in the document FAO Statistical Development Series No. 2 - Programme for the 1990 World Census of Agriculture (FAO 1986) and its companion volume FAO Statistical Development Series No. 2d - Supplement for Asia and the Pacific, Programme for the 1990 World Census of Agriculture (FAO, 1990). The guidelines provide detailed recommendations to countries on topics to be covered, statistical concepts and definitions, classifications and output.

The main aim of the Agricultural Census was to provide basic data on the structure of agricultural operations. FAO recommends the collection of data under ten main headings. An outline of the content of the 1991/92 Sample Census of Nepal under those headings is given below.

- Identification. Holding and holder identification.
- Holder characteristics. Age and sex of holder; other work done by holder; holder's main occupation; use of hired manager; whether received agricultural loan and the source.
- Demographic and other characteristics. Age and sex of household members.
- Employment. For household members: whether economically active; employment and unemployment; reasons not look for job; whether work done on holding; duration of work on holding. For agricultural labour: permanent workers by sex; whether employed occasional workers.
- Land and water. For each parcel: area; wet and dry land; whether irrigated; source of irrigation; land tenure (owned, rented, etc.); land use (arable land, permanent crops, etc.). For holding as a whole: number of parcels; area; whether rented out land; whether holding irrigated during the year; whether any drainage facilities.
- Crops. Temporary crops: type of crop and area harvested on each parcel. Permanent crops: type of crop for each parcel; compact area and number of productive and non-productive trees; number of scattered trees. Use of agricultural inputs for major crops:

fertilizers (organic/inorganic, area and quantity of inorganic fertilizer used), pesticides, irrigation and high yield seeds; crop stand for each parcel (i.e. whether mixed crop).

- Livestock. Animal numbers by type according to age and sex; poultry numbers (chickens classified by sex).

- Machinery and equipment. Use of items of machinery and equipment; number of items; source (owned by holder, government, etc.).

- Buildings and other structures. Whether non-residential buildings used for agricultural purposes; tenure and type of those buildings.

- Ancillary activities on the holding. Existence of forest trees and fisheries on the holding; number of forest trees; type and area of fishing installation.

Definitions of data items used in the collection of census data and presentation of results are given in the Technical Notes in the main census reports.

The primary reference period for the data collected in the census was the calendar year 1991. Land area and livestock were collected in respect of the day of enumeration.

Census enumeration

A pilot test of census questionnaires and procedures was undertaken in 1991. Census questionnaires were finalized following evaluation of that test. Instruction manuals were prepared for all field staff involved in the census enumeration.

Census field operations in each district were under the control of a District Census Officer, appointed for the duration of the census enumeration. Between two and three supervisors were appointed in each district to supervise the census enumerators, each supervisor controlling the work of four to five enumerators. A total of 1,100 enumerators were recruited from different government offices to undertake the data collection for the census.

Training of supervisors and enumerators was undertaken in each district by CBS officers during the period August 1991 to December 1991. Census enumeration was carried out over the period January to June 1992.

The lists of EA sample selections in each district, together with blank questionnaires, instruction documents and other census field materials, were sent to each District Census Office. There were two phases of census enumeration - listing and data collection.

Census enumerators first visited each selected EA to list all agricultural holdings in the EA. A listing book was supplied for this purpose. Information on area of holding, number of livestock and number of poultry for each holding were also recorded.

The listing book was used to do the sample selection of holdings. Sample selection was done by the supervisors. In cases where the EA was a long way from the District Census Office, listing and data collection were both done in the one visit. The supervisor accompanied the enumerator to the field for listing, sample selection was done immediately after listing, and data collection followed shortly after. For EAs which were close to the District Census Office, the enumerator returned to the District Census Office after listing. Sample selection was done in the District Census Office, and the enumerator then returned to the EA for the data collection.

Enumerators interviewed each selected holding to collect the census data. A questionnaire was completed for each selected holding. Questionnaires were returned by enumerators to District Census Offices where they were checked prior to being returned to CBS in Kathmandu for processing.

Processing of census data

The processing of the census was undertaken on micro-computers and involved computer systems for data entry, editing and tabulation. The computer systems were developed using CLIPPER 5.01.

On receipt of the questionnaires from the field, CBS staff first inspected them to ensure that no questionnaires were missing, that all required questions were answered and that responses were clearly marked. No office coding was necessary as all coding was done during enumeration.

Data entry was done by private contractors, using programs developed by the CBS. Random checks were made to ensure the quality of data entry work.

A computer system was developed to perform a series of consistency, plausibility, range and other checks on the data. More than 100 edit checks were applied. The editing was done by CBS staff. The edit program provided for interactive editing; the program applied each edit check to a questionnaire and immediately identified on the screen data failing the edit checks. Edit failures were examined and corrections were immediately entered into the computer as required.

Once data for a district had been edited and amended, the data were aggregated and weighted to produce district level tables. District tables were aggregated to produce tables for each development region and ecological belt, and finally at the national level. A set of tables was also produced showing district comparisons.

The tables were closely scrutinized and checked for their consistency with other sources. Some consistency checks were also included as part of the tabulation programs. Any problems identified were traced back to the source questionnaires, amendments were made as necessary, and final tables were produced.

Census reports

The main census results were given in a series of 85 reports, which have been issued by the CBS as follows:

- one national level report;
- reports for each of the five development regions;
- reports for each of the three ecological belts;
- reports for each of the 75 districts; and
- a report presenting a summary of district level data.

Each of the reports contain the same set of 22 tables. The tables provide data on each of the topics covered in the census, each table being classified by size of holding. Tables in the district summary report are presented in the same format with data classified by district rather than size of holding. The reports, including tables and technical notes were produced by computer in camera ready form ready for printing.

A publication showing highlights of the census has also been issued. The publication shows some summary tables together with some commentary and graphical presentations.

Availability of other census data

In addition to the census reports, census data are also available in a number of other formats.

Diskettes have been prepared containing summary data and a computer program which enables users to produce some limited tables of their own specification. Data files have also been restructured to enable additional tables to be produced or statistical analysis techniques to be applied using SPSS or other statistical analysis packages.

PART 2

SAMPLING ERRORS

Sampling error concepts

Because the Agricultural Census was conducted as a sample census, all estimates produced are subject to sampling errors. (The only exception is Manang District which was completely enumerated.) The sampling error on a sample estimate measures the expected difference between the sample estimate obtained and the estimate that would have been obtained if a full census had been taken.

Two commonly used measures of sampling error are the standard error and the relative standard error. The methods used to calculate these sampling error measures are given in Appendix 2.

The interpretation of standard errors is illustrated in the following example. The total area of land holdings in Eastern Development Region was estimated as 783,200 hectares. The standard error on this estimate has been estimated as 14,710 hectares. The following statements can be made:

- We can be about 67 percent sure that the actual (unknown) total area of holdings was in the range 783,200 ± 14,710 hectares; i.e. between 768,490 and 797,910 hectares.

- We can be about 95 percent sure that the actual (unknown) total area of holdings was in the range 783,200 ± 2 x 14,710 hectares; i.e. between 753,780 and 812,620 hectares.

The relative standard error expresses the standard error as a percentage of the estimate; i.e the relative standard error on the estimate of total area of land holdings in Eastern Development Region is 1.9 percent. The relative standard error provides a convenient way of comparing sampling errors for different estimates. The smaller the relative standard error, the more reliable is the estimate.

The size of the sampling error on an estimate depends on three main factors: the sample size, the degree of variability between holdings for the item being measured, and the efficiency of the sample design.

Sample size. All other things being equal, the larger the sample size, the lower will be the sampling error and the more reliable will be the estimate. For this reason, national level estimates will be more reliable than district level estimates. For example, the relative standard error on the estimate of total area of land holdings in Nepal as a whole is 0.8 percent, much smaller than the corresponding figure of 1.9 percent for the Eastern Development Region.

Variability in the data item. The greater the variability in the item being measured, the less reliable will be the sample estimate. For example, the relative standard error on the estimate of the area of paddy grown in the Terai is 1.3 percent, compared with 3.0 percent for the area of maize. Paddy estimates are more reliable because there is greater variability in maize area between holdings (e.g. many holdings have no maize).

Efficiency of sample design is discussed in detail later.

There were many different types of census estimates produced; including estimates of holding numbers (e.g. number of holdings growing paddy), area estimates (e.g. area of paddy grown), averages (e.g. average household size), and estimates of person numbers (e.g. number of female household members). There is no general rule as to what is an acceptable level of standard error; it depends on the type of estimate, the use being made of the estimate, and the reliability required.

For many purposes, estimates with relative standard errors of less than about 5 percent can be considered highly reliable. Relative standard errors greater than 20 percent are often considered insufficiently reliable for many uses.

In analysing distribution tables (e.g. distribution of holdings according to size of holding), standard errors on each individual estimate (e.g. the number of holdings in each size category) may be quite high but, since the user is mainly interested in the overall shape of the distribution only, the data may still be quite adequate for the purposes required.

Special note should be made of the standard errors when using the census data to make comparisons (e.g. between areas or in comparison with previous censuses). In these cases, the estimate of difference is often subject to quite high standard errors. As an approximation, the standard error on an estimate of difference between two figures is about 1.4 times the standard error on either of the estimates used in the comparison.

For example, the area of land holdings for Nepal was estimated to have increased from 2.46 million hectares to 2.60 million hectares between the 1981/82 and 1991/92 Censuses, an estimated increase of 133,700 hectares. The standard error on the estimate of total area of holdings in 1991/92 is 21,070, and therefore the standard error on the difference between the two census figures is approximately 29,500 hectares, and the relative standard error is 22 percent.

Presentation of sampling errors

It would not be possible to calculate sampling errors for each census estimate given in all census reports. Instead, sampling errors are shown in this publication for a selection of census estimates. These can be used as a guide to levels of sampling error for other estimates. The standard errors were calculated using computer programs written in CLIPPER 5.01.

Standard errors have been presented for the following ten items:

- total area of holdings;
- area under temporary crops;
- area under paddy;
- area under maize;
- area under wheat;
- area of irrigated land;
- number of cattle;
- number of buffaloes;
- number of chickens; and
- farm population.

Standard errors and relative standard errors for these items for estimates for Nepal as a whole, as well as for each development region, ecological belt and district are shown in Appendix 3. All area figures refer to land holdings only; other data refer to all holdings.

For estimates of numbers of holdings in a particular category (e.g. number of holdings with under 0.1 hectare of land), the relative standard error depends primarily on the number of sample holdings on which the estimate is based. The larger the sample size, the lower the relative standard error.

The sample size on which a district level estimate is based may be calculated from the sampling specifications given in Appendix 1. For example, an estimated 843 holdings in Dhankuta District had under 0.1 hectare of land. From Appendix 1, the sampling fraction is 6.76 percent; therefore the estimate is based on a sample of about 0.0676 times 843, or 57.

For higher level estimates, the sampling fractions are given on Page 2 of this report.

To approximate the relative standard error for an estimate of number of holdings, divide 200 by the square root of the sample size on which the estimate is based. Thus, the relative standard error on the above estimate in Dhankuta is approximately 200 divided by 7.55, or 26 percent.

Assessment of sampling errors

In general, the levels of sampling error

achieved in the census were in accordance with expectations and indicate that, on sampling error grounds, the census should provide satisfactory data for users. A detailed evaluation of sample design issues as they affect the magnitude of sampling errors on the census estimates is given later.

A general assessment of the sampling errors at the various geographic levels is given below.

(a) National level

For Nepal as a whole, the sample size of 122,270 holdings is sufficient to give reliable estimates at a fine level of detail. Relative standard errors are less than 1 percent for most major aggregates shown in the standard error tables. Data given in the national publication should generally be highly accurate and suitable for most detailed analysis. Size of holding classifications shown in the tables will usually be very reliable, although there are some rarely reported categories where small estimates may be subject to high sampling errors.

There is scope for producing more detailed cross-tabulations and other data with a high degree of reliability.

(b) Development regions

For development regions, the sample size depended on the districts making up each region. The sample size was much smaller in the Far Western Development Region than in other regions and relative standard errors are correspondingly higher - 3 to 5 percent for major aggregates compared with 2 to 3 percent in other regions. The western areas of the country are also less developed and therefore likely to exhibit greater inherent variability in the characteristics being measured in the census than in other areas; this will also tend to increase sampling errors in the Far Western region.

Data provided in the development region publications should generally be sufficiently reliable for most detailed analysis work, apart from very small estimates for rarely occurring cases.

More detailed cross-tabulations should also be able to be produced with a satisfactory degree of reliability.

(c) Ecological belts

For ecological belts, the sample size was greater in the Hill belt than in the Terai but, because of the greater inherent variability in hill areas, sampling errors were often comparable in the two areas (relative standard errors less than 2 percent being common). In the Mountain belt, the sample size was much smaller and the relative standard errors are correspondingly higher (commonly around 3 percent).

Data given in the ecological belt publications will generally be sufficiently accurate for most detailed analysis, subject to the same concerns expressed previously about small estimates. More detailed cross-tabulations should also be able to be produced with a satisfactory degree of reliability.

(d) Districts

Sample sizes in districts varied from around 1,200 (for districts considered less important agriculturally) to 2,000 (for the more important districts). The sample was designed in this way to provide more reliable estimates for the more important districts and, generally, this was achieved. However, because of different agricultural characteristics within districts, variability patterns varied considerably and, as a consequence, standard errors showed much variation. Relative standard errors are commonly in the range 4 to 6 percent on major aggregates in the more important districts, but as high as 8 percent in other areas.

District level estimates for the major aggregates (such as total area of holdings, average holding size, holdings with paddy, etc.) can be considered of sufficient reliability to be useful for most purposes. However, the district level

publications provide more detailed breakdowns and often the estimates given are subject to high sampling errors. Estimates for many categories are often very small (or even zero) and considerable care needs to be exercised in the interpretation and use of these data. The sample sizes in each district provide very limited scope for disaggregation of the data.

Sample design concepts

An evaluation of sampling errors is useful not only to assist in the use and interpretation of the census data but also to assess the efficiency of the sample design as a guide to the design of future Agricultural Censuses and surveys.

Because the sample was based on multi-stage sampling, the sample of holdings was clustered in selected EAs. This was necessary in order to reduce the cost of listing, but will mean that census estimates will be less reliable than would have been the case had the sample been spread across all EAs. The use of various sampling techniques such as PPS sampling, stratification and systematic sampling should at least partly overcome this loss of reliability.

To assist in assessing the efficiency of the census sample design and the effects on the reliability of estimates, a number of sample design parameters have been estimated. Three parameters - coefficient of variation, design effect and measure of homogeneity - are shown in Appendix 4 for a selection of variables for each district. The interpretation of these measures is given below.

The coefficient of variation measures the variability of the characteristic (i.e. the population standard deviation) relative to the average value of the characteristic. It enables comparisons to be made between the variability of different characteristics. For example, the coefficients of variation of the characteristics "Area under paddy" and "Area under maize" in Morang District are 1.78 and 3.31 respectively. This indicates that there is more variability between holdings in respect of maize area than paddy area (as expected). All other things being equal, the larger the coefficient of variation, the higher the relative standard error.

The design effect provides a measure of the reliability of the census estimate for the characteristic in question in comparison with the reliability which would have been achieved if the sample had been selected using simple random sampling (i.e. spread across all EAs). The design effect provides a measure of the extent to which the sampling error is affected by the "clustering" of the sample in selected EAs. The larger the design effect, the less efficient is the design (the more reliability is lost because of the clustering effect). A design effect of 1.0 would indicate that the reliability is the same as if simple random sampling had been used.

Measure of homogeneity. As indicated earlier, the reliability of an estimate is influenced by the population variability of the characteristic being measured. In a two stage design such as used in the census, the population variability has two components - the variability between holdings within EAs and the variability between EAs.

The measure of homogeneity measures the relationship between the two components of variability. A low measure of homogeneity (typically less than 0.1) indicates that the variability between EAs is low in comparison with the variability within EAs; this may occur for characteristics such as cattle numbers which will tend to be fairly consistent across many parts of the country. A high measure of homogeneity on the other hand indicates that the variability between EAs is high in comparison with the variability within EAs; this occurs for characteristics such as crop areas which may tend to be concentrated in certain geographic areas.

The measure of homogeneity is important to assess the most suitable configuration of sample; in particular, how many EAs should be sampled and how many holdings should be taken in each selected EA. For example, if the between EA variability is high relative to the within EA variability (i.e. a high measure of

homogeneity), then the sample should be spread across more EAs.

The measure of homogeneity is closely related to the design effect; a high design effect reflects the fact that a different configuration of sample between EAs and holdings would improve the reliability of the data.

Evaluation of sample design

Little sample design information was available from the earlier censuses to assist in designing the sample for the 1991/92 Census. For the design of future censuses, information from the 1991/92 Census on sampling errors and the various sample design parameters will be available and this will assist in developing a more efficient sample design and hence provide more reliable census data.

The sampling methodology used for the 1991/92 Census, based on two stage sampling, was sound and should form the basis of the design for future Agricultural Censuses (and agricultural surveys). A number of general observations on the sample design are given in the following.

Probability proportional to size sampling of EAs. The use of probability proportional to size sampling (PPS) for the selection of EAs provided significant improvements to the sampling efficiency of the design over the alternative equal probability selection method. The selection was based on information on numbers of holdings in each ward obtained from the Population Census. This information also provided the basis for the formation of suitable sized enumeration areas, which assisted greatly in the organization of field operations.

Sample allocation to districts. The decision to sample 50, 60, 70 or 80 EAs per district according to the importance of the district (and then to sample about 25 holdings in each selected EA) was intended to achieve two objectives - first, to provide sufficient sample in each district to enable district level estimates to be produced and second, to provide more reliable estimates in more important districts.

The approach used is appropriate in the situation where the main aim of the census is to produce district estimates. Sampling errors depend mainly on the sample size, not the sampling fraction, and therefore the aim was to take comparable sample sizes in each district, regardless of sampling fractions. In larger districts, only 2 to 3 percent of holdings were sampled, while for smaller districts, over 10 percent were sampled. In Manang, all 902 holdings were enumerated.

The sample allocation would have been different if greater emphasis had been given to producing higher level estimates. If national estimates had been the main objective, for example, it would have been best to sample holdings in proportion to the number of holdings in each district (which would have meant that data could not have been produced for small districts).

The sample allocation used provided the desired district level estimates but meant that higher level estimates were less reliable than they could have been (because sample was "wasted" in smaller districts). A sample allocation representing some sort of compromise between estimates at the different levels might be considered for future censuses. This might involve sampling very small districts less heavily than in the present census.

Stratification of holdings in selected EAs. The stratification of holdings within selected EAs for sample selection purposes was simple from an operational point of view and contributed to ensuring a good spread of holding sizes. This had some beneficial effect on sampling errors.

Variability of characteristics. Measures of the coefficient of variation, as given in Appendix 4, are sometimes large, indicating that the variability of some characteristics was quite high. Sampling errors are sometimes correspondingly higher than expected.

In some cases, coefficient of variation measures (and standard errors) were strongly influenced by very large or unusual units. For example, a sample holding with more than 50 hectares was present in Taplejung District, which

increased estimated standard errors for many items in that district by up to 30 percent.

Significant improvements in the reliability of census estimates can be achieved in future by "completely enumerating" particular types of unusual holdings; that is, allocating them to a separate stratum and sampling them with certainty. Holdings with more than 10 hectares could be treated in this way; so also could other special types of holdings.

Holdings to be completely enumerated would need to be identified in advance of the census enumeration. CBS field staff could provide such information.

Number of holdings per selected EA. The decision to sample about 25 holdings in each selected EA was based primarily on operational factors; concentrating the sample in relatively few areas facilitated the organization of the data collection and minimized the travelling times involved in moving between EAs for census data collection.

However, from a sampling point of view, this represents a fairly "clustered" sample design in that the sample holdings were not widely spread throughout each district. The effect of this clustering is seen in the measures of design effect given in Appendix 4. The design effect measures are often higher than 3.0, suggesting that significant gains in the reliability of estimates could be achieved by spreading the sample across more EAs and sampling fewer holdings in each selected EA.

This would need to be balanced against the travelling time and other operational factors. Detailed design work should be undertaken to determine the best sample allocation. It may be appropriate to sample differently in different areas according to the distance from the district headquarters and the expected time involved in travelling between EAs.

PART 3

ASSESSMENT OF QUALITY OF DATA

Comparison with the 1991 Population Census

The 1991 Population Census included two questions concerning agricultural activities of households - "total area of holding operated" and "total number of livestock". This information was used to identify whether each household constituted an agricultural holding for the purposes of the Agricultural Census. This was used as an aid in the selection of the sample for the Agricultural Census.

Tables showing a number of comparisons between data from the two censuses are given in Appendix 5. In interpreting the figures in the tables, it needs to be borne in mind that the censuses were undertaken at different times; the Population Census was undertaken in June 1991, while the Agricultural Census was undertaken between January and June 1992.

The main points highlighted by the tables are presented in the following.

(a) Farm population

The number of agricultural holdings (or farm households) in the Agricultural Census was taken to be the same as in the Population Census. Therefore, any differences between population data from the two sources reflect differences in the enumeration of household members.

Overall, the farm population as reported in the Agricultural Census was around 2 percent higher than that given by the Population Census. The differences were similar in each of the ecological belts. Amongst development regions, the differences were highest in Western region (5 percent) and lowest in Mid-western region (1 percent). (Table A5.1)

The Agricultural Census showed higher farm population in about two-thirds of the districts in the country. Differences were quite high in a few cases. Most of the districts for which the population was lower than in the Population Census were from the Mountain region. (Table A5.3)

Since the number of farm households was the same in both censuses, the average household size figures mirror the population comparisons referred to above. The average farm household size was slightly greater in the Agricultural Census than in the Population Census in each ecological belt and development region, as well as at the national level. (Table A5.2)

Data on age and sex of the farm population from the Agricultural Census have been compared with the corresponding figures from the Population Census for the population as a whole (which includes both farm and non-farm households). The comparison may therefore be influenced by differences in the age-sex structure of the population between farm and non-farm households.

Overall, there seems to be no substantial difference in the age composition of the two censuses. The age group 15 to 54 years may be slightly over-represented in the Agricultural Census in comparison with the Population Census. Persons in young age groups may have been correspondingly under-represented. (Table A5.4)

The sex ratios (number of males per 100 females) calculated from the two sources indicate that, at the national level, the Agricultural Census has enumerated more males in relation to females (sex ratio 109.5) than did the Population Census (sex ratio 99.5). Overall, the Agricultural Census enumerated 8.50 million males compared with 7.76 million females. The differences in sex ratios are quite consistent across age-groups. The sex ratios in the Agricultural Census are especially high for persons below 15 years of age and persons 45

years of age and above. For the age group 15 to 44 years, the Agricultural Census enumerated more males than females, while the Population Census enumerated significantly less males than females. (Table A5.5)

At the district level, the Agricultural Census enumerated more males than females in 70 districts, compared with only 32 for the Population Census. The differences between the censuses were quite significant in some districts. (Table A5.6)

The comparisons point to some inconsistencies in enumeration practices between the two censuses. The problem may be highlighted by a detailed analysis of data from Gulmi District. There were an estimated 47,900 agricultural holdings in the district. The Agricultural Census estimated 298,300 population (average household size 6.2), compared with only 258,400 (average household size 5.4) in the Population Census.

An examination of the age and sex structure shows that the discrepancy is entirely in the male population, especially in the working age group. This seems to have arisen because many members of this group move elsewhere to work and they appear to have been enumerated in the Agricultural Census but not in the Population Census. (As the definition of a household relates to where members spend most of their time, absent workers should not have been included.) The same pattern also seems to exist in a number of other districts and this partly explains the differences in the age and sex composition.

The Population Census was subject to some under-enumeration, which was estimated to have been higher for males than for females. On this basis, the larger household sizes and greater numbers of males reported in the Agricultural Census may not be unreasonable. However, the overall sex ratio of 109.5 in the Agricultural Census is much higher than expected.

There is some evidence of under-enumeration of females in the Agricultural Census. This seems to have occurred across all age groups. In some districts, the problem was particularly serious amongst female children. There were also instances where male children seem to have been missed.

(b) Total area of holdings

The Agricultural Census would be expected to yield more reliable area of holding figures than the Population Census (notwithstanding the presence of sampling errors), because of the use of more intensive enumeration procedures. (In the Agricultural Census, data were collected for each parcel individually, while a single total figure was collected in the Population Census). Overall, there seems to be no substantial difference in the total area of holdings reported in the two censuses. (Table A5.7)

The distribution of area by ecological belt indicates a significantly lower Agricultural Census figure in the Mountain belt and slightly higher in the other two belts. The area of holdings in the Far Western Development Region was also lower than in the Population Census. A comparison of Agricultural Census data with existing agricultural statistics (reported later) suggests that the Agricultural Census area data are unlikely to be significantly under-reported in the Mountain belt and the Far Western region. (Table A5.8)

There were significant variations between the two censuses for some districts. Sampling errors may be one factor. Many of the high variations occurred in those districts where the seed unit was used for the measurement of area. In these cases, the Agricultural Census data should be superior because of better data collection procedures used for reporting of area information.

(c) Number of livestock

The Agricultural Census recorded around 2.4 million more of all types of livestock than the Population Census - a difference of 16 percent. The difference is likely to be the result of much better enumeration practices in the Agricultural Census. In the Population Census, total

livestock numbers were collected as a single item (for the purposes of assisting in the selection of the Agricultural Census sample), while in the Agricultural Census, detailed data about the herd structure of each livestock type were collected.

At the ecological belt level, the differences varied from 11 percent (Mountain) to 19 percent (Terai). At the development region level, the variation was from 7 percent (Mid-western region) to 26 percent (Eastern region). (Table A5.9)

There are eight districts in which livestock was apparently under-recorded in the Agricultural Census. In Humla district, the Agricultural Census figure was 18 percent below the Population Census.

Comparison with current agricultural statistics

A comparison of statistics from the Agricultural Census with current estimates of crop areas and livestock numbers for 1991/92 provided by the Ministry of Agriculture is presented in Appendix 6.

The data from the Ministry of Agriculture relate to the year July 1991 to June 1992. Crop data from the Agricultural Census relate to the calendar year 1991, while livestock information was collected in respect of the day of census enumeration (sometime between January and June 1992).

(a) Crop area

The area under paddy recorded in the census was higher than that given in the figures reported by the Ministry. At the national level, the area under paddy was estimated from the census to be 68,400 hectares higher (5 percent) than the current estimates. The area under paddy has remained relatively constant in recent years and therefore this difference cannot be attributed to the varying reference periods.

The census paddy figure was higher in the Mountain and Terai belts and comparable in the Hill belt. For development regions, the census figures were higher in the three eastern-most regions and comparable in the Mid- and Far Western regions. There were significant differences for some districts. (Tables A6.1, A6.3)

The area under maize from the two sources were broadly comparable. The census estimated slightly higher area in the Mountain and Terai belts; a slightly lower figure was recorded in the Hill belt. Census figures were lower for the three western-most development regions - Western, Mid-western and Far Western, and higher for the Eastern and Central regions. (Table A6.1)

For wheat, the area recorded at the national level in the census was 61,800 hectares higher than the other source. This pattern was consistent across development regions. Amongst ecological belts, the discrepancy is most significant in the Terai; in the Hill belt, the census figure is slightly lower. (Table A6.1)

It is difficult to definitively judge the reliability of the two data sources. The census was undertaken using proven and objective statistical methods. However, it is recognized that area reporting in the census may not always have been fully accurate - based as it was on information reported by the respondent (sometimes using seed units converted into area measures). Enumeration problems undoubtedly also had an effect in some places.

On the other hand, it is widely recognized that there are serious shortcomings in the current crop statistics because of the lack of an effective data collection methodology and the reliance on subjective estimates made by field staff of the Ministry of Agriculture.

The total area of agricultural land was estimated from the census to be 2.4 million hectares, compared with the figure of 2.6 million hectares obtained from land use records and other sources. The figures are broadly

consistent, taking into consideration the coverage of the census and definitional differences. On the basis that there was no significant under-coverage in the total area of holdings, it seems unlikely that census crop area figures are too high.

In general, the census figures can be taken to be more reliable than the current crop estimates, although figures at the district level should be closely analyzed. In interpreting district level figures, it is important to recognize that the census figures relate to holders living in the district, not to the land in the district.

(b) Number of livestock

The census estimated some 1.1 million more cattle than from the Ministry of Agriculture source. The differences were consistent across ecological belts and development regions.

The number of buffaloes recorded in the census was slightly higher than in the figures reported by the Ministry of Agriculture. The census figure was higher in the Hill and Terai belts but lower in the Mountain belt. The census figures were lower for three development regions - Eastern, Central and Mid-western. (Table A6.2)

The reliability of the livestock statistics from current sources are affected by the lack of national coverage - data are collected from only some districts each year. There are no major reporting problems likely to have affected the quality of reported livestock data and therefore the census data should be considered more reliable than the current estimates.

Comparison with previous census

The following is a comparison of data from the 1981/82 and 1991/92 Agricultural Censuses. Comparison tables are shown in Appendix 7.

Comparisons between the censuses are affected by changes in methodology and improvements in data quality. Data from the 1991/92 Census should be considered to be of higher quality than earlier censuses because of better editing of the data. The interpretation of differences will also be affected by the genuine changes which have taken place over the ten years.

(a) Number and area of holdings

In the ten year period between 1981/82 and 1991/92, the number of holdings in the country increased by 25 percent, while the area of holdings increased by only 5 percent, reflecting a reduction in the average size of holding from 1.13 hectares to 0.96 hectares.

For holding numbers, amongst ecological belts the increase was larger in the Mountains (32 percent) and the Hills (30 percent). Among the development regions, the Far Western region showed the highest growth (47 percent).

Most of the increase in area of holding was in the Hill belt. In the Terai, a small decrease in area of holdings between 1981/82 and 1991/92 was recorded. A decline in area of holdings was also recorded in the Central Development Region. In the Far Western Development Region, a sharp increase in the area of holdings was recorded. (Table A7.1)

The overall reduction in farm sizes implied by the figures is consistent with the expected increasing fragmentation of land and the relatively little new land coming under cultivation. The small reduction in area of holdings in the Terai may be explained by agricultural land being converted to industrial or other uses. This may also have been a factor in the Central region, but the magnitude of the reduction suggests that some reporting problems were present in the 1981/82 Census.

(b) Number of parcels

Over the ten years 1981/82 to 1991/92, an increase of about 14 percent in the number of parcels was recorded. However, the average number of parcels per holding declined from 4.4 to 4.0, reflecting the reduction in farm sizes. The number of parcels increased

substantially in the Far Western Development Region, in line with the increase in area of holdings. (Table A7.2)

(c) Paddy growers and area under paddy

During the decade 1981/82 to 1991/92, the area under paddy increased by 6 percent, while the number of growers almost doubled. (Table A7.3)

The relatively small increase in area under paddy is consistent with expectations. The apparent large increase in numbers of paddy growers may have been the result of a combination of effects, including the reduction in farm sizes and the increasing land being brought under irrigation (perhaps predominantly small holdings).

Post-enumeration survey (PES)

A small post-enumeration survey was undertaken in association with the census field operations. The purpose of the survey was to attempt to measure the degree of under-enumeration of parcels, household members, etc. in the census and to assess the extent to which census data were mis-reported.

The survey was designed to cover at least two randomly selected holdings in each enumeration area. Selected holdings were to be re-interviewed by field supervisors immediately after completion of the data collection work by enumerators. Re-interviewing was undertaken independently of the main census; i.e. the supervisor did not take the original census form to the field. The PES was undertaken using the same questionnaires as in the main census.

The PES was undertaken in some districts only and the data were not fully processed. However, some analysis of the PES was undertaken based on a small sub-sample of 39 questionnaires in Dhankuta District. The results are reported in the following. The size of the sample analyzed is very small and the results cannot be considered conclusive.

Data from the post-enumeration questionnaires were entered into the computer and data files similar to those in the main census were created. Comparable data files containing census data for the same 39 holdings were also created. Comparisons were then made between the data from the two sources.

Holdings were matched to determine the number of parcels and household members according to whether they were:

- enumerated in both the PES and the census;
- enumerated in the PES but not in the census; or
- enumerated in the census but not in the PES.

Results are summarized below.

Parcels	
Both PES and census	75
PES but not census	5
Census but not PES	-
Household members	
Both PES and census	140
PES but not census	3
Census but not PES	-

It is difficult to interpret these results without a full understanding of how the post-enumeration data collection work was undertaken and the extent to which the data reported are superior to the original census. However, there is evidence of some under-enumeration for the characteristics shown - e.g. parcels may have been under-enumerated by about 6 percent - but it is impossible to say whether this is realistic.

Comparisons were also made at an aggregate level between the data reported for the 39 holdings in the two collections. Some results are given in Table 3.1.

Once again, it is difficult to interpret these results, although they do suggest that there was some degree of mis-reporting in the census which may have resulted in under-estimation for some items. It is apparent from the figures shown that the sample of holdings analyzed cannot be considered representative in any way (e.g. they are much smaller than average). This further complicates the interpretation of the analysis.

TABLE 3.1 - CENSUS AND PES DATA
(SAMPLE TOTALS - 39 HOLDINGS)

Data item	Census	PES
Buildings	41	54
Cattle	86	114
Buffaloes	18	29
Goats	116	124
Chickens	196	245
Rice growers	14	18
Maize growers	34	36
Ave. size of holding	.73 ha	.75 ha

APPENDIX 1

SAMPLING SPECIFICATIONS - DISTRICTS

DISTRICT NAME AND CODE		SAMPLE GROUP	ENUM. AREAS SELECTED	TOTAL HOLDINGS	SAMPLE HOLDINGS	SAMPLING FRACTION (%)	SAMPLE WEIGHT
EASTERN MOUNTAIN							
Taplejung	01	2	60	20,241	1,487	7.35	13.61
Sankhuwasabha	09	3	70	25,382	1,701	6.70	14.92
Solukhumbu	11	1	50	18,043	1,170	6.48	15.42
EASTERN HILL							
Panchthar	02	3	70	29,884	1,718	5.75	17.39
Ilam	03	3	70	37,879	1,593	4.21	23.78
Dhankuta	07	3	70	24,585	1,663	6.76	14.78
Tehrathum	08	3	70	17,191	1,703	9.91	10.09
Bhojpur	10	3	70	35,735	1,683	4.71	21.23
Okhaldhunga	12	2	60	25,821	1,413	5.47	18.27
Khotang	13	3	70	39,435	1,676	4.25	23.53
Udayapur	14	3	70	35,315	1,686	4.77	20.95
EASTERN TERAI							
Jhapa	04	4	80	74,727	1,827	2.44	40.90
Morang	05	4	80	77,857	1,827	2.35	42.62
Sunsari	06	4	80	43,746	2,055	4.70	21.29
Saptari	15	4	80	65,211	1,862	2.86	35.02
Siraha	16	4	80	65,322	1,969	3.01	33.18
CENTRAL MOUNTAIN							
Dolakha	22	2	60	34,154	1,492	4.37	22.89
Sindhupalchok	23	3	70	49,321	1,672	3.39	29.50
Rasuwa	29	1	50	6,448	1,226	19.01	5.26
CENTRAL HILL							
Sindhuli	20	3	70	35,988	1,672	4.65	21.52
Ramechhap	21	3	70	33,775	1,644	4.87	20.54
Kavre	24	4	80	53,938	1,921	3.56	28.08
Lalitpur	25	2	60	28,950	1,295	4.47	22.36
Bhaktapur	26	2	60	22,724	1,437	6.32	15.81
Kathmandu	27	2	60	45,540	1,414	3.10	32.21
Nuwakot	28	3	70	42,964	1,728	4.02	24.86
Dhading	30	3	70	48,258	1,635	3.39	29.52
Makwanpur	31	4	80	48,676	1,814	3.73	26.83

DISTRICT NAME AND CODE		SAMPLE GROUP	ENUM. AREAS SELECTED	TOTAL HOLDINGS	SAMPLE HOLDINGS	SAMPLING FRACTION (%)	SAMPLE WEIGHT
CENTRAL TERAI							
Dhanusha	17	4	80	69,956	1,994	2.85	35.08
Mahottari	18	4	80	58,019	1,914	3.30	30.31
Sarlahi	19	4	80	65,729	1,943	2.96	33.83
Rautahat	32	4	80	63,438	2,013	3.17	31.51
Bara	33	4	80	53,488	1,889	3.53	28.32
Parsa	34	4	80	40,529	2,069	5.10	19.59
Chitwan	35	4	80	53,428	1,931	3.61	27.67
WESTERN MOUNTAIN							
Manang	41	1	50	902	902	100.00	1.00
Mustang	42	1	50	2,487	1,206	48.49	2.06
WESTERN HILL							
Gorkha	36	4	80	46,093	1,895	4.11	24.32
Lamjung	37	3	70	28,367	1,629	5.74	17.41
Tanahu	38	3	70	45,303	1,575	3.48	28.76
Syangja	39	4	80	51,035	1,860	3.64	27.44
Kaski	40	4	80	43,992	1,772	4.03	24.83
Myagdi	43	2	60	18,944	1,381	7.29	13.72
Parbat	44	3	70	26,204	1,677	6.40	15.63
Baglung	45	3	70	42,421	1,614	3.80	26.28
Gulmi	46	3	70	47,913	1,597	3.33	30.00
Palpa	47	3	70	38,336	1,699	4.43	22.56
Arghakhanchi	51	3	70	33,393	1,726	5.17	19.35
WESTERN TERAI							
Nawalparasi	48	4	80	64,187	1,942	3.03	33.05
Rupandehi	49	4	80	67,839	1,860	2.74	36.47
Kapilbastu	50	4	80	51,400	1,949	3.79	26.37
MID-WESTERN MOUNTAIN							
Dolpa	62	1	50	4,607	1,212	26.31	3.80
Jumla	63	1	50	13,019	1,219	9.36	10.68
Kalikot	64	1	50	15,846	1,223	7.72	12.96
Mugu	65	1	50	6,670	1,240	18.59	5.38
Humla	66	1	50	5,890	1,216	20.65	4.84

DISTRICT NAME AND CODE		SAMPLE GROUP	ENUM. AREAS SELECTED	TOTAL HOLDINGS	SAMPLE HOLDINGS	SAMPLING FRACTION (%)	SAMPLE WEIGHT
MID-WESTERN HILL							
Pyuthan	52	3	70	31,849	1,730	5.43	18.41
Rolpa	53	3	70	32,239	1,674	5.19	19.26
Rukum	54	3	70	28,040	1,581	5.64	17.74
Salyan	55	3	70	30,069	1,662	5.53	18.09
Surkhet	59	3	70	34,583	1,698	4.91	20.37
Dailekha	60	2	60	32,881	1,336	4.06	24.61
Jajarkot	61	2	60	20,187	1,447	7.17	13.95
MID-WESTERN TERAI							
Dang	56	4	80	48,072	1,937	4.03	24.82
Banke	57	4	80	35,912	1,862	5.18	19.29
Bardiya	58	4	80	31,590	1,877	5.94	16.83
FAR WESTERN MOUNTAIN							
Bajura	67	1	50	16,827	1,179	7.01	14.27
Bajhang	68	2	60	24,069	1,396	5.80	17.24
Darchula	75	2	60	16,806	1,397	8.31	12.03
FAR WESTERN HILL							
Achham	69	2	60	38,346	1,441	3.76	26.61
Doti	70	2	60	29,202	1,394	4.77	20.95
Dadheldhura	73	2	60	17,624	1,384	7.85	12.73
Baitadi	74	2	60	34,041	1,450	4.26	23.48
FAR WESTERN TERAI							
Kailali	71	4	80	51,931	1,778	3.42	29.21
Kanchanpur	72	4	80	35,237	1,917	5.44	18.38

APPENDIX 2

SAMPLE DESIGN AND ESTIMATION SPECIFICATIONS

1. SAMPLE DESIGN AND SELECTION

The sample design is stratified two stage sampling. Within district k, the sample is selected as follows:

- first stage: n_k enumeration areas (EAs) are selected with probability P_{ki} proportional to the estimated number of holdings M'_{ki} in EA i (PPS sampling);
- second stage: within each selected EA, m_{ki} holdings are selected with equal probability.

The holding numbers in each EA, M'_{ki}, were estimated from the Population Census. The number of EAs sampled, n_k, was set at 50, 60, 70 or 80 depending on the group the district was assigned to (see Part 1). The target number of sample holdings per EA, m'_{ki}, was set at 25.

The sample is designed to be self-weighting within each district; that is all holdings within a district have the same chance of selection in the sample. This is achieved by fixing m_{ki} as:

$$m_{ki} = 25\frac{M_{ki}}{M'_{ki}}$$

where:

M_{ki} = actual number of holdings in EA i in district k as recorded in the Agricultural Census enumeration.

M_{ki} and M'_{ki} will usually be almost the same. For operational purposes, the number of selected holdings was set at 25 if:

$$0.98 < \frac{M'_{ki}}{M_{ki}} < 1.02$$

If this relationship was not fulfilled, then field staff were required to calculate the required number of holdings, m_{ki}, according to the above expression, using procedures given in instruction manuals.

Within district k, the overall probability of selection of each holding is given as:

$$p_k = n_k \frac{M'_{ki}}{M'_k} \frac{m_{ki}}{M_{ki}}$$

$$= n_k \frac{M'_{ki}}{M'_k} \frac{25\ M_{ki}}{M'_{ki}} \frac{1}{M_{ki}}$$

$$= \frac{25\ n_k}{M'_k}$$

where:

M'_k = estimated number of holdings in district k.

The PPS selection of the sample of EAs within each district was undertaken as follows:

- Order EAs according to size of total area of holdings, (obtained from the Population Census). The estimated number of holdings in the EAs are:

$$M'_{k1}\ ,\ M'_{k2}\ ,\ \ldots\ldots\ ,\ M'_{kN_k}$$

- Determine the cumulative number of holdings against each EA; i.e.:

$$i.e.\ \ K_{k1},\ K_{k2},\ \ldots\ldots,\ K_{kN_k}$$

where:

$$K_{k1}=M'_{k1}\ ,\ K_{k2}=M'_{k1}+M'_{k2}\ ,\ \ldots\ldots\ldots\ ,\ K_{kN_k}=\sum_{i=1}^{N_k} M'_{ki}$$

- The sampling interval is calculated as:

$$I_k = \frac{K_{kN_k}}{n_k}$$

- A random start is selected (using tables of random numbers) as follows:

$$r_k \leq I_k$$

- The sample of EAs is selected systematically as follows. Take selection numbers as:

$$r_k,\ r_k+I_k,\ r_k+2I_k,\ \ldots\ldots,\ r_k+(n_k-1)I_k$$

The first EA selected is EA s, where:

$$K_{k(s-1)} < r_k \leq K_{ks}$$

The l'th EA selected is EA t, where:

$$K_{k(t-1)} < r_k+(l-1)I_k \leq K_{kt}$$

For each selected EA, a list of holdings is prepared and ordered according by stratum (see details in Part 1). A systematic random sample is selected by applying a sampling interval of I_{ki2} to the holdings in the EA, where I_{ki2} is calculated as:

$$I_{ki2} = \frac{M_{ki}}{m_{ki}}$$

2. ESTIMATION

All parameters are estimated at district level first, and development region, ecological belt and national estimates are obtained by aggregating across districts.

Parameters to be estimated - district level

The average value of characteristic X per holding in district k is given by:

$$\bar{X}_k = \frac{\sum_{s=1}^{N_k} X_{ks}}{M_k} \qquad (1)$$

where:

$$X_{ks} = \sum_{j=1}^{M_{ks}} X_{ksj}$$

X_{ksj} = value of characteristic X for holding j in EA s and district k.

$$M_k = \sum_{s=1}^{N_k} M_{ks}$$

The total value of characteristic X in the district k is given by:

$$X_k = \sum_{s=1}^{N_k} X_{ks} \qquad (2)$$

The ratio of characteristics X and Y in the district k is given by:

$$R_k = \frac{X_k}{Y_k} \qquad (3)$$

Parameters to be estimated - national level

The average value of characteristic X per holding is given by:

$$\overline{X} = \frac{\sum_{k=1}^{75} X_k}{\sum_{k=1}^{75} M_k} \qquad (4)$$

The total value of characteristic X is given by:

$$X = \sum_{k=1}^{75} X_k \qquad (5)$$

The ratio of characteristics X and Y is given by:

$$R = \frac{X}{Y} \qquad (6)$$

Estimation procedure - district level

Because the sample of holdings in a district is self-weighting, the estimate of the average value of characteristic X per holding in district k (Expression (1)) is given by:

$$\overline{x}_k = \frac{\sum_{i=1}^{n_k} \sum_{j=1}^{m_{ki}} x_{kij}}{\sum_{i=1}^{n_k} m_{ki}} \qquad (7)$$

where:

x_{kij} = value of characteristic X, as recorded in the census, for holding j in EA i and district k.

The estimate of the total value of characteristic X in district k (Expression (2)) is given by:

$$x'_k = M'_k \bar{x}_k \qquad (8)$$

The estimate of the ratio of characteristics X and Y in district k (Expression (3)) is given by:

$$r_k = \frac{x'_k}{y'_k} \qquad (9)$$

The estimate of the number of units (holdings, persons, etc.) with a certain characteristic is given by applying Expressions (7) and (8) for the following:

$x_{kij} = 1$ if the unit has the characteristic in question; and

$x_{kij} = 0$ if the unit does not have the characteristic.

Estimation procedure - national level

The estimate of the average value of characteristic X per holding (Expression (4)) is given by:

$$\bar{X} = \frac{\sum_{k=1}^{75} M'_k \bar{x}_k}{\sum_{k=1}^{75} M'_k} \qquad (10)$$

The estimate of the total value of characteristic X (Expression (5)) is given by:

$$x' = \sum_{k=1}^{75} M'_k \bar{x}_k \qquad (11)$$

The estimate of ratio of characteristics X and Y (Expression (6)) is given by:

$$r = \frac{x'}{y'} \qquad (12)$$

Estimates for ecological belts and development regions are formed by aggregating across the relevant districts making up the area in the same way as for national estimates.

3. ESTIMATION OF STANDARD ERRORS

Standard errors were estimated using the sub-sample method. In each district, sample EAs were assigned to 10 sub-samples, with the same number of EAs in each sub-sample.

To estimate the standard error on the estimate of average per holding for characteristic X in district k, the estimate of average is first calculated for each sub-sample g as follows:

$$\bar{X}_{kg} = \frac{\sum_{i=1}^{n_k/10} \sum_{j=1}^{m_{ki}} x_{kij}^{(g)}}{\sum_{i=1}^{n_k/10} m_{ki}}$$

where:

$x_{kij}^{(g)}$ = the value of characteristic X in district k, EA i and holding j for sub-sample g (g = 1, 2, ..., 10);

The standard error of the estimate of average per holding for characteristic X in district k is given by:

$$s(\bar{X}_k) = \sqrt{\frac{\sum_{g=1}^{10} (\bar{X}_{kg} - \bar{X}_k^*)^2}{90}}$$

where:

$$\bar{X}_k^* = \frac{\sum_{g=1}^{10} \bar{X}_{kg}}{10}$$

The standard error of the estimate of total for characteristic X in district k is given by:

$$s(X_k') = M_k' \, s(\bar{X}_k)$$

The standard error of the estimate of total for characteristic X at the national level is given by:

$$s(X') = \sqrt{\sum_{k=1}^{75} s^2(X_k')}$$

The standard error of the estimate of average per holding for characteristic X at the national level is given by:

$$s(\bar{X}) = \frac{s(X')}{\sqrt{\sum_{k=1}^{75} M_k'}}$$

Standard errors for ecological belts and development regions are formed by aggregating across the relevant districts making

up the area in the same way as for standard errors on national estimates.

4. ESTIMATION OF SAMPLE DESIGN PARAMETERS

The design effect measures the variance of an estimate in comparison with the variance which would have been obtained if simple random sampling had been used. The design effect d_k for characteristic X in district k is estimated as:

$$d_k = \frac{s^2(\bar{x}_k) \times m_k}{s^2(x_{kij})}$$

where:

$$s^2(x_{kij}) = \frac{1}{m_k - 1} \sum_{i=1}^{n_k} \sum_{j=1}^{m_{ki}} (x_{kij} - \bar{x}_k)^2$$

$$m_k = \sum_{i=1}^{n_k} m_{ki}$$

The coefficient of variation is given by:

$$CV_k = \frac{s(x_{kij})}{\bar{x}_k}$$

The measure of homogeneity for characteristic X in district k is estimated as:

$$\delta_k = \frac{d_k - 1}{\bar{m}_k - 1}$$

where:

$\bar{m}_k$ = average sample holdings per EA in district k.

δ_k is a measure of the relationship between the variability of the first and second stages of sampling. If the variability within EAs is high in comparison with the variability between EAs, then δ_k will be small. If on the other hand EAs are very homogeneous, δ_k will be high.

δ_k is influenced by the size of EAs - the larger EAs are, the more heterogeneous will they be and therefore δ_k will be lower.

In assessing the sample design for future censuses, decisions will need to taken on how many EAs to sample, and then how many holdings to sample within each selected EA. This decision is based on variance and cost (or time) factors.

The total cost of conducting the Census enumeration in district k can be represented as:

$$C_k = C_{k0} + n_k C_{k1} + n_k \bar{m}_k C_{k2}$$

where:

C_{k0} = overhead costs;

C_{k1} = average costs associated with each of the first stage units (e.g. listing, travel to EAs); and

C_{k2} = average costs associated with each of the second stage units in each EA (e.g. interviewing holdings).

The optimum number of sample holdings to sample per EA is calculated as:

$$opt(\bar{m}_k) = \sqrt{\frac{C_{k1}}{C_{k2}} \quad \frac{1 - \delta_k}{\delta_k}}$$

A low C_{k2} means interviewer costs are low and therefore $\bar{m}_k$ should be high. A high C_{k2} means that interviewer costs are high and therefore $\bar{m}_k$ should be low. High within EA variability means a low δ_k implying the need for a large $\bar{m}_k$ Low within EA variability means a high δ_k and therefore a low $\bar{m}_k$.

APPENDIX 3

STANDARD ERROR TABLES

NOTE: Area figures shown in the tables refer to land holdings only. All other figures refer to all holdings.

TABLE A3.1: NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DEVELOPMENT REGIONS

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
		EASTERN			CENTRAL	
Total area of holdings (ha)	783,200	14,710	1.9%	719,750	8,600	1.2%
Area of temporary crops (ha)	684,440	11,110	1.6%	659,820	7,730	1.2%
Area under paddy (ha)	488,970	9,620	2.0%	449,310	7,810	1.7%
Area under maize (ha)	224,230	5,440	2.4%	216,730	4,110	1.9%
Area under wheat (ha)	118,440	2,800	2.4%	183,140	3,350	1.8%
Area of irrigated land (ha)	287,020	10,770	3.8%	261,420	6,860	2.6%
Number of cattle	1,812,200	19,170	1.1%	1,651,830	21,770	1.3%
Number of buffaloes	563,360	13,930	2.5%	749,410	13,970	1.9%
Number of chickens	2,929,210	69,060	2.4%	4,052,200	349,390	8.6%
Farm population	3,712,750	18,870	0.5%	5,060,960	19,220	0.4%
		WESTERN			MID-WESTERN	
Total area of holdings (ha)	566,370	9,410	1.7%	324,730	5,000	1.5%
Area of temporary crops (ha)	467,410	7,240	1.5%	286,650	4,610	1.6%
Area under paddy (ha)	290,620	5,860	2.0%	131,020	3,910	3.0%
Area under maize (ha)	167,450	2,920	1.7%	113,720	2,460	2.2%
Area under wheat (ha)	114,880	3,670	3.2%	122,590	3,030	2.5%
Area of irrigated land (ha)	160,990	5,790	3.6%	95,580	3,830	4.0%
Number of cattle	1,403,360	21,580	1.5%	1,523,700	21,570	1.4%
Number of buffaloes	986,960	14,390	1.5%	455,260	8,960	2.0%
Number of chickens	2,963,510	404,230	13.6%	1,777,260	41,070	2.3%
Farm population	3,618,010	15,720	0.4%	2,242,690	13,140	0.6%
		FAR WESTERN			TOTAL NEPAL	
Total area of holdings (ha)	203,350	6,330	3.1%	2,597,400	21,070	0.8%
Area of temporary crops (ha)	186,260	6,010	3.2%	2,284,580	17,110	0.7%
Area under paddy (ha)	121,320	5,420	4.5%	1,481,240	15,250	1.0%
Area under maize (ha)	46,600	1,560	3.4%	768,730	7,970	1.0%
Area under wheat (ha)	94,020	2,480	2.6%	633,060	6,920	1.1%
Area of irrigated land (ha)	77,380	4,180	5.4%	882,390	15,120	1.7%
Number of cattle	968,250	15,070	1.6%	7,359,330	44,720	0.6%
Number of buffaloes	361,320	9,580	2.7%	3,116,320	27,720	0.9%
Number of chickens	610,860	22,900	3.7%	12,333,140	540,790	4.4%
Farm population	1,623,810	14,830	0.9%	16,258,220	36,950	0.2%

TABLE A3.2: NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - ECOLOGICAL BELTS

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
		MOUNTAIN			HILL	
Total area of holdings (ha)	176,850	3,670	2.1%	1,046,210	12,070	1.2%
Area of temporary crops (ha)	158,680	3,170	2.0%	848,240	6,820	0.8%
Area under paddy (ha)	49,250	1,560	3.2%	335,180	4,430	1.3%
Area under maize (ha)	69,310	2,520	3.6%	515,350	5,060	1.0%
Area under wheat (ha)	48,670	1,480	3.0%	223,550	3,510	1.6%
Area of irrigated land (ha)	41,760	1,310	3.1%	245,510	4,290	1.7%
Number of cattle	844,510	11,760	1.4%	3,663,670	31,270	0.9%
Number of buffaloes	267,800	9,530	3.6%	1,860,090	18,670	1.0%
Number of chickens	1,040,290	19,040	1.8%	7,615,430	346,750	4.6%
Farm population	1,446,640	9,120	0.6%	7,747,940	20,210	0.3%
		TERAI			TOTAL NEPAL	
Total area of holdings (ha)	1,374,340	16,880	1.2%	2,597,400	21,070	0.8%
Area of temporary crops (ha)	1,277,650	15,370	1.2%	2,284,580	17,110	0.7%
Area under paddy (ha)	1,096,810	14,510	1.3%	1,481,240	15,250	1.0%
Area under maize (ha)	184,080	5,610	3.0%	768,730	7,970	1.0%
Area under wheat (ha)	360,840	5,770	1.6%	633,060	6,920	1.1%
Area of irrigated land (ha)	595,120	14,440	2.4%	882,390	15,120	1.7%
Number of cattle	2,851,150	29,720	1.0%	7,359,330	44,720	0.6%
Number of buffaloes	988,440	18,140	1.8%	3,116,320	27,720	0.9%
Number of chickens	3,677,420	414,550	11.3%	12,333,140	540,790	4.4%
Farm population	7,063,640	29,560	0.4%	16,258,220	36,950	0.2%

TABLE A3.3: NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
EAST MOUNTAIN

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 01 TAPLEJUNG			DISTRICT 09 SANKHUWASABHA		
Total area of holdings (ha)	24,150	1,040	4.3%	22,440	1,460	6.5%
Area of temporary crops (ha)	20,510	1,010	4.9%	20,320	1,340	6.6%
Area under paddy (ha)	6,080	570	9.4%	10,430	690	6.6%
Area under maize (ha)	10,280	380	3.7%	8,390	560	6.7%
Area under wheat (ha)	2,540	370	14.4%	2,800	430	15.4%
Area of irrigated land (ha)	7,120	690	9.7%	9,830	550	5.6%
Number of cattle	57,880	3,600	6.2%	88,720	2,680	3.0%
Number of buffaloes	24,260	6,870	28.3%	18,870	750	4.0%
Number of chickens	173,200	7,870	4.5%	215,240	8,080	3.8%
Farm population	115,140	1,510	1.3%	141,780	1,620	1.1%
	DISTRICT 11 SOLUKHUMBU			TOTAL EAST MOUNTAIN		
Total area of holdings (ha)	14,590	1,490	10.2%	61,190	2,330	3.8%
Area of temporary crops (ha)	12,900	1,340	10.4%	53,730	2,150	4.0%
Area under paddy (ha)	1,390	160	11.3%	17,890	910	5.1%
Area under maize (ha)	7,260	1,480	20.4%	25,920	1,630	6.3%
Area under wheat (ha)	3,940	340	8.5%	9,290	660	7.1%
Area of irrigated land (ha)	110	50	43.9%	17,050	890	5.2%
Number of cattle	47,160	2,700	5.7%	193,760	5,240	2.7%
Number of buffaloes	12,380	1,430	11.6%	55,500	7,050	12.7%
Number of chickens	51,970	7,990	15.4%	440,410	13,820	3.1%
Farm population	86,090	1,980	2.3%	343,010	2,970	0.9%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
EAST HILL

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 02 PANCHTHAR			DISTRICT 03 ILAM		
Total area of holdings (ha)	38,210	3,250	8.5%	54,100	1,920	3.6%
Area of temporary crops (ha)	29,380	1,350	4.6%	37,470	1,560	4.2%
Area under paddy (ha)	9,850	960	9.7%	13,460	920	6.8%
Area under maize (ha)	15,390	680	4.4%	23,510	1,040	4.4%
Area under wheat (ha)	2,520	290	11.3%	6,150	680	11.0%
Area of irrigated land (ha)	9,720	890	9.1%	9,320	1,120	12.0%
Number of cattle	73,010	2,830	3.9%	121,580	3,480	2.9%
Number of buffaloes	27,930	1,960	7.0%	24,010	2,290	9.6%
Number of chickens	210,600	8,250	3.9%	195,930	17,600	9.0%
Farm population	174,310	2,580	1.5%	220,490	3,030	1.4%
	DISTRICT 07 DHANKUTA			DISTRICT 08 TEHRATHUM		
Total area of holdings (ha)	27,750	5,260	19.0%	26,360	1,100	4.2%
Area of temporary crops (ha)	23,180	1,670	7.2%	19,290	650	3.4%
Area under paddy (ha)	8,750	290	3.3%	8,030	750	9.3%
Area under maize (ha)	15,810	1,800	11.4%	11,520	630	5.5%
Area under wheat (ha)	1,700	420	24.8%	2,500	240	9.4%
Area of irrigated land (ha)	6,730	360	5.4%	7,410	610	8.3%
Number of cattle	80,290	2,580	3.2%	56,430	3,170	5.6%
Number of buffaloes	22,350	1,430	6.4%	20,160	1,640	8.1%
Number of chickens	159,470	3,920	2.5%	96,030	7,190	7.5%
Farm population	140,470	930	0.7%	103,110	1,230	1.2%
	DISTRICT 10 BHOJPUR			DISTRICT 12 OKHALDHUNGA		
Total area of holdings (ha)	36,100	1,850	5.1%	28,700	910	3.2%
Area of temporary crops (ha)	33,360	1,810	5.4%	22,900	740	3.2%
Area under paddy (ha)	14,780	1,070	7.2%	5,210	460	8.9%
Area under maize (ha)	19,510	890	4.6%	17,520	810	4.6%
Area under wheat (ha)	1,950	280	14.3%	3,570	390	10.8%
Area of irrigated land (ha)	8,150	950	11.6%	4,640	430	9.2%
Number of cattle	100,900	4,580	4.5%	75,070	3,150	4.2%
Number of buffaloes	35,690	2,590	7.2%	45,960	1,430	3.1%
Number of chickens	226,550	8,320	3.7%	168,380	8,360	5.0%
Farm population	178,490	3,800	2.1%	144,110	2,370	1.6%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
EAST HILL (continued)

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 13 KHOTANG			DISTRICT 14 UDAYAPUR		
Total area of holdings (ha)	39,600	4,820	12.2%	30,940	1,430	4.6%
Area of temporary crops (ha)	31,010	1,580	5.1%	27,310	1,320	4.8%
Area under paddy (ha)	9,460	580	6.1%	16,110	910	5.7%
Area under maize (ha)	20,660	1,100	5.3%	15,630	1,070	6.8%
Area under wheat (ha)	4,300	360	8.4%	1,760	230	13.3%
Area of irrigated land (ha)	8,160	560	6.8%	12,390	1,530	12.4%
Number of cattle	101,980	2,770	2.7%	132,620	5,520	4.2%
Number of buffaloes	61,080	2,610	4.3%	29,920	6,940	23.2%
Number of chickens	303,150	12,850	4.2%	225,180	10,730	4.8%
Farm population	217,880	3,900	1.8%	195,540	4,040	2.1%
	TOTAL EAST HILL					
Total area of holdings (ha)	281,780	8,520	3.0%			
Area of temporary crops (ha)	223,910	3,940	1.8%			
Area under paddy (ha)	85,660	2,220	2.6%			
Area under maize (ha)	139,550	3,000	2.1%			
Area under wheat (ha)	24,430	1,090	4.5%			
Area of irrigated land (ha)	66,510	2,500	3.8%			
Number of cattle	741,860	10,290	1.4%			
Number of buffaloes	267,110	8,800	3.3%			
Number of chickens	1,585,280	29,400	1.9%			
Farm population	1,374,480	8,350	0.6%			

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
EAST TERAI

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 04 JHAPA			DISTRICT 05 MORANG		
Total area of holdings (ha)	105,090	6,130	5.8%	110,900	8,330	7.5%
Area of temporary crops (ha)	93,540	4,620	4.9%	105,280	7,420	7.1%
Area under paddy (ha)	91,480	4,920	5.4%	100,600	6,090	6.1%
Area under maize (ha)	30,660	1,840	6.0%	21,720	3,620	16.7%
Area under wheat (ha)	6,770	670	9.9%	21,070	1,020	4.8%
Area of irrigated land (ha)	47,850	4,600	9.6%	64,380	8,280	12.9%
Number of cattle	219,730	4,300	2.0%	232,850	7,570	3.3%
Number of buffaloes	66,020	2,770	4.2%	46,920	4,720	10.1%
Number of chickens	419,410	33,790	8.1%	330,490	48,570	14.7%
Farm population	459,820	7,090	1.5%	467,200	5,760	1.2%
	DISTRICT 06 SUNSARI			DISTRICT 15 SAPTARI		
Total area of holdings (ha)	64,180	3,290	5.1%	83,130	3,150	3.8%
Area of temporary crops (ha)	60,670	3,070	5.1%	76,710	3,060	4.0%
Area under paddy (ha)	54,240	2,810	5.2%	74,940	3,180	4.2%
Area under maize (ha)	3,200	830	26.0%	390	210	54.0%
Area under wheat (ha)	20,070	1,480	7.4%	20,360	1,220	6.0%
Area of irrigated land (ha)	41,260	2,750	6.7%	33,870	3,080	9.1%
Number of cattle	130,940	8,360	6.4%	156,820	6,390	4.1%
Number of buffaloes	37,130	5,060	13.6%	49,700	2,260	4.6%
Number of chickens	96,180	7,080	7.4%	25,010	6,630	26.5%
Farm population	273,600	5,870	2.1%	407,830	8,100	2.0%
	DISTRICT 16 SIRAHA			TOTAL EAST TERAI		
Total area of holdings (ha)	76,940	3,220	4.2%	440,240	11,760	2.7%
Area of temporary crops (ha)	70,610	2,820	4.0%	406,820	10,160	2.5%
Area under paddy (ha)	64,150	2,750	4.3%	385,420	9,320	2.4%
Area under maize (ha)	2,790	840	30.1%	58,760	4,240	7.2%
Area under wheat (ha)	16,450	1,010	6.2%	84,710	2,490	2.9%
Area of irrigated land (ha)	16,080	1,450	9.0%	203,450	10,440	5.1%
Number of cattle	136,220	6,900	5.1%	876,560	15,310	1.7%
Number of buffaloes	41,010	2,460	6.0%	240,760	8,170	3.4%
Number of chickens	32,450	10,870	33.5%	903,520	60,940	6.7%
Farm population	386,890	9,700	2.5%	1,995,340	16,660	0.8%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
CENTRAL MOUNTAIN

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 22 DOLAKHA			DISTRICT 23 SINDHUPALCHOK		
Total area of holdings (ha)	21,890	710	3.3%	30,690	2,320	7.6%
Area of temporary crops (ha)	20,250	650	3.2%	27,950	1,830	6.5%
Area under paddy (ha)	4,520	260	5.8%	10,570	1,060	10.0%
Area under maize (ha)	7,570	380	5.1%	16,210	1,700	10.5%
Area under wheat (ha)	8,070	520	6.5%	6,750	780	11.6%
Area of irrigated land (ha)	4,670	270	5.9%	8,970	770	8.6%
Number of cattle	74,600	3,170	4.2%	109,110	5,020	4.6%
Number of buffaloes	31,640	1,610	5.1%	57,250	2,550	4.5%
Number of chickens	192,130	4,570	2.4%	227,260	9,340	4.1%
Farm population	175,470	1,990	1.1%	271,900	6,400	2.4%
	DISTRICT 29 RASUWA			TOTAL CENTRAL MOUNTAIN		
Total area of holdings (ha)	5,870	410	7.0%	58,450	2,460	4.2%
Area of temporary crops (ha)	5,460	380	6.9%	53,650	1,980	3.7%
Area under paddy (ha)	1,430	260	18.4%	16,520	1,120	6.8%
Area under maize (ha)	3,740	290	7.8%	27,530	1,760	6.4%
Area under wheat (ha)	1,070	240	22.6%	15,890	970	6.1%
Area of irrigated land (ha)	1,050	240	22.9%	14,690	850	5.8%
Number of cattle	21,100	1,330	6.3%	204,820	6,080	3.0%
Number of buffaloes	9,700	780	8.1%	98,590	3,120	3.2%
Number of chickens	48,240	3,300	6.8%	467,620	10,910	2.3%
Farm population	35,250	800	2.3%	482,610	6,750	1.4%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
CENTRAL HILL

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 20 SINDHULI			DISTRICT 21 RAMECHHAP		
Total area of holdings (ha)	29,670	1,200	4.0%	33,350	2,160	6.5%
Area of temporary crops (ha)	26,480	970	3.7%	27,000	1,360	5.0%
Area under paddy (ha)	12,160	790	6.5%	5,800	400	6.9%
Area under maize (ha)	21,810	670	3.1%	21,270	510	2.4%
Area under wheat (ha)	3,000	620	20.6%	4,650	460	10.0%
Area of irrigated land (ha)	10,690	880	8.2%	4,720	300	6.3%
Number of cattle	120,860	5,270	4.4%	79,980	2,620	3.3%
Number of buffaloes	37,440	1,740	4.7%	47,770	1,970	4.1%
Number of chickens	276,430	9,400	3.4%	221,210	9,510	4.3%
Farm population	210,190	2,400	1.1%	187,260	3,060	1.6%
	DISTRICT 24 KAVRE			DISTRICT 25 LALITPUR		
Total area of holdings (ha)	43,280	1,860	4.3%	10,620	320	3.0%
Area of temporary crops (ha)	38,280	1,690	4.4%	9,680	290	3.0%
Area under paddy (ha)	12,360	930	7.5%	4,330	340	7.8%
Area under maize (ha)	24,770	1,410	5.7%	4,600	480	10.5%
Area under wheat (ha)	10,980	740	6.7%	3,790	290	7.5%
Area of irrigated land (ha)	8,560	630	7.4%	3,520	290	8.2%
Number of cattle	102,990	7,840	7.6%	24,700	3,490	14.1%
Number of buffaloes	61,600	3,960	6.4%	11,910	2,160	18.2%
Number of chickens	356,400	27,270	7.7%	187,880	27,410	14.6%
Farm population	328,630	5,920	1.8%	168,340	2,440	1.4%
	DISTRICT 26 BHAKTAPUR			DISTRICT 27 KATHMANDU		
Total area of holdings (ha)	7,100	240	3.4%	12,800	920	7.2%
Area of temporary crops (ha)	6,710	240	3.5%	11,760	870	7.4%
Area under paddy (ha)	5,030	160	3.1%	7,280	500	6.8%
Area under maize (ha)	1,450	230	15.9%	4,220	580	13.8%
Area under wheat (ha)	4,550	110	2.3%	5,640	560	10.0%
Area of irrigated land (ha)	1,880	150	8.0%	4,580	670	14.6%
Number of cattle	15,130	1,080	7.1%	47,280	4,120	8.7%
Number of buffaloes	7,800	1,260	16.2%	14,720	2,160	14.7%
Number of chickens	178,730	46,310	25.9%	729,560	335,040	45.9%
Farm population	144,740	2,660	1.8%	265,640	3,540	1.3%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
CENTRAL HILL (continued)

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 28 NUWAKOT			DISTRICT 30 DHADING		
Total area of holdings (ha)	31,950	740	2.3%	35,290	1,310	3.7%
Area of temporary crops (ha)	30,340	680	2.2%	33,120	1,370	4.1%
Area under paddy (ha)	16,200	1,020	6.3%	15,300	920	6.0%
Area under maize (ha)	16,010	410	2.6%	22,500	1,050	4.7%
Area under wheat (ha)	8,390	590	7.0%	2,950	430	14.6%
Area of irrigated land (ha)	7,820	790	10.1%	10,240	580	5.6%
Number of cattle	98,410	3,350	3.4%	129,340	5,550	4.3%
Number of buffaloes	64,300	2,760	4.3%	82,500	4,000	4.8%
Number of chickens	219,240	7,200	3.3%	317,180	16,880	5.3%
Farm population	254,250	3,640	1.4%	259,840	2,270	0.9%
	DISTRICT 31 MAKWANPUR			TOTAL CENTRAL HILL		
Total area of holdings (ha)	31,540	1,360	4.3%	235,600	3,830	1.6%
Area of temporary crops (ha)	29,660	1,320	4.4%	213,050	3,270	1.5%
Area under paddy (ha)	8,490	1,020	12.0%	86,950	2,230	2.6%
Area under maize (ha)	23,240	1,440	6.2%	139,880	2,580	1.8%
Area under wheat (ha)	3,180	500	15.6%	47,130	1,530	3.2%
Area of irrigated land (ha)	5,980	860	14.4%	57,990	1,880	3.2%
Number of cattle	146,120	8,290	5.7%	764,790	15,400	2.0%
Number of buffaloes	30,330	3,590	11.8%	358,340	8,370	2.3%
Number of chickens	351,920	15,780	4.5%	2,838,550	341,550	12.0%
Farm population	281,300	3,250	1.2%	2,100,150	10,230	0.5%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
CENTRAL TERAI

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 17 DHANUSHA			DISTRICT 18 MAHOTTARI		
Total area of holdings (ha)	73,610	4,250	5.8%	63,750	2,680	4.2%
Area of temporary crops (ha)	66,800	3,890	5.8%	57,800	2,550	4.4%
Area under paddy (ha)	58,430	4,310	7.4%	53,800	3,070	5.7%
Area under maize (ha)	1,540	460	29.9%	3,380	1,010	29.9%
Area under wheat (ha)	17,470	660	3.8%	19,030	1,320	6.9%
Area of irrigated land (ha)	21,080	3,190	15.2%	17,310	2,730	15.8%
Number of cattle	113,490	1,870	1.6%	99,220	5,320	5.4%
Number of buffaloes	41,010	1,870	4.6%	33,770	1,940	5.7%
Number of chickens	14,730	2,700	18.3%	55,960	9,050	16.2%
Farm population	428,640	6,710	1.6%	354,280	3,500	1.0%
	DISTRICT 19 SARLAHI			DISTRICT 32 RAUTAHAT		
Total area of holdings (ha)	75,150	3,130	4.2%	65,970	1,930	2.9%
Area of temporary crops (ha)	69,770	2,640	3.8%	61,270	1,900	3.1%
Area under paddy (ha)	55,230	2,770	5.0%	54,630	2,240	4.1%
Area under maize (ha)	8,820	1,270	14.4%	4,880	860	17.7%
Area under wheat (ha)	19,090	1,540	8.1%	18,790	1,170	6.2%
Area of irrigated land (ha)	21,930	2,330	10.6%	29,840	2,440	8.2%
Number of cattle	124,620	5,910	4.7%	96,870	5,180	5.3%
Number of buffaloes	48,550	1,950	4.0%	38,160	2,990	7.8%
Number of chickens	76,620	13,650	17.8%	78,060	10,150	13.0%
Farm population	387,000	6,070	1.6%	376,570	4,870	1.3%
	DISTRICT 33 BARA			DISTRICT 34 PARSA		
Total area of holdings (ha)	60,960	2,360	3.9%	43,450	2,520	5.8%
Area of temporary crops (ha)	57,050	2,230	3.9%	40,410	2,430	6.0%
Area under paddy (ha)	50,160	2,320	4.6%	41,430	2,610	6.3%
Area under maize (ha)	3,920	780	19.9%	730	280	38.2%
Area under wheat (ha)	21,460	1,100	5.1%	16,580	720	4.4%
Area of irrigated land (ha)	46,070	2,520	5.5%	28,240	2,210	7.8%
Number of cattle	79,030	4,880	6.2%	65,620	5,230	8.0%
Number of buffaloes	30,330	2,720	9.0%	20,880	1,230	5.9%
Number of chickens	72,320	14,770	20.4%	59,820	7,850	13.1%
Farm population	343,140	7,850	2.3%	262,290	5,040	1.9%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
CENTRAL TERAI (continued)

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 35 CHITWAN			TOTAL CENTRAL TERAI		
Total area of holdings (ha)	42,810	1,560	3.6%	425,700	7,290	1.7%
Area of temporary crops (ha)	40,030	1,430	3.6%	393,130	6,720	1.7%
Area under paddy (ha)	32,160	1,330	4.1%	345,840	7,400	2.1%
Area under maize (ha)	26,050	1,680	6.4%	49,330	2,660	5.4%
Area under wheat (ha)	7,710	540	6.9%	120,130	2,820	2.3%
Area of irrigated land (ha)	24,460	1,590	6.5%	188,930	6,540	3.5%
Number of cattle	103,340	7,430	7.2%	682,210	14,140	2.1%
Number of buffaloes	79,770	9,310	11.7%	292,470	10,750	3.7%
Number of chickens	388,610	68,150	17.5%	746,130	72,820	9.8%
Farm population	326,300	3,780	1.2%	2,478,210	14,810	0.6%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
WESTERN MOUNTAIN

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 41 MANANG			DISTRICT 42 MUSTANG		
Total area of holdings (ha)	800	-	-	1,180	30	2.2%
Area of temporary crops (ha)	630	-	-	1,010	30	2.9%
Area under paddy (ha)	-	-	-	-	-	-
Area under maize (ha)	140	-	-	120	30	27.3%
Area under wheat (ha)	180	-	-	30	10	38.5%
Area of irrigated land (ha)	130	-	-	940	60	6.6%
Number of cattle	2,980	-	-	7,870	430	5.5%
Number of buffaloes	30	-	-	90	60	69.1%
Number of chickens	1,960	-	-	4,880	690	14.1%
Farm population	4,550	-	-	11,280	210	1.8%
	TOTAL WESTERN MOUNTAIN					
Total area of holdings (ha)	2,000	30	1.3%			
Area of temporary crops (ha)	1,640	30	1.8%			
Area under paddy (ha)	-	-	-			
Area under maize (ha)	270	30	12.5%			
Area under wheat (ha)	210	10	5.5%			
Area of irrigated land (ha)	1,070	60	5.8%			
Number of cattle	10,900	430	3.9%			
Number of buffaloes	120	60	50.9%			
Number of chickens	6,870	690	10.0%			
Farm population	15,840	210	1.3%			

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
WESTERN HILL

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 36 GORKHA			DISTRICT 37 LAMJUNG		
Total area of holdings (ha)	31,180	1,140	3.7%	19,100	990	5.2%
Area of temporary crops (ha)	28,760	1,050	3.7%	16,380	860	5.2%
Area under paddy (ha)	13,820	1,070	7.8%	9,960	570	5.7%
Area under maize (ha)	14,560	910	6.2%	8,850	560	6.3%
Area under wheat (ha)	2,320	340	14.8%	620	90	14.1%
Area of irrigated land (ha)	5,300	680	12.9%	8,630	440	5.0%
Number of cattle	114,100	4,550	4.0%	50,120	3,580	7.1%
Number of buffaloes	63,650	2,890	4.5%	44,660	1,590	3.6%
Number of chickens	242,580	12,530	5.2%	146,190	9,610	6.6%
Farm population	271,980	3,160	1.2%	148,950	2,210	1.5%
	DISTRICT 38 TANAHU			DISTRICT 39 SYANGJA		
Total area of holdings (ha)	33,890	1,140	3.4%	31,150	850	2.7%
Area of temporary crops (ha)	31,750	1,020	3.2%	25,370	830	3.3%
Area under paddy (ha)	15,630	1,340	8.6%	10,550	670	6.3%
Area under maize (ha)	17,330	730	4.2%	17,690	530	3.0%
Area under wheat (ha)	2,630	380	14.4%	3,550	250	7.1%
Area of irrigated land (ha)	8,780	1,050	12.0%	8,560	720	8.4%
Number of cattle	132,550	5,440	4.1%	79,350	5,000	6.3%
Number of buffaloes	71,300	3,600	5.0%	112,080	4,650	4.1%
Number of chickens	297,730	21,220	7.1%	236,380	18,210	7.7%
Farm population	275,930	4,170	1.5%	285,200	5,040	1.8%
	DISTRICT 40 KASKI			DISTRICT 43 MYAGDI		
Total area of holdings (ha)	25,050	1,380	5.5%	13,620	740	5.4%
Area of temporary crops (ha)	22,550	1,260	5.6%	12,040	640	5.3%
Area under paddy (ha)	14,490	940	6.5%	2,970	420	14.0%
Area under maize (ha)	10,140	740	7.3%	8,340	520	6.3%
Area under wheat (ha)	3,620	480	13.3%	2,710	250	9.3%
Area of irrigated land (ha)	12,690	800	6.3%	2,920	400	13.6%
Number of cattle	61,890	3,200	5.2%	59,140	6,660	11.3%
Number of buffaloes	75,770	2,310	3.0%	42,280	3,970	9.4%
Number of chickens	188,180	12,190	6.5%	115,480	15,750	13.6%
Farm population	243,380	2,790	1.1%	105,300	1,640	1.6%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
WESTERN HILL (continued)

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 44 PARBAT			DISTRICT 45 BAGLUNG		
Total area of holdings (ha)	28,350	5,290	18.7%	31,910	1,430	4.5%
Area of temporary crops (ha)	12,780	800	6.3%	23,390	1,080	4.6%
Area under paddy (ha)	6,410	490	7.7%	6,880	930	13.4%
Area under maize (ha)	7,760	440	5.6%	15,980	950	6.0%
Area under wheat (ha)	2,110	330	15.6%	6,850	540	7.8%
Area of irrigated land (ha)	5,730	460	8.1%	4,930	780	15.8%
Number of cattle	36,550	2,210	6.0%	87,180	3,990	4.6%
Number of buffaloes	50,360	2,040	4.1%	87,860	5,940	6.8%
Number of chickens	102,940	9,770	9.5%	167,130	11,900	7.1%
Farm population	145,300	2,240	1.5%	226,260	5,160	2.3%
	DISTRICT 46 GULMI			DISTRICT 47 PALPA		
Total area of holdings (ha)	50,510	1,960	3.9%	35,470	1,400	3.9%
Area of temporary crops (ha)	27,840	1,330	4.8%	27,980	1,440	5.2%
Area under paddy (ha)	8,100	1,000	12.3%	8,820	940	10.7%
Area under maize (ha)	21,150	890	4.2%	18,600	870	4.7%
Area under wheat (ha)	7,390	860	11.7%	6,710	880	13.2%
Area of irrigated land (ha)	5,260	1,000	18.9%	6,170	810	13.1%
Number of cattle	86,440	2,090	2.4%	108,690	9,280	8.5%
Number of buffaloes	114,640	5,220	4.6%	71,550	3,410	4.8%
Number of chickens	158,440	12,510	7.9%	232,290	14,180	6.1%
Farm population	298,280	3,920	1.3%	231,190	5,200	2.2%
	DISTRICT 51 ARGHAKHANCHI			TOTAL WESTERN HILL		
Total area of holdings (ha)	29,020	1,550	5.3%	329,250	6,710	2.0%
Area of temporary crops (ha)	16,530	920	5.6%	245,380	3,470	1.4%
Area under paddy (ha)	5,050	360	7.1%	102,690	2,810	2.7%
Area under maize (ha)	11,030	660	5.9%	151,430	2,420	1.6%
Area under wheat (ha)	9,290	480	5.1%	47,800	1,670	3.5%
Area of irrigated land (ha)	4,610	400	8.8%	73,570	2,390	3.2%
Number of cattle	65,400	2,770	4.2%	881,400	16,170	1.8%
Number of buffaloes	74,120	1,110	1.5%	808,290	12,090	1.5%
Number of chickens	89,770	6,170	6.9%	1,977,110	45,390	2.3%
Farm population	179,540	2,340	1.3%	2,411,330	12,150	0.5%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
WESTERN TERAI

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 48 NAWALPARASI			DISTRICT 49 RUPANDEHI		
Total area of holdings (ha)	71,560	4,530	6.3%	73,190	3,260	4.5%
Area of temporary crops (ha)	67,340	4,460	6.6%	67,850	3,320	4.9%
Area under paddy (ha)	45,730	3,060	6.7%	63,050	3,330	5.3%
Area under maize (ha)	13,780	1,590	11.5%	1,570	310	19.9%
Area under wheat (ha)	21,230	2,560	12.0%	21,090	1,490	7.1%
Area of irrigated land (ha)	23,890	2,480	10.4%	36,480	3,220	8.8%
Number of cattle	170,640	12,590	7.4%	163,030	3,750	2.3%
Number of buffaloes	52,350	5,670	10.8%	67,110	3,420	5.1%
Number of chickens	247,160	19,170	7.8%	270,990	53,850	19.9%
Farm population	420,840	6,290	1.5%	424,250	6,410	1.5%
	DISTRICT 50 KAPILBASTU			TOTAL WESTERN TERAI		
Total area of holdings (ha)	90,390	3,530	3.9%	235,140	6,610	2.8%
Area of temporary crops (ha)	85,250	3,070	3.6%	220,440	6,350	2.9%
Area under paddy (ha)	79,150	2,440	3.1%	187,930	5,140	2.7%
Area under maize (ha)	400	120	29.9%	15,760	1,630	10.3%
Area under wheat (ha)	24,560	1,380	5.6%	66,870	3,270	4.9%
Area of irrigated land (ha)	25,980	3,370	13.0%	86,360	5,280	6.1%
Number of cattle	177,440	5,590	3.2%	511,110	14,280	2.8%
Number of buffaloes	59,100	4,160	7.0%	178,560	7,820	4.4%
Number of chickens	461,410	397,580	86.2%	979,560	401,670	41.0%
Farm population	345,820	4,330	1.3%	1,190,920	9,970	0.8%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
MID-WESTERN MOUNTAIN

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 62 DOLPA			DISTRICT 63 JUMLA		
Total area of holdings (ha)	3,550	240	6.7%	8,760	460	5.2%
Area of temporary crops (ha)	3,260	150	4.6%	8,080	420	5.3%
Area under paddy (ha)	70	20	30.6%	2,000	230	11.3%
Area under maize (ha)	770	100	13.2%	1,700	130	7.9%
Area under wheat (ha)	360	50	15.3%	1,530	100	6.7%
Area of irrigated land (ha)	350	90	25.7%	1,890	230	12.0%
Number of cattle	17,640	1,830	10.3%	57,990	2,140	3.7%
Number of buffaloes	1,150	230	20.1%	1,520	310	20.5%
Number of chickens	26,670	1,830	6.9%	25,130	1,890	7.5%
Farm population	23,950	370	1.5%	72,370	1,260	1.7%
	DISTRICT 64 KALIKOT			DISTRICT 65 MUGU		
Total area of holdings (ha)	6,010	410	6.8%	3,060	110	3.6%
Area of temporary crops (ha)	5,580	380	6.9%	2,840	110	3.9%
Area under paddy (ha)	1,990	190	9.4%	610	80	13.5%
Area under maize (ha)	2,220	190	8.4%	80	10	17.2%
Area under wheat (ha)	3,070	310	10.0%	1,060	70	6.8%
Area of irrigated land (ha)	1,820	150	8.4%	370	50	14.1%
Number of cattle	54,470	3,350	6.1%	27,000	1,580	5.9%
Number of buffaloes	18,330	1,880	10.2%	4,670	350	7.5%
Number of chickens	9,970	1,950	19.6%	9,330	920	9.8%
Farm population	87,650	2,390	2.7%	37,070	570	1.5%
	DISTRICT 66 HUMLA			TOTAL MID-WESTERN MOUNTAIN		
Total area of holdings (ha)	3,070	240	7.7%	24,450	710	2.9%
Area of temporary crops (ha)	2,880	230	7.9%	22,640	640	2.8%
Area under paddy (ha)	320	70	20.7%	4,980	310	6.3%
Area under maize (ha)	160	40	25.8%	4,930	260	5.2%
Area under wheat (ha)	640	80	12.9%	6,640	350	5.2%
Area of irrigated land (ha)	210	60	26.1%	4,640	300	6.4%
Number of cattle	20,490	900	4.4%	177,590	4,740	2.7%
Number of buffaloes	1,550	280	18.0%	27,220	1,970	7.2%
Number of chickens	10,900	2,070	19.0%	81,990	3,990	4.9%
Farm population	32,920	650	2.0%	253,960	2,860	1.1%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
MID-WESTERN HILL

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 52 PYUTHAN			DISTRICT 53 ROLPA		
Total area of holdings (ha)	34,380	1,720	5.0%	21,330	1,310	6.2%
Area of temporary crops (ha)	23,050	1,030	4.5%	18,000	1,170	6.5%
Area under paddy (ha)	5,440	270	4.9%	2,140	310	14.7%
Area under maize (ha)	14,650	680	4.6%	12,890	1,050	8.1%
Area under wheat (ha)	8,910	680	7.6%	9,330	1,350	14.5%
Area of irrigated land (ha)	7,520	760	10.0%	2,110	270	12.6%
Number of cattle	104,990	4,960	4.7%	186,800	8,080	4.3%
Number of buffaloes	49,100	2,840	5.8%	38,600	2,060	5.3%
Number of chickens	151,720	9,270	6.1%	233,620	8,630	3.7%
Farm population	183,440	2,820	1.5%	180,970	3,370	1.9%
	DISTRICT 54 RUKUM			DISTRICT 55 SALYAN		
Total area of holdings (ha)	12,710	560	4.4%	24,160	1,020	4.2%
Area of temporary crops (ha)	10,620	480	4.5%	20,410	990	4.8%
Area under paddy (ha)	1,580	210	13.0%	7,510	470	6.3%
Area under maize (ha)	8,140	400	4.9%	10,780	650	6.0%
Area under wheat (ha)	7,520	310	4.1%	15,570	760	4.9%
Area of irrigated land (ha)	1,170	190	16.6%	5,710	520	9.1%
Number of cattle	103,680	2,960	2.9%	157,600	6,220	3.9%
Number of buffaloes	50,240	3,030	6.0%	25,130	2,130	8.5%
Number of chickens	153,590	5,810	3.8%	212,340	8,940	4.2%
Farm population	151,600	1,260	0.8%	180,800	2,810	1.6%
	DISTRICT 59 SURKHET			DISTRICT 60 DAILEKHA		
Total area of holdings (ha)	26,600	1,530	5.7%	12,410	940	7.5%
Area of temporary crops (ha)	23,510	1,360	5.8%	11,560	890	7.7%
Area under paddy (ha)	9,730	670	6.8%	5,830	500	8.5%
Area under maize (ha)	11,790	1,150	9.7%	4,080	270	6.6%
Area under wheat (ha)	14,490	1,230	8.5%	6,340	540	8.6%
Area of irrigated land (ha)	8,930	990	11.1%	5,020	440	8.9%
Number of cattle	154,830	12,020	7.8%	103,670	3,220	3.1%
Number of buffaloes	32,520	1,440	4.4%	43,730	2,500	5.7%
Number of chickens	190,190	14,300	7.5%	66,500	5,300	8.0%
Farm population	208,300	3,890	1.9%	183,020	3,000	1.6%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
MID-WESTERN HILL (continued)

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 61 JAJARKOT			TOTAL MID-WESTERN HILL		
Total area of holdings (ha)	12,470	690	5.6%	144,050	3,120	2.2%
Area of temporary crops (ha)	11,590	650	5.6%	118,740	2,590	2.2%
Area under paddy (ha)	3,350	280	8.4%	35,600	1,100	3.1%
Area under maize (ha)	6,730	350	5.2%	69,070	1,910	2.8%
Area under wheat (ha)	7,840	490	6.3%	70,010	2,240	3.2%
Area of irrigated land (ha)	1,870	190	10.4%	32,340	1,470	4.6%
Number of cattle	93,610	3,360	3.6%	905,180	17,420	1.9%
Number of buffaloes	28,390	1,540	5.4%	267,720	6,050	2.3%
Number of chickens	78,350	7,620	9.7%	1,086,300	23,770	2.2%
Farm population	108,420	1,770	1.6%	1,196,520	7,490	0.6%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
MID-WESTERN TERAI

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 56 DANG			DISTRICT 57 BANKE		
Total area of holdings (ha)	56,440	2,060	3.6%	49,060	2,200	4.5%
Area of temporary crops (ha)	50,590	1,940	3.8%	46,860	2,090	4.5%
Area under paddy (ha)	26,770	1,440	5.4%	31,400	1,230	3.9%
Area under maize (ha)	21,970	780	3.6%	4,850	900	18.5%
Area under wheat (ha)	17,710	1,480	8.4%	15,440	1,140	7.4%
Area of irrigated land (ha)	31,060	1,520	4.9%	3,320	420	12.5%
Number of cattle	215,230	5,570	2.6%	107,910	9,480	8.8%
Number of buffaloes	53,310	4,560	8.6%	48,680	3,680	7.6%
Number of chickens	335,800	25,240	7.5%	42,840	7,650	17.9%
Farm population	325,640	7,520	2.3%	212,980	5,240	2.5%
	DISTRICT 58 BARDIYA			TOTAL MID-WESTERN TERAI		
Total area of holdings (ha)	50,720	2,390	4.7%	156,220	3,840	2.5%
Area of temporary crops (ha)	47,830	2,450	5.1%	145,280	3,760	2.6%
Area under paddy (ha)	32,280	3,220	10.0%	90,440	3,740	4.1%
Area under maize (ha)	12,900	960	7.4%	39,720	1,530	3.9%
Area under wheat (ha)	12,790	750	5.9%	45,940	2,010	4.4%
Area of irrigated land (ha)	24,220	3,150	13.0%	58,600	3,520	6.0%
Number of cattle	117,780	4,280	3.6%	440,920	11,800	2.7%
Number of buffaloes	58,330	2,350	4.0%	160,330	6,310	3.9%
Number of chickens	230,330	20,250	8.8%	608,960	33,250	5.5%
Farm population	253,570	4,920	1.9%	792,200	10,400	1.3%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
FAR WESTERN MOUNTAIN

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 67 BAJURA			DISTRICT 68 BAJHANG		
Total area of holdings (ha)	10,470	660	6.3%	9,060	670	7.4%
Area of temporary crops (ha)	9,790	640	6.5%	8,330	630	7.5%
Area under paddy (ha)	3,950	360	9.0%	3,490	230	6.6%
Area under maize (ha)	3,310	530	16.1%	2,510	390	15.6%
Area under wheat (ha)	5,440	420	7.7%	5,410	550	10.1%
Area of irrigated land (ha)	850	110	12.6%	1,740	270	15.4%
Number of cattle	73,870	4,770	6.5%	107,860	4,690	4.3%
Number of buffaloes	26,400	4,250	16.1%	31,950	2,710	8.5%
Number of chickens	20,270	3,480	17.1%	14,980	3,580	23.9%
Farm population	95,820	2,030	2.1%	144,250	2,780	1.9%
	DISTRICT 75 DARCHULA			TOTAL FAR WESTERN MOUNTAIN		
Total area of holdings (ha)	11,240	780	6.9%	30,770	1,220	4.0%
Area of temporary crops (ha)	8,910	580	6.5%	27,030	1,070	3.9%
Area under paddy (ha)	2,420	270	11.2%	9,860	500	5.1%
Area under maize (ha)	4,840	300	6.1%	10,660	720	6.8%
Area under wheat (ha)	5,800	470	8.1%	16,650	830	5.0%
Area of irrigated land (ha)	1,730	200	11.8%	4,310	350	8.2%
Number of cattle	75,780	2,570	3.4%	257,510	7,170	2.8%
Number of buffaloes	28,020	1,430	5.1%	86,370	5,250	6.1%
Number of chickens	8,180	3,370	41.2%	43,430	6,020	13.9%
Farm population	111,250	2,940	2.6%	351,330	4,530	1.3%

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
FAR WESTERN HILL

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 69 ACHHAM			DISTRICT 70 DOTI		
Total area of holdings (ha)	10,680	940	8.8%	11,500	440	3.8%
Area of temporary crops (ha)	9,890	810	8.2%	10,620	420	4.0%
Area under paddy (ha)	5,200	490	9.3%	5,910	250	4.3%
Area under maize (ha)	2,890	390	13.6%	1,700	100	6.0%
Area under wheat (ha)	7,060	660	9.3%	7,520	270	3.5%
Area of irrigated land (ha)	3,080	310	10.1%	4,030	210	5.2%
Number of cattle	104,740	5,030	4.8%	94,570	5,200	5.5%
Number of buffaloes	51,760	2,350	4.5%	24,320	1,360	5.6%
Number of chickens	60,670	7,920	13.1%	32,980	3,560	10.8%
Farm population	209,270	1,740	0.8%	154,800	2,120	1.4%
	DISTRICT 73 DADHELDHURA			DISTRICT 74 BAITADI		
Total area of holdings (ha)	12,120	430	3.6%	21,250	1,510	7.1%
Area of temporary crops (ha)	10,610	340	3.2%	16,100	750	4.7%
Area under paddy (ha)	5,660	220	4.0%	7,510	520	6.9%
Area under maize (ha)	3,470	340	9.7%	7,380	430	5.8%
Area under wheat (ha)	7,410	370	5.0%	12,190	590	4.9%
Area of irrigated land (ha)	3,460	270	7.8%	4,720	710	15.0%
Number of cattle	67,690	2,540	3.8%	103,390	3,300	3.2%
Number of buffaloes	24,020	1,930	8.1%	58,530	2,670	4.6%
Number of chickens	18,260	2,140	11.7%	16,270	3,580	22.0%
Farm population	109,010	2,780	2.6%	192,410	3,840	2.0%
	TOTAL FAR WESTERN HILL					
Total area of holdings (ha)	55,540	1,890	3.4%			
Area of temporary crops (ha)	47,220	1,230	2.6%			
Area under paddy (ha)	24,280	790	3.2%			
Area under maize (ha)	15,430	680	4.4%			
Area under wheat (ha)	34,190	1,000	2.9%			
Area of irrigated land (ha)	15,300	840	5.5%			
Number of cattle	370,390	8,350	2.3%			
Number of buffaloes	158,620	4,270	2.7%			
Number of chickens	128,180	9,630	7.5%			
Farm population	665,490	5,480	0.8%			

TABLE A3.3 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92
STANDARD ERRORS - DISTRICTS
FAR WESTERN TERAI

Data item	Census estimate	Standard error	Relative standard error	Census estimate	Standard error	Relative standard error
	DISTRICT 71 KAILALI			DISTRICT 72 KANCHANPUR		
Total area of holdings (ha)	70,060	5,100	7.3%	46,980	2,990	6.4%
Area of temporary crops (ha)	67,220	5,030	7.5%	44,790	2,850	6.4%
Area under paddy (ha)	56,560	4,680	8.3%	30,610	2,580	8.4%
Area under maize (ha)	9,390	640	6.8%	11,120	1,020	9.2%
Area under wheat (ha)	20,840	1,350	6.5%	22,340	1,620	7.2%
Area of irrigated land (ha)	35,860	3,270	9.1%	21,920	2,440	11.1%
Number of cattle	204,950	8,610	4.2%	135,410	5,640	4.2%
Number of buffaloes	73,400	6,360	8.7%	42,940	2,350	5.5%
Number of chickens	297,540	16,320	5.5%	141,720	11,350	8.0%
Farm population	381,270	10,180	2.7%	225,740	8,120	3.6%
	TOTAL FAR WESTERN TERAI					
Total area of holdings (ha)	117,030	5,910	5.1%			
Area of temporary crops (ha)	112,010	5,780	5.2%			
Area under paddy (ha)	87,170	5,340	6.1%			
Area under maize (ha)	20,510	1,210	5.9%			
Area under wheat (ha)	43,190	2,110	4.9%			
Area of irrigated land (ha)	57,780	4,080	7.1%			
Number of cattle	340,360	10,290	3.0%			
Number of buffaloes	116,340	6,780	5.8%			
Number of chickens	439,260	19,880	4.5%			
Farm population	607,020	13,020	2.1%			

APPENDIX 4
SAMPLE DESIGN PARAMETERS

TABLE A4.1: NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Area of holdings			Area under paddy			Area under maize		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
EASTERN MOUNTAIN									
01 Taplejung	1.56	1.12	0.01	1.32	7.55	0.27	1.16	1.48	0.02
09 Sankhuwasabha	1.06	6.39	0.22	1.24	4.88	0.16	1.28	4.62	0.15
11 Solukhumbu	1.46	5.71	0.20	2.63	2.16	0.05	2.15	10.52	0.40
EASTERN HILL									
02 Panchthar	3.20	1.21	0.01	1.70	5.65	0.19	1.10	2.76	0.07
03 Ilam	1.64	0.75	0.01	2.98	0.84	0.01	1.44	1.50	0.02
07 Dhankuta	1.52	1.13	0.01	1.86	3.55	0.11	1.03	2.50	0.06
08 Tehrathum	3.13	6.90	0.25	1.44	1.05	0.00	3.17	4.13	0.13
10 Bhojpur	0.96	4.80	0.16	1.62	3.32	0.10	0.94	4.02	0.13
12 Okhaldhunga	0.96	1.56	0.02	1.86	3.20	0.09	0.91	3.61	0.11
13 Khotang	4.08	1.49	0.02	1.67	2.25	0.05	2.41	0.82	0.01
14 Udayapur	1.22	2.42	0.06	1.65	1.98	0.04	1.38	4.13	0.13
EASTERN TERAI									
04 Jhapa	2.83	0.78	0.01	1.43	2.59	0.07	1.55	2.75	0.07
05 Morang	1.88	2.93	0.08	1.78	2.11	0.05	3.31	4.63	0.15
06 Sunsari	1.30	3.18	0.09	1.33	3.12	0.09	3.39	12.09	0.46
15 Saptari	1.56	1.10	0.00	1.57	1.37	0.02	9.83	5.62	0.19
16 Siraha	1.43	1.69	0.03	1.51	1.58	0.02	4.25	9.86	0.37
CENTRAL MOUNTAIN									
22 Dolakha	0.94	1.80	0.03	1.23	3.28	0.09	1.56	1.58	0.02
23 Sindhupalchok	3.16	0.96	0.00	1.68	6.01	0.21	4.75	0.81	0.01
29 Rasuwa	2.06	1.41	0.02	4.53	2.03	0.04	2.47	1.22	0.01
CENTRAL HILL									
20 Sindhuli	1.38	1.45	0.19	1.70	2.43	0.06	1.35	0.87	0.01
21 Ramechhap	1.07	6.09	0.21	1.64	2.88	0.08	0.97	1.03	0.00
24 Kavre	1.17	2.59	0.07	1.78	3.46	0.10	1.26	3.92	0.12
25 Lalitpur	1.13	0.89	0.00	1.27	4.82	0.16	1.92	3.86	0.12
26 Bhaktapur	0.90	2.04	0.04	0.86	1.91	0.04	2.26	7.10	0.25
27 Kathmandu	1.08	6.34	0.22	1.22	4.43	0.14	1.84	8.03	0.29
28 Nuwakot	0.84	1.31	0.01	1.36	3.71	0.11	0.90	1.39	0.02
30 Dhading	0.85	3.13	0.09	1.39	3.04	0.08	0.98	3.72	0.11
31 Makwanpur	1.23	2.22	0.05	2.69	3.63	0.11	1.42	3.45	0.10

TABLE A4.1 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Area of holdings			Area under paddy			Area under maize		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
CENTRAL TERAI									
17 Dhanusha	1.59	2.63	0.07	1.68	3.83	0.12	5.53	5.83	0.20
18 Mahottari	1.45	1.62	0.03	1.60	2.44	0.06	4.33	9.14	0.34
19 Sarlahi	1.61	1.30	0.01	1.81	1.49	0.02	2.71	5.46	0.19
32 Rautahat	1.24	1.12	0.00	1.29	2.03	0.04	3.85	4.24	0.14
33 Bara	1.41	1.43	0.02	1.53	1.74	0.03	3.88	4.99	0.17
34 Parsa	1.72	2.35	0.06	1.82	2.49	0.06	6.01	8.37	0.31
35 Chitwan	1.16	1.91	0.04	1.49	1.50	0.02	1.33	4.54	0.15
WESTERN MOUNTAIN									
41 Manang	4.50	..	..	30.04	..	..	7.14	..	..
42 Mustang	1.20	0.39	0.03	0.00	0.00	0.04	3.98	5.68	0.20
WESTERN HILL									
36 Gorkha	0.95	2.79	0.07	1.45	5.44	0.18	1.16	5.45	0.19
37 Lamjung	1.26	2.75	0.07	1.44	2.54	0.06	1.52	2.80	0.07
38 Tanahu	1.03	1.66	0.03	1.45	5.50	0.19	1.33	1.59	0.02
39 Syangja	0.89	1.77	0.03	1.45	3.55	0.11	0.85	2.34	0.06
40 Kaski	1.12	4.31	0.14	1.46	3.52	0.10	1.30	5.64	0.19
43 Myagdi	0.90	5.10	0.17	1.66	9.87	0.37	1.02	5.14	0.17
44 Parbat	2.72	7.91	0.29	2.36	1.77	0.03	2.32	0.99	0.00
45 Baglung	1.05	2.95	0.08	2.01	7.24	0.26	1.14	4.46	0.14
46 Gulmi	1.40	1.23	0.01	2.12	5.37	0.18	1.09	2.40	0.06
47 Palpa	0.82	3.90	0.12	1.64	7.19	0.26	0.93	4.29	0.14
51 Arghakhanchi	1.29	2.93	0.08	1.97	2.24	0.05	1.73	2.03	0.04
WESTERN TERAI									
48 Nawalparasi	1.54	3.27	0.09	1.53	3.70	0.11	3.68	1.91	0.04
49 Rupandehi	1.25	2.35	0.06	1.30	3.06	0.09	3.64	5.54	0.19
50 Kapilbastu	1.63	1.12	0.00	1.55	0.78	0.01	5.00	6.98	0.25
MID-WESTERN MOUNTAIN									
62 Dolpa	1.11	4.47	0.14	4.90	4.71	0.15	1.81	6.49	0.23
63 Jumla	1.09	2.80	0.08	1.98	3.97	0.12	1.48	3.50	0.10
64 Kalikot	1.01	5.53	0.19	1.25	6.99	0.25	1.51	3.85	0.12
65 Mugu	0.77	2.73	0.07	1.53	9.66	0.36	4.63	1.71	0.03
66 Humla	0.85	9.99	0.37	2.26	10.21	0.38	3.52	6.53	0.23

TABLE A4.1 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Area of holdings			Area under paddy			Area under maize		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
MID-WESTERN HILL									
52 Pyuthan	1.40	2.21	0.05	1.69	1.47	0.02	0.92	4.40	0.14
53 Rolpa	2.73	0.85	0.01	5.32	1.27	0.01	3.34	0.99	0.00
54 Rukum	0.92	3.64	0.11	2.36	4.79	0.16	0.98	3.94	0.12
55 Salyan	1.15	2.24	0.05	1.82	1.97	0.04	1.16	4.38	0.14
59 Surkhet	1.22	3.78	0.12	1.43	3.90	0.12	1.86	4.67	0.15
60 Dailekha	1.35	4.15	0.13	1.76	3.13	0.09	1.39	3.03	0.08
61 Jajarkot	0.89	5.69	0.20	1.32	5.88	0.20	1.08	3.37	0.10
MID-WESTERN TERAI									
56 Dang	1.41	1.29	0.01	1.95	1.47	0.02	1.37	1.31	0.01
57 Banke	1.38	1.95	0.04	1.55	1.19	0.01	2.58	9.55	0.36
58 Bardiya	1.28	2.55	0.06	1.61	7.26	0.26	1.72	3.52	0.10
FAR WESTERN MOUNTAIN									
67 Bajura	1.10	3.89	0.12	1.61	3.68	0.11	2.01	7.51	0.27
68 Bajhang	1.01	7.39	0.27	1.31	3.52	0.11	1.74	11.18	0.42
75 Darchula	1.12	5.34	0.18	1.62	6.69	0.24	1.24	3.40	0.10
FAR WESTERN HILL									
69 Achham	1.18	8.01	0.29	1.15	9.45	0.35	1.98	6.78	0.24
70 Doti	1.17	1.49	0.02	1.30	1.49	0.02	2.03	1.20	0.01
73 Dadheldhura	0.98	1.81	0.03	1.17	1.58	0.02	1.63	4.89	0.16
74 Baitadi	1.02	7.13	0.26	1.44	3.36	0.10	1.12	3.93	0.12
FAR WESTERN TERAI									
71 Kailali	1.70	3.26	0.09	1.79	3.80	0.12	2.29	1.58	0.02
72 Kanchanpur	1.14	5.94	0.21	1.39	7.02	0.25	1.63	5.11	0.21

TABLE A4.1 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Number of cattle			Farm population			Holdings with rice		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
EASTERN MOUNTAIN									
01 Taplejung	1.58	2.31	0.05	0.47	1.17	0.01	0.75	15.89	0.62
09 Sankhuwasabha	0.78	2.55	0.06	0.43	1.20	0.01	0.62	5.70	0.20
11 Solukhumbu	0.98	4.00	0.13	0.34	5.48	0.19	1.88	3.51	0.10
EASTERN HILL									
02 Panchthar	0.90	3.20	0.09	0.48	1.61	0.03	0.81	6.47	0.23
03 Ilam	0.87	1.74	0.03	0.46	1.40	0.02	1.04	3.64	0.11
07 Dhankuta	1.02	2.47	0.06	0.47	0.58	0.02	0.99	6.07	0.21
08 Tehrathum	0.87	4.68	0.15	0.46	0.64	0.01	0.61	4.09	0.13
10 Bhojpur	0.99	3.52	0.11	0.48	3.35	0.10	0.85	4.83	0.16
12 Okhaldhunga	0.83	3.64	0.11	0.52	1.40	0.02	1.01	5.88	0.20
13 Khotang	0.93	1.43	0.02	0.48	2.29	0.05	0.73	8.27	0.30
14 Udayapur	0.98	3.06	0.09	0.47	3.28	0.10	0.75	4.29	0.14
EASTERN TERAI									
04 Jhapa	0.99	0.71	0.01	0.44	2.20	0.05	0.49	6.40	0.23
05 Morang	0.98	2.01	0.04	0.47	1.25	0.01	0.46	2.04	0.04
06 Sunsari	1.13	6.55	0.23	0.46	4.46	0.14	0.50	5.79	0.20
15 Saptari	1.11	2.50	0.06	0.53	2.60	0.07	0.27	0.94	0.00
16 Siraha	1.27	3.11	0.09	0.52	4.54	0.15	0.34	5.12	0.17
CENTRAL MOUNTAIN									
22 Dolakha	1.01	2.66	0.07	0.43	1.02	0.00	0.67	4.75	0.16
23 Sindhupalchok	1.02	3.40	0.10	0.50	3.72	0.11	0.63	4.36	0.14
29 Rasuwa	1.10	4.02	0.13	0.45	3.09	0.09	1.20	19.97	0.79
CENTRAL HILL									
20 Sindhuli	0.98	3.33	0.10	0.47	0.97	0.00	0.78	7.70	0.28
21 Ramechhap	1.02	1.69	0.03	0.50	1.78	0.03	0.90	4.12	0.13
24 Kavre	1.13	8.78	0.32	0.49	2.57	0.07	0.81	6.84	0.24
25 Lalitpur	4.67	1.19	0.01	0.51	1.03	0.00	0.67	6.24	0.22
26 Bhaktapur	1.80	2.26	0.05	0.54	1.66	0.03	0.19	1.58	0.02
27 Kathmandu	1.43	5.23	0.18	0.50	1.00	0.00	0.56	5.83	0.20
28 Nuwakot	1.01	1.97	0.04	0.51	1.38	0.02	0.50	5.27	0.18
30 Dhading	0.90	3.68	0.11	0.45	0.61	0.02	0.69	3.14	0.09
31 Makwanpur	1.93	1.57	0.02	0.49	1.02	0.00	1.39	8.02	0.29

TABLE A4.1 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Number of cattle			Farm population			Holdings with rice		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
CENTRAL TERAI									
17 Dhanusha	1.14	0.42	0.02	0.49	2.00	0.04	0.30	5.54	0.19
18 Mahottari	1.08	4.71	0.15	0.53	0.65	0.01	0.29	1.95	0.04
19 Sarlahi	1.18	3.16	0.09	0.56	1.53	0.02	0.46	5.35	0.18
32 Rautahat	1.63	2.17	0.05	0.51	1.29	0.01	0.40	8.98	0.33
33 Bara	1.48	3.29	0.10	0.59	2.83	0.08	0.36	5.52	0.19
34 Parsa	2.48	2.14	0.05	0.52	2.80	0.08	0.30	6.93	0.25
35 Chitwan	2.97	1.13	0.01	0.49	1.10	0.00	0.65	4.08	0.13
WESTERN MOUNTAIN									
41 Manang	4.84	..	..	1.75	..	..	26.30	..	..
42 Mustang	0.90	4.49	0.15	0.47	1.89	0.04	0.00	0.00	0.04
WESTERN HILL									
36 Gorkha	1.30	1.78	0.03	0.49	1.08	0.00	0.63	8.26	0.30
37 Lamjung	1.35	4.58	0.15	0.51	1.36	0.02	0.44	1.96	0.04
38 Tanahu	1.22	1.80	0.03	0.52	1.35	0.01	0.67	9.98	0.37
39 Syangja	1.43	3.60	0.11	0.48	2.51	0.06	0.75	4.88	0.16
40 Kaski	1.96	1.23	0.01	0.50	0.94	0.00	0.69	5.99	0.21
43 Myagdi	1.19	12.36	0.47	0.51	1.31	0.01	1.02	15.62	0.61
44 Parbat	1.43	2.98	0.08	0.50	1.60	0.03	0.54	4.25	0.14
45 Baglung	1.29	2.01	0.04	0.52	3.11	0.09	0.98	11.35	0.43
46 Gulmi	1.32	0.54	0.02	0.56	0.88	0.00	1.13	6.22	0.22
47 Palpa	1.11	10.09	0.38	0.54	2.97	0.08	0.94	4.43	0.14
51 Arghakhanchi	1.34	1.72	0.03	0.46	1.36	0.02	0.95	4.76	0.16
WESTERN TERAI									
48 Nawalparasi	1.18	7.66	0.28	0.55	1.45	0.02	0.49	8.49	0.31
49 Rupandehi	1.05	0.90	0.00	0.54	1.46	0.02	0.23	2.89	0.08
50 Kapilbastu	1.22	1.31	0.01	0.59	0.88	0.00	0.25	1.80	0.03
MID-WESTERN MOUNTAIN									
62 Dolpa	1.06	11.65	0.44	0.41	1.32	0.01	2.05	16.98	0.67
63 Jumla	0.79	2.65	0.07	0.43	1.99	0.04	0.43	10.65	0.40
64 Kalikot	0.78	7.60	0.27	0.48	3.94	0.12	0.32	3.39	0.10
65 Mugu	0.84	6.08	0.21	0.49	1.20	0.01	0.66	16.06	0.63
66 Humla	0.88	3.42	0.10	0.48	2.10	0.05	0.99	19.91	0.79

TABLE A4.1 (continued): NATIONAL SAMPLE CENSUS OF AGRICULTURE, 1991/92 - SAMPLE DESIGN PARAMETERS

District	Number of cattle			Farm population			Holdings with rice		
	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity	Coeffic. of variation	Design effect	Measure of homo-geneity
MID-WESTERN HILL									
52 Pyuthan	0.90	4.78	0.16	0.46	1.97	0.04	0.87	2.34	0.06
53 Rolpa	1.91	0.86	0.01	0.48	2.56	0.07	1.17	7.39	0.27
54 Rukum	0.86	1.76	0.03	0.46	0.52	0.02	1.26	5.01	0.17
55 Salyan	0.76	4.52	0.15	0.47	1.78	0.03	0.65	4.81	0.16
59 Surkhet	2.71	1.40	0.02	0.44	0.08	0.59	5.80	0.20	0.20
60 Dailekha	0.80	2.03	0.04	0.48	1.53	0.02	0.39	3.87	0.12
61 Jajarkot	0.85	2.59	0.07	0.49	1.59	0.02	0.69	4.01	0.13
MID-WESTERN TERAI									
56 Dang	0.96	1.41	0.02	0.53	3.68	0.11	0.84	6.01	0.21
57 Banke	1.57	5.80	0.20	0.58	3.34	0.10	0.54	3.27	0.09
58 Bardiya	1.49	1.11	0.00	0.64	1.70	0.03	0.73	8.68	0.32
FAR WESTERN MOUNTAIN									
67 Bajura	1.06	4.37	0.14	0.49	2.19	0.05	0.34	4.66	0.15
68 Bajhang	0.63	6.69	0.24	0.55	1.70	0.03	0.52	8.09	0.30
75 Darchula	0.67	3.56	0.11	0.55	3.25	0.09	0.66	8.76	0.32
FAR WESTERN HILL									
69 Achham	0.75	5.98	0.21	0.44	0.51	0.02	0.33	4.33	0.14
70 Doti	0.95	4.62	0.15	0.49	1.11	0.00	0.27	3.43	0.10
73 Dadheldhura	0.82	2.91	0.08	0.48	3.88	0.12	0.34	7.98	0.29
74 Baitadi	0.59	4.29	0.14	0.45	2.87	0.08	0.55	11.84	0.45
FAR WESTERN TERAI									
71 Kailali	1.78	1.00	0.00	0.66	2.89	0.08	0.51	3.67	0.11
72 Kanchanpur	1.30	1.95	0.04	0.57	7.66	0.28	0.38	2.76	0.07

APPENDIX 5

AGRICULTURAL CENSUS, 1991/92
COMPARISONS WITH 1991 POPULATION CENSUS

TABLE A5.1: FARM POPULATION BY REGION, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Farm population ('000)	
	Agricultural Census, 1991/92	Population Census, 1991
Nepal	16,258.2	15,901.3
Ecological belt		
Mountain	1,446.6	1,411.7
Hill	7,747.9	7,576.7
Terai	7,063.6	6,912.9
Development region		
Eastern	3,712.7	3,649.5
Central	5,061.0	4,978.9
Western	3,618.0	3,456.8
Mid-western	2,242.7	2,222.6
Far Western	1,623.8	1,593.6

TABLE A5.2: FARM HOUSEHOLD SIZE BY REGION, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Average farm household size	
	Agricultural Census, 1991/92	Population Census, 1991
Nepal	5.9	5.8
Ecological belt		
Mountain	5.5	5.4
Hill	5.7	5.6
Terai	6.3	6.2
Development region		
Eastern	5.8	5.7
Central	5.9	5.8
Western	5.9	5.7
Mid-western	6.0	6.0
Far Western	6.1	6.0

TABLE A5.3: FARM POPULATION AND FARM HOUSEHOLD SIZE BY DISTRICT, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Agricultural Census 1991/92		Population Census 1991	
	Population ('000)	Ave. h'hold size	Population ('000)	Ave. h'hold size
Taplejung	115.1	5.7	116.4	5.8
Sankhuwasabha	141.8	5.6	137.9	5.4
Solukhumbu	86.1	4.8	93.9	5.2
Panchthar	174.3	5.8	170.4	5.7
Ilam	220.5	5.8	221.3	5.8
Dhankuta	140.5	5.7	137.4	5.6
Tehrathum	103.1	6.0	99.2	5.8
Bhojpur	178.5	5.0	196.1	5.5
Okhaldhunga	144.1	5.6	138.5	5.4
Khotang	217.9	5.5	216.3	5.5
Udayapur	195.5	5.5	201.1	5.7
Jhapa	459.8	6.2	440.4	5.9
Morang	467.2	6.0	456.8	5.9
Sunsari	273.6	6.3	270.0	6.2
Saptari	407.8	6.3	373.3	5.7
Siraha	386.9	5.9	380.6	5.8
Dolakha	175.5	5.1	168.6	4.9
Sindhupalchok	271.9	5.5	262.8	5.3
Rasuwa	35.3	5.5	34.4	5.3
Sindhuli	210.2	5.8	214.7	6.0
Ramechhap	187.3	5.5	185.4	5.5
Kavre	328.6	6.1	313.3	5.8
Lalitpur	168.3	5.8	169.8	5.9
Bhaktapur	144.7	6.4	142.8	6.3
Kathmandu	265.6	5.8	266.8	5.9
Nuwakot	254.2	5.9	236.4	5.5
Dhading	259.8	5.4	267.8	5.6
Makwanpur	281.3	5.8	282.9	5.8
Dhanusha	428.6	6.1	414.1	5.9
Mahottari	354.3	6.1	342.7	5.9
Sarlahi	387.0	5.9	394.9	6.0
Rautahat	376.6	5.9	361.8	5.7
Bara	343.1	6.4	343.5	6.4
Parsa	262.3	6.5	269.2	6.6
Chitwan	326.3	6.1	307.2	5.8

TABLE A5.3 (continued): FARM POPULATION AND FARM HOUSEHOLD SIZE BY DISTRICT, COMPARISON BETWEEN CENSUSES

	Agricultural Census 1991/92		Population Census 1991	
	Population ('000)	Ave. h'hold size	Population ('000)	Ave. h'hold size
Manang	4.5	5.0	4.1	4.5
Mustang	11.3	4.5	12.1	4.9
Gorkha	272.0	5.9	242.4	5.3
Lamjung	149.0	5.3	146.6	5.2
Tanahu	275.9	6.1	256.1	5.7
Syangja	285.2	5.6	278.9	5.5
Kaski	243.4	5.5	230.6	5.2
Myagdi	105.3	5.6	95.2	5.0
Parbat	145.3	5.6	138.0	5.3
Baglung	226.3	5.3	227.1	5.4
Gulmi	298.3	6.2	258.4	5.4
Palpa	231.2	6.0	222.8	5.8
Arghakhanchi	179.5	5.4	178.6	5.3
Nawalparasi	420.8	6.6	400.2	6.2
Rupandehi	424.2	6.3	437.4	6.4
Kapilbastu	345.8	6.7	328.4	6.4
Dolpa	24.0	5.2	23.6	5.1
Jumla	72.4	5.6	74.5	5.7
Kalikot	87.7	5.5	88.2	5.6
Mugu	37.1	5.6	35.8	5.4
Humla	32.9	5.6	33.9	5.8
Pyuthan	183.4	5.8	171.8	5.4
Rolpa	181.0	5.6	179.2	5.6
Rukum	151.6	5.4	152.5	5.4
Salyan	181.0	6.0	178.4	5.9
Surkhet	208.3	6.0	206.6	6.0
Dailekha	183.0	5.6	185.3	5.6
Jajarkot	108.4	5.4	113.0	5.6
Dang	325.6	6.8	318.3	6.6
Banke	213.0	5.9	220.8	6.2
Bardiya	253.6	8.0	240.6	7.6
Bajura	95.8	5.7	90.9	5.4
Bajhang	144.3	6.0	135.7	5.6
Darchula	111.2	6.6	98.9	5.9
Achham	209.3	5.5	198.7	5.2
Doti	154.8	5.3	158.4	5.4
Dadeldhura	109.0	6.2	102.1	5.8
Baitadi	192.4	5.7	196.3	5.8
Kailali	381.3	7.3	375.3	7.2
Kanchanpur	225.7	6.4	237.4	6.7

TABLE A5.4: AGE COMPOSITION OF FARM AND TOTAL POPULATION, NEPAL, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

Age group	Farm population*		Total population#	
	Number ('000)	Per cent	Number ('000)	Per cent
All ages	16,258.2	100.0	18,491.1	100.0
Under 10 years	4,414.8	27.2	5,513.3	29.8
10 - 14 years	2,061.0	12.7	2,327.3	12.6
15 - 24 years	3,124.2	19.2	3,379.3	18.3
25 - 34 years	2,313.7	14.2	2,528.7	13.7
35 - 44 years	1,789.7	11.0	1,870.0	10.1
45 - 54 years	1,265.3	7.8	1,332.6	7.2
55 - 65 years	789.9	4.9	897.6	4.9
65 years & over	499.7	3.1	639.6	3.5
Not stated	-	-	2.5	-

* 1991/92 Agricultural Census.
\# 1991 Population Census.

TABLE A5.5: GENDER COMPOSITION OF FARM AND TOTAL POPULATION BY AGE, NEPAL, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

Age group	Males per 100 females	
	Farm population* 1991/92	Total population# 1991
All ages	109.5	99.5
Under 10 years	107.5	103.3
10 - 14 years	117.4	108.3
15 - 24 years	109.8	90.7
25 - 34 years	100.8	90.4
35 - 44 years	104.7	98.1
45 - 54 years	116.6	104.8
55 - 65 years	121.6	107.7
65 years & over	118.2	104.6

* 1991/92 Agricultural Census.
\# 1991 Population Census.

TABLE A5.6: FARM AND TOTAL POPULATION BY SEX AND DISTRICT, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

District	Farm population* 1991/92			Total population# 1991		
	Male ('000)	Female ('000)	Sex ratio	Male ('000)	Female ('000)	Sex ratio
Taplejung	57.2	58.0	98.7	58.8	61.3	95.9
Sankhuwasabha	73.3	68.5	107.0	69.5	72.4	96.0
Solukhumbu	47.3	38.8	121.8	47.9	49.3	97.2
Panchthar	88.0	86.3	102.1	86.3	89.0	97.0
Ilam	114.4	106.1	107.8	115.4	113.8	101.4
Dhankuta	69.7	70.8	98.6	72.1	74.3	97.0
Tehrathum	51.8	51.3	101.1	50.3	52.6	95.8
Bhojpur	90.6	87.9	103.0	96.0	102.7	93.5
Okhaldhunga	73.4	70.7	103.8	68.0	71.5	95.0
Khotang	109.5	108.4	101.0	104.9	111.1	94.4
Udayapur	102.8	92.7	110.9	109.7	111.6	98.3
Jhapa	243.4	216.4	112.5	300.0	293.8	102.1
Morang	245.5	221.7	110.7	343.0	331.8	103.4
Sunsari	147.6	126.0	117.2	234.2	229.3	102.2
Saptari	217.5	190.3	114.3	236.4	229.3	103.1
Siraha	209.8	177.1	118.5	236.2	224.5	105.2
Dolakha	88.0	87.5	100.5	84.8	88.4	95.9
Sindhupalchok	140.8	131.0	107.5	131.5	129.5	101.6
Rasuwa	19.4	15.8	123.0	19.0	17.8	106.9
Sindhuli	109.8	100.4	109.4	111.4	112.5	99.0
Ramechhap	93.7	93.5	100.2	90.7	97.3	93.2
Kavre	169.6	159.0	106.6	159.8	164.5	97.1
Lalitpur	86.6	81.7	106.0	130.3	126.8	102.8
Bhaktapur	73.8	70.9	104.1	86.8	86.1	100.8
Kathmandu	133.0	132.6	100.3	351.3	324.0	108.4
Nuwakot	130.2	124.0	105.0	122.5	122.7	99.8
Dhading	137.3	122.6	112.0	138.0	140.0	98.6
Makwanpur	148.3	133.0	111.5	159.6	155.0	102.9
Dhanusha	229.7	199.0	115.4	281.8	261.9	107.6
Mahottari	191.1	163.2	117.2	227.6	212.5	107.1
Sarlahi	212.2	174.8	121.5	255.0	237.8	107.2
Rautahat	207.7	168.8	123.1	214.0	200.0	107.0
Bara	189.4	153.7	123.2	214.9	200.8	107.0
Parsa	143.2	119.1	120.2	193.2	179.4	107.7
Chitwan	170.5	155.8	109.5	175.7	178.8	98.2

* 1991/92 Agricultural Census.
\# 1991 Population Census.
Sex ratio: Number of males per 100 females.

TABLE A5.6 (continued): FARM AND TOTAL POPULATION BY SEX AND DISTRICT, COMPARISON BETWEEN CENSUSES

District	Farm population 1991/92			Total population 1991		
	Male ('000)	Female ('000)	Sex ratio	Male ('000)	Female ('000)	Sex ratio
Manang	2.3	2.3	96.4	2.8	2.6	108.4
Mustang	6.2	5.1	119.9	7.5	6.8	109.4
Gorkha	141.6	130.4	108.5	121.3	131.2	92.5
Lamjung	75.6	73.4	103.0	73.1	80.6	90.6
Tanahu	141.2	134.8	104.7	127.3	140.8	90.5
Syangja	146.5	138.7	105.6	136.3	157.3	86.7
Kaski	123.0	120.3	102.3	141.5	151.4	93.5
Myagdi	54.1	51.2	105.6	47.7	52.8	90.4
Parbat	67.9	77.4	87.7	66.6	77.0	86.5
Baglung	115.9	110.4	105.0	108.3	124.1	87.3
Gulmi	152.3	146.0	104.3	120.8	145.5	83.0
Palpa	123.0	108.2	113.7	110.3	126.0	87.6
Arghakhanchi	85.6	93.9	91.2	84.2	96.7	87.0
Nawalparasi	224.2	196.7	114.0	217.7	218.5	99.7
Rupandehi	220.2	204.1	107.9	264.6	257.5	102.7
Kapilbastu	184.2	161.6	114.0	191.4	180.3	106.2
Dolpa	12.2	11.7	104.0	12.7	12.3	103.2
Jumla	38.3	34.1	112.5	38.6	37.4	103.2
Kalikot	46.7	40.9	114.2	44.7	44.1	101.3
Mugu	19.2	17.8	107.9	18.6	17.8	104.3
Humla	17.5	15.4	114.0	17.7	16.7	106 1
Pyuthan	94.4	89.1	106.0	81.8	93.7	87.2
Rolpa	92.6	88.4	104.7	86.8	92.8	93.6
Rukum	79.3	72.3	109.8	77.0	78.6	97.9
Salyan	91.7	89.1	103.0	90.2	91.6	98.4
Surkhet	108.2	100.1	108.0	111.8	113.9	98.2
Dailekha	94.3	88.7	106.3	93.6	93.8	99.7
Jajarkot	57.6	50.9	113.2	57.2	56.8	100.6
Dang	169.3	156.4	108.2	175.1	179.3	97.6
Banke	116.1	96.9	119.9	147.8	137.8	107.2
Bardiya	132.8	120.8	110.0	146.9	143.4	102.5
Bajura	49.9	45.9	108.8	45.1	47.0	96.0
Bajhang	75.2	69.1	108.8	66.7	72.4	92.0
Darchula	57.0	54.3	105.0	50.1	51.6	97.2
Achham	105.1	104.2	100.8	93.1	105.1	88.6
Doti	78.5	76.3	102.8	80.9	86.3	93.7
Dadeldhura	55.9	53.1	105.3	50.4	54.2	92.9
Baitadi	102.3	90.1	113.6	96.4	104.4	92.3
Kailali	199.8	181.4	110.1	210.1	207.8	101.1
Kanchanpur	123.3	102.5	120.3	130.0	127.9	101.7

TABLE A5.7: TOTAL AREA OF HOLDINGS BY SIZE OF HOLDING, NEPAL, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Area of holdings ('000 ha.)*	
	Agricultural Census, 1991/92	Population Census, 1991
All holdings	2,599.0	2,604.2
Holdings without land	1.6	-
Holdings with land	2,597.4	2,604.2
Under 0.1 ha.	9.6	9.3
0.1 - 0.2 ha.	38.0	38.8
0.2 - 0.5 ha.	244.8	221.4
0.5 - 1.0 ha.	499.5	468.6
1.0 - 2.0 ha.	716.5	701.4
2.0 - 3.0 ha.	400.2	426.2
3.0 - 4.0 ha.	202.4	213.6
4.0 - 5.0 ha.	125.7	147.1
5.0 - 10.0 ha.	209.3	243.1
10.0 ha. & over	151.3	134.7

* Includes small amount of land for holdings with no land.

TABLE A5.8: TOTAL AREA OF HOLDINGS BY REGION, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Area of holdings ('000 ha.)*	
	Agricultural Census, 1991/92	Population Census, 1991
Nepal	2,599.0	2,604.2
Ecological belt		
Mountain	176.9	260.7
Hill	1,047.3	1,010.9
Terai	1,374.8	1,332.7
Development region		
Eastern	783.9	758.8
Central	720.4	748.8
Western	566.5	519.7
Mid-western	324.8	348.2
Far Western	203.4	228.7

* Includes small amount of land for holdings with no land.

TABLE A5.9: TOTAL NUMBER OF LIVESTOCK BY REGION, COMPARISON BETWEEN POPULATION AND AGRICULTURAL CENSUSES

	Number of livestock ('000)	
	Agricultural Census, 1991/92	Population Census, 1991
Nepal	17,175.3	14,824.3
Ecological belt		
Mountain	2,169.1	1,951.0
Hill	9,174.8	7,983.5
Terai	5,831.4	4,889.8
Development region		
Eastern	4,116.8	3,278.7
Central	4,244.6	3,649.7
Western	3,712.3	3,212.1
Mid-western	3,246.9	3,027.0
Far Western	1,854.7	1,656.9

APPENDIX 6

AGRICULTURAL CENSUS, 1991/92
COMPARISONS WITH CURRENT AGRICULTURAL STATISTICS

NOTE: Area figures shown in the tables refer to land holdings only. All other figures refer to all holdings.

TABLE A6.1: AREA UNDER PADDY, MAIZE AND WHEAT BY REGION, COMPARISON BETWEEN CENSUS AND OTHER SOURCE, 1991/92

Region	Area ('000 hectares)					
	Paddy		Maize		Wheat	
	Census 1991/92	Other source	Census 1991/92	Other source	Census 1991/92	Other source
Nepal	1,481.2	1,411.8	768.7	754.1	633.1	571.3
Ecological belt						
Mountain	49.3	40.4	69.3	57.7	48.7	42.1
Hill	335.2	341.4	515.3	535.8	223.5	240.0
Terai	1,096.8	1,030.0	184.1	160.6	360.8	289.2
Development region						
Eastern	489.0	452.5	224.2	169.2	118.4	91.8
Central	449.3	431.0	216.7	194.9	183.1	176.4
Western	290.6	271.9	167.5	198.0	114.9	104.6
Mid-western	131.0	129.7	113.7	140.1	122.6	120.2
Far Western	121.3	126.7	46.6	51.8	94.0	78.4

Other source - Ministry of Agriculture, 1991/92 data.

TABLE A6.2: NUMBER OF CATTLE AND BUFFALOES BY REGION, COMPARISON BETWEEN CENSUS AND OTHER SOURCE, 1991/92

Region	Number of cattle ('000)		Number of buffaloes ('000)	
	Census 1991/92	Other source	Census 1991/92	Other source
Nepal	7,359.3	6,245.7	3,116.3	3,058.3
Ecological belt				
Mountain	844.5	808.8	267.8	316.7
Hill	3,663.7	3,181.4	1,860.1	1,779.6
Terai	2,851.1	2,255.4	988.4	962.0
Development region				
Eastern	1,812.2	1,497.7	563.4	605.7
Central	1,651.8	1,470.8	749.4	776.0
Western	1,403.4	1,274.5	987.0	847.6
Mid-western	1,523.7	1,261.5	455.3	496.2
Far Western	968.2	741.2	361.3	332.9

Other source - Ministry of Agriculture, 1991/92 data.

TABLE A6.3: SELECTED CHARACTERISTICS BY DISTRICT, COMPARISON BETWEEN CENSUS AND OTHER SOURCE, 1991/92

District	Area under paddy ('000 hectares)		Area under maize ('000 hectares)		Cattle numbers ('000)	
	Census	Other	Census	Other	Census	Other
EASTERN MOUNTAIN						
01 Taplejung	6.1	6.5	10.3	9.3	57.9	77.2
09 Sankhuwasabha	10.4	11.6	8.4	9.9	88.7	79.4
11 Solukhumbu	1.4	0.7	7.3	4.3	47.2	41.1
EASTERN HILLS						
02 Panchthar	9.9	9.7	15.4	15.2	73.0	57.6
03 Ilam	13.5	11.8	23.5	15.3	121.6	80.7
07 Dhankuta	8.8	9.6	15.8	19.0	80.3	87.4
08 Tehrathum	8.0	8.2	11.5	12.1	56.4	46.4
10 Bhojpur	14.8	12.6	19.5	16.3	100.9	94.5
12 Okhaldhunga	5.2	5.5	17.5	9.1	75.1	62.4
13 Khotang	9.5	12.8	20.7	15.3	102.0	87.2
14 Udayapur	16.1	11.7	15.6	9.7	132.6	99.5
EASTERN TERAI						
04 Jhapa	91.5	88.7	30.7	10.5	219.7	190.7
05 Morang	100.6	80.2	21.7	11.7	232.9	127.9
06 Sunsari	54.2	51.6	3.2	7.5	130.9	102.4
15 Saptari	74.9	65.6	0.4	1.0	156.8	132.6
16 Siraha	64.2	65.8	2.8	3.0	136.2	130.8
CENTRAL MOUNTAIN						
22 Dolakha	4.5	2.2	7.6	4.3	74.6	74.6
23 Sindhupalchok	10.6	6.0	16.2	10.2	109.1	108.3
29 Rasuwa	1.4	1.1	3.7	2.4	21.1	24.1
CENTRAL HILLS						
20 Sindhuli	12.2	10.9	21.8	17.1	120.9	135.2
21 Ramechhap	5.8	4.9	21.3	16.9	80.0	73.4
24 Kavre	12.4	10.8	24.8	23.5	103.0	101.0
25 Lalitpur	4.3	4.1	4.6	5.1	24.7	24.0
26 Bhaktapur	5.0	4.8	1.5	2.1	15.1	15.2
27 Kathmandu	7.3	9.7	4.2	4.7	47.3	33.6
28 Nuwakot	16.2	16.9	16.0	19.7	98.4	102.8
30 Dhading	15.3	13.5	22.5	15.7	129.3	125.4
31 Makwanpur	8.5	13.0	23.2	19.2	146.1	68.3

Other source - Ministry of Agriculture, 1991/92 data.

TABLE A6.3 (continued): SELECTED CHARACTERISTICS BY DISTRICT, COMPARISON BETWEEN CENSUS AND OTHER SOURCE, 1991/92

District	Area under paddy ('000 hectares)		Area under maize ('000 hectares)		Cattle numbers ('000)	
	Census	Other	Census	Other	Census	Other
CENTRAL TERAI						
17 Dhanusha	58.4	51.2	1.5	2.7	113.5	103.1
18 Mahottari	53.8	46.6	3.4	3.3	99.2	97.4
19 Sarlahi	55.2	48.7	8.8	10.3	124.6	92.4
32 Rautahat	54.6	52.3	4.9	4.9	96.9	68.3
33 Bara	50.2	58.4	3.9	6.4	79.0	86.8
34 Parsa	41.4	45.7	0.7	4.6	65.6	49.0
35 Chitwan	32.2	30.5	26.0	22.0	103.3	88.0
WESTERN MOUNTAIN						
41 Manang	-	-	0.1	0.1	3.0	2.5
42 Mustang	-	-	0.1	1.0	7.9	7.1
WESTERN HILLS						
36 Gorkha	13.8	16.8	14.6	18.6	114.1	77.5
37 Lamjung	10.0	11.5	8.8	10.0	50.1	75.7
38 Tanahu	15.6	12.6	17.3	20.0	132.5	102.0
39 Syangja	10.6	15.1	17.7	34.2	79.3	105.1
40 Kaski	14.5	17.3	10.1	15.4	61.9	48.9
43 Myagdi	3.0	1.3	8.3	6.6	59.1	44.6
44 Parbat	6.4	6.2	7.8	11.7	36.6	30.4
45 Baglung	6.9	5.0	16.0	14.7	87.2	77.4
46 Gulmi	8.1	10.4	21.2	21.6	86.4	85.9
47 Palpa	8.8	7.6	18.6	20.2	108.7	101.8
51 Arghakhanchi	5.0	4.8	11.0	14.5	65.4	47.0
WESTERN TERAI						
48 Nawalparasi	45.7	34.7	13.8	7.0	170.6	146.8
49 Rupandehi	63.0	63.5	1.6	1.5	163.0	164.8
50 Kapilbastu	79.2	65.2	0.4	0.9	177.4	157.2
MID-WESTERN MOUNTAIN						
62 Dolpa	0.1	0.5	0.8	2.0	17.6	18.4
63 Jumla	2.0	1.3	1.7	1.3	58.0	50.1
64 Kalikot	2.0	1.2	2.2	1.8	54.5	57.5
65 Mugu	0.6	1.2	0.1	1.6	27.0	21.2
66 Humla	0.3	0.5	0.2	0.1	20.5	24.5

Other source - Ministry of Agriculture, 1991/92 data.

TABLE A6.3 (continued): SELECTED CHARACTERISTICS BY DISTRICT, COMPARISON BETWEEN CENSUS AND OTHER SOURCE, 1991/92

District	Area under paddy ('000 hectares)		Area under maize ('000 hectares)		Cattle numbers ('000)	
	Census	Other	Census	Other	Census	Other
MID-WESTERN HILLS						
52 Pyuthan	5.4	5.3	14.7	10.5	105.0	78.1
53 Rolpa	2.1	4.7	12.9	8.9	186.8	166.4
54 Rukum	1.6	4.8	8.1	19.0	103.7	80.8
55 Salyan	7.5	5.8	10.8	21.7	157.6	126.0
59 Surkhet	9.7	9.0	11.8	14.6	154.8	118.9
60 Dailekha	5.8	5.0	4.1	10.1	103.7	91.5
61 Jajarkot	3.4	3.1	6.7	8.0	93.6	77.4
MID-WESTERN TERAI						
56 Dang	26.8	36.6	22.0	20.5	215.2	192.2
57 Banke	31.4	23.5	4.9	10.2	107.9	80.8
58 Bardiya	32.3	27.4	12.9	9.8	117.8	77.7
FAR WESTERN MOUNTAIN						
67 Bajura	4.0	2.5	3.3	0.8	73.9	57.0
68 Bajhang	3.5	3.6	2.5	2.5	107.9	91.5
75 Darchula	2.4	1.7	4.8	6.1	75.8	74.1
FAR WESTERN HILLS						
69 Achham	5.2	6.8	2.9	5.2	104.7	94.5
70 Doti	5.9	6.7	1.7	4.2	94.6	79.4
73 Dadeldhura	5.7	6.5	3.5	2.5	67.7	68.4
74 Baitadi	7.5	5.0	7.4	7.6	103.4	109.5
FAR WESTERN TERAI						
71 Kailali	56.6	50.5	9.4	11.6	204.9	90.5
72 Kanchanpur	30.6	43.5	11.1	11.3	135.4	76.1

Other source - Ministry of Agriculture, 1991/92 data.

APPENDIX 7

COMPARISONS BETWEEN 1981/82 AND 1991/92 AGRICULTURAL CENSUSES

NOTE: Area figures shown in the tables refer to land holdings only. All other figures refer to all holdings.

TABLE A7.1: NUMBER AND AREA OF HOLDINGS BY REGION, 1981/82 AND 1991/92

Region	Number of holdings ('000)		Area of holdings ('000 ha.)	
	1991/92	1981/82	1991/92	1981/82
Nepal	2,736.1	2,194.0	2,597.4	2,463.7
Ecological belt				
Mountain	260.7	197.6	176.8	122.6
Hill	1,357.7	1,045.2	1,046.2	939.7
Terai	1,117.6	951.2	1,374.3	1,401.4
Development region				
Eastern	636.4	578.2	783.2	771.0
Central	855.3	706.4	719.7	823.3
Western	608.8	453.3	566.4	463.6
Mid-western	371.5	276.7	324.7	258.2
Far Western	264.1	179.2	203.3	147.6

TABLE A7.2: NUMBER OF PARCELS AND FARM POPULATION BY REGION, 1981/82 AND 1991/92

Region	Number of parcels ('000)		Farm population ('000)	
	1991/92	1981/82	1991/92	1981/82
Nepal	10,806.2	9,516.4	16,258.2	12,877.7
Ecological belt				
Mountain	1,207.1	976.8	1,446.6	1,097.5
Hill	5,317.7	4,455.5	7,747.9	6,022.6
Terai	4,281.4	4,084.0	7,063.6	5,757.6
Development region				
Eastern	2,123.6	1,913.0	3,712.8	3,398.4
Central	3,195.1	2,793.7	5,061.0	4,160.2
Western	2,797.4	2,915.6	3,618.0	2,635.1
Mid-western	1,585.2	1,249.3	2,242.7	1,634.4
Far Western	1,105.0	644.8	1,623.8	1,049.3

TABLE A7.3: HOLDINGS GROWING PADDY AND AREA UNDER PADDY BY REGION, 1981/82 AND 1991/92

Region	Holdings with paddy ('000)		Area under paddy ('000 ha.)	
	1991/92	1981/82	1991/92	1981/82
Nepal	2,037.5	1,021.7	1,481.2	1,394.1
Ecological belt				
Mountain	179.1	49.9	49.3	25.4
Hill	905.4	350.9	335.2	284.0
Terai	953.0	620.9	1,096.8	1,084.7
Development region				
Eastern	468.4	234.2	489.0	463.4
Central	655.2	380.6	449.3	465.8
Western	439.1	227.0	290.6	253.2
Mid-western	248.9	105.9	131.0	137.6
Far Western	225.8	74.0	121.3	74.1