
TANZANIA - Agricultural Sample Census 2007-2008 – Explanatory notes

1. Historical Outline

In 2007, the Government of Tanzania launched 2007/08 National Sample Census of Agriculture as an important part of the Poverty Monitoring Master Plan. This plan supports the production of statistics for advocacy of effective public policy, including poverty reduction, access to services, gender and other planning purposes. The census is intended to support and fill in the information gap necessary for planning and policy formulation by high level decision making bodies. Besides, it is meant to provide critical data indicators for monitoring Agricultural Sector Development Programme (ASDP) and other agricultural and rural development programmes as well as prioritizing specific interventions for agriculture and rural development – based programmes.

The 2007/08 Agricultural Sample Census is the fourth Agricultural Census to be carried out in Tanzania since Independence. The first was conducted in 1971/72, the second in 1993/94 and 1994/95 (household characteristics and livestock counts were collected 1993/94 and data on crop area and production in 1994/95), and the third in 2002/03.

2. Legal Basis and Organization

The Statistics Act 2002 empowers the National Bureau of Statistics (NBS) to collect and publish specified statistics. At the National level, the Director General of the National Bureau of Statistics, Tanzania Mainland, in collaboration with the Chief Government Statistician, Tanzania Zanzibar was responsible for the Census of Agriculture.

The 2007/08 Agricultural Sample Census was conducted by the National Bureau of Statistics (NBS) in collaboration with the sector Ministries of Agriculture, and the Office of the Chief Government Statistician (OCGS), Zanzibar. At the National level, the census was headed by the Director General of the National Bureau of Statistics with assistance from the Director of Economic Statistics. The Planning Group had the responsibility to oversee the operational aspects of the census and this group was comprised of staff from the Department of Agricultural Statistics of NBS and three representatives of the Department of Policy and Planning of the Ministry of Agriculture, Food Security and Cooperatives (MAFC). At the regional level, implementation of the census activities was overseen by the Regional Statistical Officers of NBS and the Regional Agricultural Statistics Supervisors from the Ministry of Agriculture and Food Security. At the District level, the census activities were managed by two Supervisors from the Prime Minister's Office, Regional Administration and Local Government (PMO-RALG). The supervisors managed the enumerators who also came from PMO-RALG.

The 2007/08 Agricultural Sample Census was supported by funding from the Department for International Development (DFID), the Japan International Cooperation Agency (JICA) who financed most of the operational activities with the remaining funding coming from the Government of Tanzania. In addition, the Food and Agriculture Organization (FAO) provided technical assistance.

3. Reference Period or Date

The reference period and dates are not explicitly stated but it appears that for livestock and other variables where it is meaningful to assign a specific day, the reference day would be the date of enumeration. For land, crops, farm inputs the reference period appears to be the 2007/2008 crop year (from 1st October 2007 to 30th September 2008).

4. Enumeration Period

The listing of households started in the first week of May, 2009 in all the sampled villages and was completed by the fourth week of May 2009. Data collection activities for the 2007/08 Agricultural Sample Census lasted for three months from June through August 2009.

5. Definition of the Statistical Unit

The concepts and definitions were essentially those recommended by the FAO and commonly used in

censuses and surveys. For example, an *Agricultural Holding* refers to an economic unit of agricultural production under single management consisting of all livestock kept and all land used for agricultural production without regard to title, a *Holder* is a person who exercises management control over the agricultural holding operation and who takes major decisions regarding resource utilization or disbursement, and an *Agricultural Household* (farm household) is a household where one or more persons are holder(s). In subsistence farming, there is normally a one-to-one correspondence between the agricultural household and the holding.

A *large scale farm* is an economic unit of agriculture production. It consists of all the livestock kept and all the land used for agricultural production without regard to title.

6. Geographic Coverage

The 2007/08 Agricultural Sample Census was conducted for both large and small scale farms. It was large in its scope and coverage as it provides data that can be disaggregated at district level and thus allow comparisons with the 2002/03 National Sample Census of Agriculture. The census covered small holders in rural areas only and all the large scale farms of both the Mainland and Zanzibar.

7. Exclusions and Cut-Off Thresholds

Agriculture in urban and peri-urban areas was excluded. For the purpose of the 2007/08 Agricultural Sample Census, agricultural holdings were limited to those that met one or more of the following conditions: (1) operating at least 25 square meters of arable land; and (2) own or keep at least 1 head of cattle or 5 goats/sheep/pigs or 50 chicken/ducks/turkeys during the agricultural year 2007/08.

8. Methodology

FAO Modular Approach

The Modular approach was used.

Frame

The census covered small-holders in rural areas only and all the large-scale farms. The National Master Sample was developed from the previous 2002 Population and Housing Census. The Mainland sample consisted of 3,192 villages. The villages were drawn from the National Master Sample (NMS) developed by the National Bureau of Statistics (NBS) to serve as a national framework for the conduct of household-based surveys in the country. The total Mainland sample was 47,880 agricultural households while in Zanzibar, a total of 317 EAs were selected and 4,755 agricultural households were covered.

Complete or sample enumeration methods

The 2007/08 Agricultural Sample Census covered both large scale and small scale farms. For large scale farms, data was collected for all farms in the Mainland and Zanzibar on a complete enumeration basis. The sample design for the small holders was designed to provide estimates at the District level for the rural part of both Tanzania Mainland and Tanzania Zanzibar.

Sample Design

The sample design was a stratified two-stage sample, where the rural part of Tanzania was stratified into Districts. The first stage units (Primary Sampling Units) were villages in the case of Tanzania Mainland and rural enumeration areas in the case of Tanzania Zanzibar. In the first stage, villages/EAs were selected in each rural part of the District. About 27 villages/rural EAs per district were selected.

The villages/EAs in the first stage were selected with probability proportional to the number of households in the village. The cumulative total method was then used to achieve the probability proportional to size selection of villages/EAs.

In the second stage, farm households or the secondary sampling units, were selected using a systematic random sampling procedure of farming households identified in the Village/EA listings that was compiled for each selected village/EA. A sample of 15 farming households was selected per selected village/rural EA

Collection Method

The interview method was used to collect data during census. Data collection was monitored by a hierarchical system of supervisors that included a Mobile Response Team, and Regional and District Supervisors. The Mobile Response Team, which was headed by the Manager, Agriculture Statistics Department, provided an overall direction to the field operations and responded to queries arising outside the scope of the training exercise. Decisions made on the definitions and procedures were then communicated back to the enumerators via the Regional and District Supervisors. On the Mainland, each region had two Regional Supervisors (total 42) and two district supervisors per District (total 266).

During the household listing exercise, 3,192 extension staff participated on the Mainland and a total of 177 enumerators participated during the listing exercise and the enumeration of small-scale farms in Zanzibar. A total of 1,596 enumerators were involved in data collection of small-scale farms on the Mainland. An additional five percent of the enumerators were kept as reserves in case of drop-outs during the enumeration exercise.

Questionnaire(s)

The census covered the sector of agriculture in detail as well as many other aspects of rural development and was conducted using three different questionnaires:

- Small scale questionnaire ;
- Community level questionnaire ;
- Large scale farm questionnaire.

The Small-Scale farm questionnaire was the main census instrument and it included questions related to crop and livestock production and practices; population demographics; access to services, community resources and infrastructure; issues on poverty and gender. The community level questionnaire was designed to collect village level data such as access and use of common resources, community tree plantation and seasonal farm gate prices. The Large-Scale Farm questionnaire was administered to large farms either privately or corporately managed.

The Census collected detailed data on crop production, crop marketing, crop storage, livestock production, fish farming, and poverty indicators. In addition to this, the Census was large in its scope and coverage as it provides data that can be disaggregated at district level and thus allow comparisons with the 2002/03 National Sample Census of Agriculture.

The Questionnaire was pre-tested in two locations (Arusha and Dodoma). This was done to test the wording, flow and relevance of the questions and to finalize crop lists, questionnaire coding and manuals. In addition to this, several data collection methodologies had to be finalized, namely, livestock numbers in pastoralist communities, cut flower production, mixed cropping, use of percentage in the questionnaire and finalizing skip patterns and documenting consistency checks.

Controls to Minimize Non-Sampling Errors

A great deal of emphasis was placed on data quality throughout the whole exercise from planning, questionnaire design, training, supervision, data entry, validation and cleaning/editing. As a result of this process, it is believed that the Census is highly accurate and representative of what was experienced in the field during the census operation.

Innovative Methodologies

The Census Data Capture exercise was performed using Optical Character Recognition (OCR) scanning technology. The decision to use the scanning process was made to ensure that the census

data was free of keystroke errors at all stages. Tanzania reports that a number of lessons were learned from the Scanning/Extraction Process:

- (1) Excel is a very satisfactory application for designing questionnaires for scanning due to its precise tabular structure,
- (2) Ensure all answers in the questionnaire are numeric codes. Do not try to extract textual data unless using some of the very costly and sophisticated systems that are usually not in the budgets of developing nations.
- (3) Spend time emphasizing scanning handwriting. Enumerators must practice this and a test should be given to the enumerators before their appointment.
- (4) Registration points - make sure that the questionnaire has many registration points that should vary in size and shape.
- (5) For null response leave blank not zero.
- (6) Boxes in the questionnaire should all be of the same size.
- (7) Consider using perforation instead of a guillotine (an operation cuts the bound edge of all questionnaires so they can be read by the scanning equipment).

9. Data Entry, Edits, Imputation and Tabulation

Data Entry: Scanning and Intelligent Character Recognition (ICR) data capture technology was used on the Mainland for the small-holder questionnaire. This not only increased the speed of data entry, it also increased accuracy due to the reduction of keystroke errors. Interactive validation routines were incorporated into the ICR software to catch errors during the verification process. The scanning operation was so successful that it is highly recommended that the technology be adopted for future censuses and surveys.

Prior to scanning, all questionnaires underwent a manual edit exercise. This involved checking that the questionnaire had a full set of pages, correct identification, and clean and clear handwriting. Questionnaires found unsuitable for scanning were put aside for manual data entry.

CSPro was used for data entry of all Large-Scale Farms and community-based questionnaires due to the relatively small number of questionnaires. It was also used to enter small-holder questionnaires that were rejected by the ICR extraction application as well as those found unsuitable for scanning during the manual editing exercise.

Edit and Imputations: A batch validation program was developed in CSPro in order to identify inconsistencies within a questionnaire. This is in addition to the interactive validation during the ICR extraction process. The procedures varied from simple range checking within each variable to a more complex checking between variables. It took six months to screen, edit and validate the data from the small-holder questionnaire. After the long process of data cleaning, the tabulations were prepared based on the pre-designed tabulation plan.

Tabulations: Statistical Package for Social Sciences (SPSS) was used to produce the Census tabulations and Microsoft Excel was used to organize the tables and compute additional indicators. Excel was also used to produce charts while Arc GIS (Geographic Information System) software was used in producing maps.

10. Data Dissemination and Use

An extensive list of National Sample Census of Agriculture publications is available on the National Bureau of Statistics website.

11. Census Data Quality

A great deal of emphasis was placed on data quality throughout the whole exercise from planning, questionnaire design, training, supervision, data entry, validation and cleaning/editing. With very few exceptions, the variables in the questionnaires were within the norms for Tanzania and they followed the expected time series trends when compared to historical data.

12. Data Sources

FAO ESS World Census of Agriculture 2010, Country Documents
www.fao.org/economic/ess/ess-wca/wca-2010/countryinfo/en/

National Sample Census of Agriculture 2007/2008, Volume 1: Technical and Operation Report, December 2011

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