GOVERNMENT OF THE GAMBIA

Report of the

Agricultural Census

of

The Gambia

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AGRICULTURAL CENSUS REPORT

Foreword

The dominance of the agriculture sector in the economy of the Gambia makes it inevitable that the sector is made a primary target for all economic and social developmental efforts undertaken by the government and other planners and policy makers. However the absence, paucity and unreliability of essential agricultural data required for policy, planning, programming and monitoring of appropriate activities in the sector has hampered efforts at constructive and realistic development planning. It is thus vital that an agricultural statistical database be established urgently to provide reliable data and information with which to accurately plan the implementation of developmental measures.

It is relevant to note that a fully-fledged agricultural census exercise has never been implemented in the country, and over the years, this must undoubtedly have led to an inevitable but unacceptably tremendous void in data and information knowledge. This has definitely inhibited the planning process for the country and led to the misallocation of resources, not only to the agricultural sector but also to the economy as a whole. It has always been the intention of Government to implement an agricultural census as a means of rectifying this major short-coming in planning and ensure that reliable and timely data and information are available on a continuous basis with which to take urgent remedial measures for adequate planning of the economy.

The outcome of the census will also allow for the establishment of realistic databases which will greatly facilitate the designing of developmental strategies in respect of the programmes and project being pursued, especially in government's priority areas of domestic resource mobilisation, food security and poverty alleviation. Such databases will, in addition, provide vital information for the effective integration of the more vulnerable groups into the main stream development, and allow for the achievements and gains of sector strategies to be more accurately and comprehensively known. Also, the locations and conditions of these groups will be clearly and precisely identified to successfully implement poverty alleviation programmes.

This report is self-evident of the successful implementation of this agricultural census exercise and how well the exercise has achieved its objective to provide a broad statistical picture of the country's agricultural sector. The report is presented in two volumes: Volume 1 providing an overview of the more important tables containing the results obtained from field activities, and showing relevant highlights and analysis of trends. Volume 2 gives details of all tables containing all the results obtained from the census.

Although the Government made generous budgetary allocations for the implementation of the census exercise, the total resource demands were such that the Government had to seek additional assistance from various external donors. In this regard, profound thanks and appreciation are extended to all such donors particularly the FAO, the Catholic Relief Services, the UNDP, the ActionAid in the Gambia, the Commonwealth Fund for Technical Co-operation, the European Development Fund, and the Republic of China.

Any success achieved by this census must be attributed, in a large measure, to the hard work of many people. In particular: to the Secretary of State for Agriculture, DOSA, whose personal efforts and commitment, as well as advice to the implementation of the census was extremely valuable; to the Permanent Secretary, DOSA, who as the main link between the Government and the FAO/other donors was extremely helpful in promoting the project; to the Deputy Director of Planning and Head of ASRE, DOP, whose drive and initiative added to the clarity of purpose; to staff of the Technical Departments of DOSA who assisted in developing the census workplan and data requirements; to the Central Statistics Department of the Gambia, who provided the basis for the design of the census; to the field enumerators and supervisors who sacrificed a lot, working under sometimes harsh and difficult terrain to obtain good results; to the data entry and statistical clerks of DOP, whose dedication to their duties contributed greatly to the reliability of the data and the ease of processing them; and to various other DOP staff too numerous to mention, whose support facilitated the entire exercise. The DOP is grateful for their co-operation and assistance and hereby offer its sincere thanks to all of them.

Special thanks are due and are hereby conveyed to Dr. H. Mikkola, the FAO Representative to the Gambia, to Mr. G. Coker, the FAO Regional Statistician and Mr. M. Singh, the CTFC Adviser, who were at the helm in formulating, developing and implementing the programme; to Ms. D. Tempelman, the FAO Regional Officer, Women in Development, who contributed in no small measure towards ensuring that the correct information and data in regard to gender concerns were collected; to Mr. T. E. C. Palmer, the FAO Senior Policy and Programme Officer, who provided valuable advice in the planning, resource mobilisation and start-up of the activity; to Mr. C. Camara, the FAO Country Programme Assistant in the Gambia, who facilitated the administrative procedures to for the smooth take-off the project; and to Mr. F. Ngopya, the FAO Statistician, who was kind enough to visit the Gambia, at short notice, to provide much needed and vital advice in connection with the processing of the census results.

Finally, thanks are due above all, to those farmers and their families who so willingly provided the information for which they were asked. Without their co-operation, the census exercise could not have been successfully accomplished. It is the hope that the implementation of this agricultural census will be the precursor of many more such censuses and/or related surveys which will serve to provide reliable agricultural statistical data and information as well as enable the development of key indicators that aptly describe and reflect the socio-economic developments of the country.

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Introduction

1. Pre-Survey Considerations

In the Gambia, five main government institutions had been identified to be basically responsible for the development and provision of agricultural statistics in the country. However, because of its experience in managing agricultural surveys in the past, the Agricultural Statistics and Resources Economics Unit (ASRE) of the Department of Planning (DOP) of the Department of State for Agriculture (DOSA) was deemed to be in the best position in the country to execute an agricultural census. The capacity of the staff available in the ASRE to organise and implement an agricultural census was inadequate, in terms of experience to design and manage a census. The infrastructural capacity (both human and material) of the ASRE thus had to be significantly strengthened to enable it to implement such a census.

In view of its comparative advantage in the organisation and implementation of agricultural censuses and surveys, the Government of the Gambia requested the FAO, under its Technical Co-operation Programme (TCP), to take the initial initiative to formulate a project for the implementation of an agricultural census in the country. This project included, *inter alia*, a strategy to build and strengthen the capacity and capability in the ASRE in particular, and in the country, in general, to conduct the census as well as to determine the best design and other implementation procedures.

The project document was signed in March 2001 for an initial duration of 12 months and with a financial contribution from the FAO of some US$200,000. The implementation of the project effectively commenced in May 2001, with the visits of the Statistician in the FAO Regional Office for Africa and the International Data Processing expert to set up the Data Processing Unit in the ASRE and the purchase of the relevant equipment. The ASRE was designated the counterpart institution to implement the project with the head of the ASRE as the National Project Co-ordinator (NPC). The ARSE data processing and other staff, available at the time, had to be trained to improve their capacity and experience to process data as well as to execute and manage a census exercise. The concerned FAO staff and other officials/consultants were assigned variously to supervise and/or otherwise carry out the TORs of the different census activities. The Regional Statistician, as Lead Consultant to the project, worked with the NPC to establish the work plan for the project and the timing of the various activities envisaged.

As in any census exercise of this nature, one of the prime considerations is the availability of a census frame. In earlier consultations with the Central Statistics Department, (CSD) of the Gambia, the agency responsible for the conduct of Population Censuses in the country, it had been established that a statistical frame, comprising a list of Enumeration Areas (EAs), was in existence. These EAs are small geographic segmentations of the country and the list, which had been compiled from the results of the last population census held in 1993, was readily available with the corresponding relevant demographic information. The list covered the whole country and each EA had a corresponding map and proper identification. Naturally this was an obvious choice for the census frame. Further, the fact that the EAs are the same as those constructed and used for the population census of the country would allow for further extensive analysis and cross classifications with other

demographic data. Close co-operation was thus established with the CSD to obtain the list of EAs.

2.   Data requirements

One of the initial activities in formulating and developing the census programme for the county was the identification of data needs and priorities. In this regard, a national agricultural statistics user/producer workshop was organised some years back wherein a catalogue of the basic agricultural data requirements for the Gambia were enumerated, Appropriate recommendations were also made for improving the agricultural statistical database and data collection system in the country. The detailed data requirements and corresponding recommendations of the workshop are given in Appendix A of this programme.

3.   Objectives of the Census

Long-term Objectives:

   (a)   Improvement of the capacity and capability in the country to implement an agricultural census and thereby provide agricultural statistical data within an overall integrated agricultural statistical system
   (b)   Provision of national agricultural statistical indicators for assessing and monitoring of the implementation of agricultural development programmes and interventions.

Short-term Objectives:

   (a)   Establishment of a viable sampling frame for agricultural surveys and censuses
   (b)   Development and Implementation of a national programme for an Agricultural Census and an Annual Crop and Livestock Surveys to collect of Integrated Food and Agricultural Statistics
   (c)   Improvement of skills of technical and field staff in agricultural statistical data collection and compilation techniques and thereby develop the capability for undertaking agricultural censuses and surveys as well as compile relevant indicators
   (d)   Collection and accumulation of annual national agricultural statistics
   (e)   Establishment of an agricultural data bank

4.   Scope

The scope of the data collection activities of the Agriculture Census embraced benchmark data on the agricultural sector, which consisted of basic agricultural statistical data and information that

   a. concern the enduring characteristics of agriculture, such as land utilisation, land tenure, distribution of holdings by size, agricultural technologies in use, etc. land tenure, farm labour and inputs, holders characteristics and household composition, marketing information, livestock and poultry numbers, etc. and

b. are likely to fluctuate or change from year to year as well as on those which fluctuate or change from year to year such as crop acreages and yields, prices, agricultural marketing, agricultural commodity prices, livestock numbers and production, etc.

5. Coverage

This agricultural census will essentially provide agricultural statistical data for the whole country, albeit on a sample basis. Its coverage is an expanded version of that which had operating for the annual sample surveys of the past, and entails a much expanded scope to obtain relevant information not covered in the sample surveys. Both the census and these surveys will involve the same elements in regard to methodology and design. Future censuses will be implemented decennially and the surveys annually, in the years between the census years. The censuses being expanded versions of the annual surveys, it has been advocated in certain quarters that they be called sample censuses. It may be more appropriate to refer to it here as expanded agricultural sample surveys.

6. Basic Concepts and Definitions

The basic concepts and definitions used in the census generally followed guidelines set in the 2000 FAO World Census of Agriculture Programme. However some were developed as best suited to the situation in the Gambian situation and the more important ones included:

"Alkalo"   The local head of a village or town

Enumeration Area   For the purpose of Population Census, the entire country is divided into small areas whose size, in terms of geographical expanse and human population, is such that the counting of the population in each area can be conveniently and comfortably carried out within a reasonably short time by one Enumerator. These areas are called Enumeration Areas (EAs). An E.A. may be a single village or group of villages. Several E.A's may also be within a single village or town. For the purpose of Agricultural Census, the pre-determined number of sample EAs for the country as a whole are allocated to the districts, roughly in proportion to their agricultural population.

Locality (Settlement): A locality is a village or town. No physical boundaries are given. So the locality goes on and on until one reaches the outskirts of the village or town. An EA comprises of one or more localities depending on the size of the localities contained.

Compound: A compound may be defined as a " roofless " structure consisting of a space enclosed or in some case not enclosed by walls and containing one or more buildings or huts. There can be a seprate single dabada or strucure which constitutes a compound by itself.

"Dabada"/Household:	A group of individuals, usually related, that conduct work activities (farming or non-farming) as a unit and pool their resources from their activities. A "dabada"/household may contain one or more "sinkiros".
"Sinkiro":	A group of persons living together and eating together from the same pot regardless of whether they live in the same house.
Head of the "Dabada" /Household	The head of the dabada/household is the person (male or female) who is acknowledged as such by all other members. Such a person is usually vested with the responsibility for the maintenance of the dabada/ household and gives advice to other dabada members on all matters of social and economic significance. (N.B.: Only persons residing a minimum of 6 months per year in a dabada are considered members of that unit. This same applies to the Head of the Dabada)
Respondent	the person, who answers the question for the census, usually is the holder.
Agricultural Holder	The holder is the person (man, woman or youngster) who makes the day-to-day decisions for the agricultural holding. A holder could be the owner, manager, senior partner, etc. but should be present at least 6 months per year.
Agricultural Holding	An agricultural holding is defined to include all the land that is used wholly or partially for agricultural production under one technical or operational unit by one person alone or with others without regard to title, legal form, size or location. Non-crop agricultural units producing livestock and poultry are also considered as holdings, if the scope of the survey is extended to a count of livestock and poultry.
Agricultural Production	Agricultural production includes the growing, processing and marketing of field crops, fruits and vegetables and the rearing of livestock, small ruminants (goats, sheep) and poultry/rabbits and their products.
Field	Piece of land, which is inter-cropped or planted in one or more crop.
Plot	Piece of land demarkated on a field for yield and density studies.
Field Manager	The field manager is the person (man, woman or youngster) who makes the day-to-day decisions for a particular part of the agricultural holding (field/s), without necessarily being the owner of that part.

Fallow land	Land not planted this year but has been planted in previous years is farming land allowed to rest so as to regain its fertility under natural cover.
"Maruo"	A communal plot which is designated to provide the bulk of the food that will be required by the household until the following harvest, although it may or may not last through the dry season. The "<u>maruo</u>" plot is usually under the control of the dabada head.
"Kamanyango"	A private plot, the produce of which is allocated for individual disposal.

Organisation of the Survey

7.   Census Frame/Mapping/Construction of EAs

As mentioned earlier, for the purpose of the sampling design to be employed in this census, a statistical frame comprising a listing of EAs was used. This frame covered the whole country and each EA, with its corresponding map and proper identification, had been defined and obtained from the Central Statistics Department of the Gambia. The development, construction and definition of the EAs are spelt out in Appendix B of this report. Supplementary information in the listing, which comprised the statistical frame, included for each EA: the total population distributed by sex and the corresponding cumulative totals, the number of adults in agriculture distributed by sex and the corresponding cumulative totals. The use of this frame as the basis for selecting samples for the census as well as for future agricultural surveys would greatly enhance the synchronisation of statistical and other analysis of data obtained from the field.

8.   Publicity

For an exercise of this nature, the co-operation of all actors in the field was essential to ensure success of the implementation of the activities at the field level. This is necessary to enhance the acquisition of accurate and reliable information. The objective of adequate publicity in this census was first, to allay any anxiety regarding the purposes of the census concerning, for example, taxation, forced expulsion of foreigners, etc., and secondly, to explain the reasons for the various questions to be asked. The publicity mounted entailed the widest possible coverage at the national, divisional, district and local area levels. The publicity campaign started with the circulation of an information note on the objectives of the census to members of the Gambian parliament. Next, a one-day seminar was organized at which senior government, international and other high-ranking nationals were informed of the purposes and strategy of the census. Details in regard to the implementation strategy for the census were discussed and improved.

In April, representatives of the ASRE, the Ministry of Information and the Ministry of Agriculture met and decided on positive steps to betaken in order to give the widest publicity possible to the census throughout the country. The first step entailed the distribution of special press releases to the print media (local newspapers), and broadcasts of special radio and television programmes, etc. by the Department of State for Agriculture. Secondly,

information agents from the Department of State for Agriculture were requested to visit as many localities as possible, making sure that they visited all large villages in every district. The ARSE prepared information briefs used by these agents. Also Commissioners, and Agricultural Officers were requested to publicise the survey to various chiefs, people and farmers alike through their information agents and other personnel such as their extension workers. Thirdly, people were informed through village meetings, conferences of producer associations, etc. Finally local leaders, village headmen and other influential members of the society were contacted and informed of the census exercise. The main publicity campaign relied mostly on radio, television and village meetings and on the distribution of relevant information letters to Divisional Commissioners.

9. Staffing and Recruitment

The composition of the ASRE unit included the following permanent staff:

At the Office level

-       The Director of Planning, DOSA,
-       The Deputy Director of Planning/Principal Statistician, ASRE, who was in overall charge of the project,
-       One Senior Statistician, ASRE
-       One Statistician, ASRE
-       One Cadet Statistician, ASRE
-       Two Secretaries
-       One Stenographer
-       Seven Data Processing Staff, comprising Six Data Entry Clerks and one local Consultant. One of the data processing staff was also responsible for Receipt and Control of forms received, and another assisted with some basic analysis.
-       One CFTC Adviser (International Staff)

At the Field level

-       Three Senior Supervisors, ASRE
-       Ten (10)Supervisors, ASRE,
-       Three Drivers, ASRE
-       60 Enumerators comprising 44 regular staff and 16 hired temporary field staff.

All these staff were mobilised to work in the collection and processing of the data for the census. As indicated, 16 additional field workers had to be employed to increase the total strength of the field enumerators to 60, the required number needed to execute the census operations.

10. Training

A one-week training course was organized for 80 enumerators and other census field staff at the Jenoi Training Centre (some 200-km from the head office in the capital city) from 23- 28 April 2000. The training programme included five days for classroom instructions and two days for field practices, and enumerators reference manuals and questionnaires were

developed and used during the training sessions. The topics covered included undertaking agricultural censuses, familiarisation with the questionnaires and reporting forms, measurement techniques, use of equipment and understanding the importance played by data in the planning process. During the training, special emphasis was placed on techniques for fully capturing information on then participation of men and women in the agricultural sector. After the training, the enumerators were dispatched to their respective areas of assignment for commencement of the census field activities.

Another training session was held for 50 supervisors and 10 statistical officers at the same training centre. This was to upgrade the supervisors' overall knowledge of the census operations, with emphasis on the need for proper quality control during the field operations.

The Data Processing Staff were trained in the use of the SPSS software for data entry, processing, editing, tabulating and analysing agricultural data as well as database design and management for data storage and retrieval. Other technical ASRE staff associated with the project were also trained in census taking techniques and management as well as in data analysis using the SPSS software.

11. Data Collection Activities/Field Operations

After the training course for enumerators/supervisors, they were dispatched to their areas of work. They took with them the census equipment, questionnaires, maps and other supplies needed for the field operations. The enumerators commenced work immediately on arrival in their respective EAs. The field operations for the census undertaken by the enumerators consisted of five different operations viz.:

a.   Reconnaissance Census/Canvassing the EA: The enumerator's first task on arrival was to locate his/her area of assignment. For this purpose he/she was provided with an EA map showing the list of localities (villages) in the EA together with boundaries. Senior Supervisors, together with the supervisors assisted the enumerators in identifying the selected EAs in the respective Local Government Areas (LGAs), to ensure accuracy. They discussed with the village elders within the selected EAs, explaining the purpose of the census, acquainting them with the type of work to be done and the methods of enumeration, as a means of enhancing full co-operation from respondents. On locating the EA, the enumerator then proceeded to canvass the EA. In this operation the enumerator traversed the EA, observing and publicising the census. In the course of this work, he/she prepared an itinerary for visits to the EA in subsequent operations as well as for familiarising himself/herself with the EA and the corresponding localities.

b.   Enumeration area listing of heads of household: The Enumeration Area Listing was the second assignment the enumerator performed in the EA. The operation involved contacting all heads of households in the villages within a selected EA, recording their names and asking them a few questions to determine whether they had any agricultural operations. In the process, the enumerator completed Form 1, the Household Listing Form. These forms are contained in a booklet referred to as the Enumeration Area Listing Booklet.

c.   Filling of holding questionnaires: On completion of the enumeration area listing of heads of households, enumerators visited the E.A., interviewed a sample of

holders selected from the list of heads of households, collected information about them and their operations, and in the process completed Form 2, the Holding Questionnaire.

d.   Measurement of fields and Filling of field questionnaires: After filling the holding questionnaires, enumerators visited and measured all the fields (farms) of the selected holders for information on acreage and the type of crop mixtures in the fields, completing Form 3, the Field Questionnaire, in the process. On arrival at a field for the measurement, the enumerator walked around the field and with the help of the holder, identified and observed the boundaries of the field. He/She then made a free-hand sketch of the field and indicated the different crops growing in the field. Next, he/she proceeded to measure the field in traditional style using a prismatic compass and a measuring tape. Determination of the acreage of the field was made with a programmable hand calculator in the field by the supervisor. Some information on the field was obtained by interviewing the holder and was also recorded on the form.

e.   Implementing Crop Yield Estimation and Filling the Yield Questionnaires: After the completion of field measurements, the supervisors prepared a list of all the fields of the selected holders, with their corresponding crops, and selected a sample of two fields for each crop, for the yield studies. The enumerators then laid yield plots on these selected fields at harvest time harvested the produce, and where possible, carted them to the enumerators' home for drying and weighing. In most cases however, the harvested plots were left with the farmer, who was advised to co-operate and not to interfere with them. After drying, the enumerators returned, weighed the harvested produce and returned them to the farmers. The plots were 5mx5m square plots, i.e. of an area of 25 square metres or 1/400th of a hectare. The weights of the harvested produce from the plots were recorded on Form 4, the Crop Yield Estimation Form. Other yield supporting information was obtained by interviewing the farmer and this was also recorded on the Form.

12.   Receipt and Quality Control Operations

In the course of their field assignments, Senior Supervisors supervised Supervisors who in turn supervised Enumerators. Supervisors observed the enumerators every day at work and reported monthly on their performance in order to ensure reliability and efficiency. Enumerators kept a daily record of their activities in a notebook and the authorities took appropriate actions in regard to problems and other difficulties experienced. Supervisors also kept daily records of their activities in notebooks for appropriate actions, as and when necessary.

After listing all the households in an EA during the listing operation, the enumerators identified all the holders in the district in the listing forms in the booklets and submitted the completed listing booklets to their respective supervisors for review and certification. The supervisors checked the work for completeness and accuracy, signed the Listing Booklet, and submitted them to the senior supervisors for further review and certification. On satisfactory certification of the work done, the senior supervisors selected the sample of holders, and forwarded the completed booklets to headquarters.

After completion of the subsequent field operations, the enumerators at every stage submitted the completed questionnaires to their respective supervisors for review and certification. The supervisors checked the work for completeness and accuracy signed the

questionnaires and submitted them to the senior supervisors for further review and certification. Unsatisfactory questionnaires were returned to the enumerators for correction. With the satisfactory certification of the work done, the senior supervisors forwarded the completed questionnaires to headquarters.

The Supervisors and Senior Supervisors kept records which showed the number of forms they expected to receive, the expected date of receipt, and the number actually received and transmitted. By this procedure, a strict check and control was kept on the rate of progress of the work, and any unnecessary delay was quickly investigated and corrected.

On arrival in the ASRE office at headquarters, each questionnaire or form was carefully registered and the total number received was counted and recorded in the office receipt and control form. This from also showed the number of forms expected; thus a check was maintained in the office on the flow of completed work from the field to the office.

At headquarters, the materials received from the field were checked, verified and cross-checked by a team of Senior Statisticians. The team of statisticians checked and reviewed the work done by the enumerators for accuracy in the filling questionnaires and booklets; implementation of the proper selection procedures; correct measurement of fields; etc. All major inconsistencies, inaccuracies, omissions and unsatisfactory work detected were returned to the field for resolution and correction. All satisfactory work (i.e. completed forms), after certification by the team were sent to the Data Entry Receipt and Control of the Data Processing Unit for subsequent processing.

13.   Timetable: Schedule of Operations/Activities

For the census, several rounds of field and office activities were undertaken to obtain the required data and information. In the main, the rounds of field and office activities entailed the following major practical operations viz.:

Item	Activity	Commencement Period (Month)
1	Sample Selection of Survey Units	January
2	Implementation of administrative logistics and Acquisition of equipment for the Census Operations	February
3	Recruitment of Staff and Other Census Personnel	March
4	Preparation of Census/Surveys Instruments (Manuals, Questionnaires, etc.)	April
5	Training of Staff	May
6	Listing of Households/ Selection of Farmers(Holders)	June
7	Holding Interviews	July
8	Field Interviews and Measurements	July
9	Yield Studies and Measurements	September
10	Processing of Data received from the field	October

14.   Equipment and Costs

At the commencement of the census the equipment situation in the ASRE for collecting agricultural statistics throughout the country was found to be very inadequate. For data

processing, the stock included four computers (two 2000 Gateway 386, one IBM 286, and one Compaq 286). However these computers were outdated, of low capacity and capability, and could not handle all the data capturing and processing activities foreseen under in the census. At best, they could be used for data capture. Similarly, census field equipment, compasses, measuring tapes, scales, photocopiers, printers, etc. were found to be non-functional or lacking. Ultimately, the decision was made to boost the census field equipment and data processing facilities in the ASRE and the following were acquired:

♦ In regard to Data Processing: 5 COMPAQ/DELL computers, 1 MICROSOFT OFFICE 2000 SUITE software, 2 SPSS software packages, 1 CANON photocopier, 3 LASERJET printers, 5 UPS, 5 STABILIZERS, 1 AIR-CONDITIONERS, 3 EXTENSION BOARDS, 5 computer tables and chairs, 3 storage shelves and 2 Security/protection guard-bars.

♦ In regard to the Census Field Work: 1 vehicle, 10 sets of field survey equipment comprising tape measures, compasses, programmable calculators, weighing scales, sighting poles, etc.

The related cost for these hardware was in the region of US$40,000.

15. <u>Funding</u>

At the commencement of planning for the census, the Government accepted the responsibility to provide all the facilities necessary and accommodation for the successful implementation of the project, secretarial and clerical support and transport (including drivers). The Government also agreed to provide the necessary supporting arrangements and counterpart contribution (staff and operating expenses) through the recurrent budget and/or external budgetary arrangements. It soon became apparent however, that the Gambian Government, (the ASRE in particular), did not have all the necessary financial and material resource requirements to undertake an agricultural census. This included the purchase the necessary field and data processing equipment and the further development or acquisition of the necessary statistical skills.

The decision was therefore made to secure external financial and technical assistance from external donors to complement the Government's efforts to fund the agricultural census and related activities. Further, it was proposed that the budget for the census and its corresponding activities be devised and presented in a format for cost-sharing the financial obligations in order to attract the interest of prospective donors and other prospective private and public sector funding agencies more easily. Thereby it was possible to adequately fund the census and to provide the basic essentials for strengthening the capacity and capability in the ASRE and the country, to produce reliable and timely agricultural statistics on an annual and sustainable basis. Technical and financial assistance was forthcoming from the following donors: the Catholic Relief Services, the UNDP, the ActionAid in the Gambia, the Commonwealth Fund for Technical Co-operation, the European Development Fund, the Republic of China and the FAO.

Sampling Design and Estimation Procedures

16. Preliminary Work: Sample Design and Identification of Sampling Units

The overall sample design includes the choice of a frame, choice of sampling units, determination of the sample size, development of the selection procedure, preparation of estimators and their sampling errors and an analysis of the results. In this programme the use of EAs as primary sampling units (PSU) was advocated and these EAs corresponded with those used in the Population Census. In the past, the Enumeration Areas used by the ASRE were different from those of the CSD and this made comparability and other cross-classifications and related studies difficult. The sample selection was done in a manner that enabled the determination of the probability of each unit in the sample. These probabilities were used as weights to form the estimates.

The secondary sampling units (SSU) were dabadas, (clusters of households) found within the EAs. Within a selected EA, all dabadas are listed and those that are agricultural were identified. This list of identified households then constituted the list of holders from which a systematic random sample was selected for further enumeration and study.

17. Sample Size and Selection Procedures

In the past, the sampling design in operation was a two-stage design in which villages constituted the first stage units and households (dabadas) the second stage units (SSU). All the villages within a district, were listed and a sample of six (6) villages selected with probability proportion to size; size being the number of dabadas (clusters of households) within each village. The district was called an enumeration area since one enumerator was in charge of enumerating the all the six (6) villages selected in a district – the corresponding workload deemed to be the most suitable for one enumerator within a district. Three (3) dabadas were then selected within a selected village by systematic random sample. The procedure resulted in the selection of a total of 222 villages (i.e.13 %) out of a total of 1710 villages in the country being used in the sample, corresponding to a total of 666 dabadas (i.e. 1.4%) of the total of 48989 dabadas in the country.

With the current procedure, consideration was first given to the determination of a satisfactory sample size to be used for the census, using available sampling errors. In previous surveys, the sampling error obtained for the early millet crop acreage was determined to be 12%. However experience had shown that, for a country like the Gambia, increasing the number of dabadas in the sample to about 2000, i.e. 4% of the total dabadas in the country, would result in an acceptable sampling error of 2%.

With this in view, it was proposed to use a new sampling procedure for the census in which the EAs would constitute the first stage units and the total number of dabadas in the sample would be increased to about 1850 dabadas. This will produce an acceptable percentage error as explained above. Of the total number of EAs in the country (1601), a 25% sample of EAs (400) will result in approximately 1850 dabadas. Such a sample is also adequate to provide divisional estimates with a reasonable degree of precision. Further, it is known from experience that by providing adequate logistics, such as adequate transportation facilities and pecuniary incentives, the enumerators could handle the additional workload with little or no difficulty.

In practice, all the EAs within a district were listed in the frame and a sample of 25 per cent selected with probability proportional to size. In this instances size is the number of adults in agriculture. Use of adults in agriculture was advocated as it gives a fairer representation of the intensity of agricultural activity. These EAs constituted the first stage units while the dabadas within the EAs constituted the second stage units. From each selected EA, a systematic random sample of five (5) dabadas was selected for enumeration. This resulted in a total of 405 EAs (i.e. 3% of the total EAs in the country) and 1400 dabadas (i.e. 25% of the total dabadas in the country) being selected in the sample. A detailed example of the sampling procedure for selection of the EAs is given in Appendix C.

18. Estimation Techniques and Procedures

The actual estimation techniques and procedures used for processing the census data and providing the related tables, relevant analysis and graphics, comprised the use of modern day "state of the art" electronic data processing facilities (computer hardware and software). In particular, the SPSS computer software package was used and this enabled a quick and accurate processing of the results and production of the tables. Starting with data entry, this package facilitated quick data entry into spreadsheets from data entry forms, the creation of data files for interactive data entry, editing and cleaning, relevant interaction between data editing and analysis, and calculation of the relevant statistical estimates and their standard errors. The General Formulae and corresponding explanations for the Estimation Procedures are spelt out in Appendix D.

Survey Methodology

19. The Census Questionnaires

In this census, most of the data/information was obtained by direct investigation through: (a) the interview method in which answers from respondents to prepared questions were recorded by trained interviewers, and (b) physical measurements of fields and yields in order to obtain estimates of acreages and yields. The five basic questionnaires/forms used for collecting the census data in the field were:

1. FORM 1 - ENUMERATION AREA LISTING(Twenty of these forms were put together to and bound to form a BOOKLET): On this form, the names of all heads of households (dabadas) were listed on this form. The main purpose of the form was to prepare a list from which households with agricultural operations could be identified. Having identified these agricultural households, the heads of these households qualified as holders and a sample of five holders were selected for further investigation in the census. The form is divided into two major sections. Section I – List of Households and Buildings, provides for obtaining information on the buildings and households for identification purposes. Section II – Agricultural Operations, provides for obtaining information on the agricultural operations of the households whereby the holders could be identified.

2. FORM 2 - HOLDING QUESTIONNAIRE: This form was used for obtaining basic information on the holder and was divided into seven sections. Section I - Holding Identification, provides information for identification of the holding.

Section II - List of Person in the Household and their Occupations, provides for obtaining basic information on the structure of the holder's household. Section III - Marketing and Distribution Information, provides for obtaining basic marketing information. Section VI - Participation in Co-operative or any other similar Marketing Society, Banking Institution or the like, provides for obtaining information related to participation in co-operative or similar marketing society, etc., for the holder's household. Section V - Revenues from Off-Farm Employment and Remittances provides for employment information. Section VI – Horticulture Crops Grown, provides for obtaining information on horticultural gardens. Section VII - Livestock, Small Ruminants and Poultry Owned/Managed, provides for obtaining livestock and poultry information.

3. <u>FORM 3 – FIELD QUESTIONNAIRE</u>: This form was used to obtain field area measurements for estimatinge total crop hectarage planted and was divided into five sections. Section I – Field Identification, provides information for identification of the field of the holder. Section II - Field Inventory, provides for obtaining information on managerial arrangements of the fields. Section III – Field Practices, provides for obtaining information on inputs into the fields. Section IV – Field Measurements provides for ontaing the field acreages. Section V - Employment in Agriculture, provides for obtaining information onn employment at the field level. Section VI – Land Tenure and Land Practices, is used to obtain Land Tenure Information. Section VII - Agricultural Power/Machinery, provides for obtaining information on the types of tools and implement used to cultivate fields.

4. <u>FORM 4 - CROP YIELD ESTIMATION FORM</u>: This form is used for recording Crop Yield Measurements obtained by use of the Crop Cutting Method. The general crop cutting procedure is used to locate and harvest one (5X5) 25 square meter sub-plot for each of the measured fields and then to weigh the produce and therefrom obtain yields of the crops. Section I – Yield Plot Identification, provides information for identification of the yield plot.

A copy of each census questionnaire is to be found in Appendix E of this report.

20. <u>Data Processing</u>

The Data Processing consultants, both International and National, developed the programme for processing of the census data and ultimate production of the census results and tabulations using the SPSS Statistical Software package. The questionnaires used in the census were designed in such a way that data could be directly entered into the computer. Data Entry Operation consisted of the creation of a Data Table, which involved the structure of the questionnaire layout, was prepared to specify the variables in the fields corresponding to the entries in the questionnaire. Using the SPSS Data Entry Builder, the entry screen was designed. Validation rules were assigned to the variables to avoid duplication, typographical and other such like errors. Data Entry clerks were trained to input the data correspondingly from the questionnaire to the prepared entry forms on the computer. This enabled quick entry of the data. In practice, some questionnaires were found without the required data entry indicating that there was some flaw in the quality control process. Using Excel, the table output structure was prepared according to the required tables and indicated the corresponding

data sources from the different questionnaires. Tables were then prepared using the analytical procedures in the software package.

21. <u>Data Analysis and Tabulation</u>

Initial tabulations of results from the early rounds of the census operations were produced and analysed to check on coverage, response rate, consistency and reliability of the information being acquired. Also, preliminary tables for the more important variables were produced for basic socio-economic analysis of the census results to be included in the summary results section in this first volume of the census report as well as for other consistency and comparison exercises. The detailed tables containing all the census results are contained in the second volume of the report.

22. <u>Dissemination</u>

A dissemination seminar for users and producers of agricultural statistics in the country was organized in June 2002, to familiarise all concerned with the publication of the census reports and assist in the understanding of some of the inferences and interpretations as contained therein.

Summary of Survey Results

23. <u>Number and Distribution of Farmers</u>

CHART 1:NUMBER AND DISTRIBUTION OF HOLDERS BY SEX BY LGA
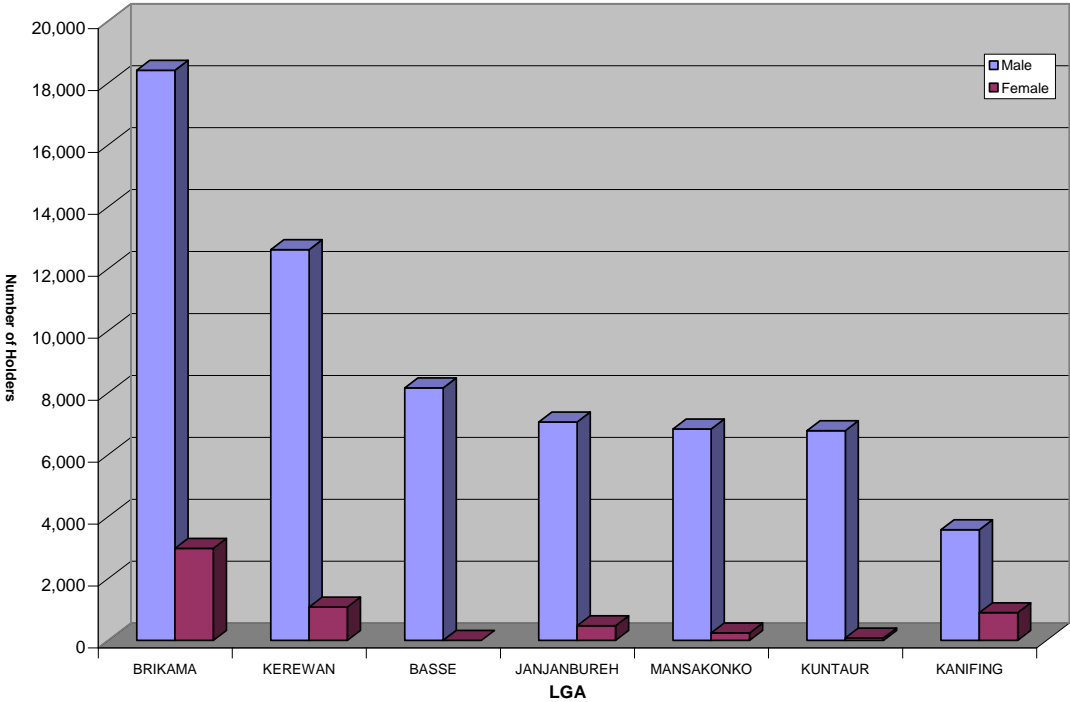
TABLE 1: NUMBER AND DISTRIBUTION OF HOLDERS BY SEX BY LGA

| LGA | NUMBER OF HOLDERS (FROM 2001/2002 AGRICULTURE CENSUS) | | | | | TOTAL POPULATION (FROM 1993 POPULATION CENSUS) | | |
| | Male | | Female | | Total | Male | Female | Total |
	Number	Percent	Number	Percent				
BRIKAMA	18,409	86.1	2,974	13.9	21,383	119,031	115,886	234,917
KEREWAN	12,618	92.1	1,076	7.9	13,694	76,892	79,570	156,462
BASSE	8,156	100.0	-	-	8,156	74,838	80,221	155,059
JANJANBUREH	7,053	93.7	471	6.3	7,524	43,673	44,574	88,247
MANSAKONKO	6,828	96.6	238	3.4	7,066	31,606	33,540	65,146
KUNTAUR	6,771	98.8	79	1.2	6,850	33,385	34,389	67,774
KANIFING	3,574	80.0	893	20.0	4,467	118,257	109,957	228,214
TOTAL (THE GAMBIA)	63,409	91.7	5,731	8.3	69,140	519,950	518,195	1,038,145

♦ As shown in Table 1, the 2001/2002 agricultural census revealed a total of 69,140 small-scale farmers (holders) in the country. The BRIKAMA LGA recorded the highest number of holders, 21,383, which constitutes 30.9% of the total number of holders in the country. This, with the exception of the KANIFING LGA, is most likely a reflection of the pattern of distribution in the 1993 Population Census, in which the highest number of persons was recorded in the BRIKAMA LGA and the lowest in the MANSAKONKO LGA. The KANIFING LGA is an exception in that it is the most highly urbanised area in the country, in which the capital is located and is to be expected, with much less agricultural activity.

CHART 2: NUMBER OF HOLDERS BY AGE, SEX BY LGA
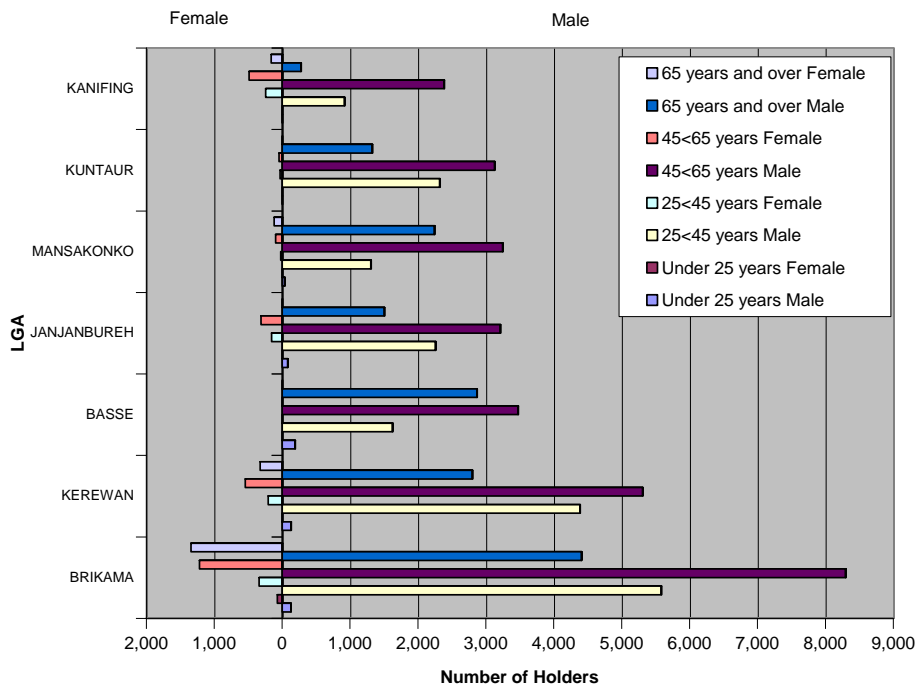
TABLE 2 : NUMBER OF HOLDERS FROM 2001/2002 AGRICULTURE CENSUS BY AGE, SEX BY LGA

			NUMBER OF HOLDERS								TOTAL
	Male					Female					ALL
	Under 25 years	25<45 years	45<65 years	65 years and over	Total	Under 25 years	25<44 years	45<65 years	65 years and over	Total	HOLDERS
LGA											
KANIFING	-	916	2,383	275	3,574	-	244	487	162	893	4,467
BRIKAMA	127	5,581	8,294	4,407	18,409	71	341	1,219	1,343	2,974	21,383
MANSAKONKO	35	1,305	3,246	2,242	6,828	-	21	96	121	238	7,066
KEREWAN	129	4,385	5,305	2,799	12,618	-	206	544	326	1,076	13,694
KUNTAUR	-	2,320	3,126	1,325	6,771	-	32	47	-	79	6,850
JANJANBUREH	80	2,257	3,212	1,504	7,053	-	157	314	-	471	7,524
BASSE	190	1,624	3,474	2,868	8,156	-	-	-	-	-	8,156
TOTAL (THE GAMBIA)	561	18,390	29,038	15,419	63,409	71	1,000	2,707	1,953	5,731	69,140

♦ In Table 2, the distribution of these holders by gender shows that 91.7% were males and only 8.3% females. With the definition of a holder as" the person who exercises management control over the agricultural holding operations and who takes major decisions regarding resource use", this distribution reflects the socio-cultural gender imbalance in the control and management of agricultural holdings in the country.

♦ Most of the holders, 45.8%, are in the age group, 45<65 years. The number of holders below 25 years of age was very small, totalling 632, i.e. 0.9% of the holders in the country. Among female holders, the percentage in the age group 45 years and over was higher (81.3%) as compared to the corresponding figure (70.1%) for males. This may be an indication that female holders were relatively older that male holders.

24. <u>Number and Distribution of the Farming Population:</u>

CHART 3: NUMBER OF FAMILY MEMBERS BY SEX, AGE BY LGA

TABLE 3: NUMBER AND PERCENTAGE DISTRIBUTIION OF FAMILY MEMBERS LIVING IN HOLDER'S HOUSEHOLD BY AGE-GROUP, SEX AND LGA

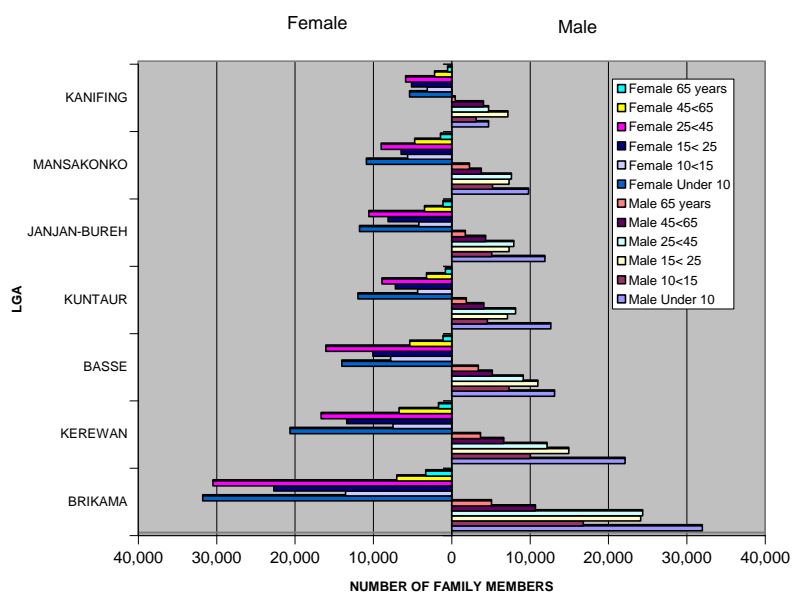| Sex of Family Members	Age Groups	Number of Family Members in							TOTAL	
		KANIFING	BRIKAMA	MANSAKONKO	KEREWAN	KUNTAUR	JANJAN-BUREH	BASSE	No.	%
	Under 10	4,692	31,976	9,805	22,134	12,634	11,894	13,114	106,249	28.8
	10<15	3,128	16,796	5,194	10,025	4,563	5,106	7,317	52,129	14.1
	15< 25	7,175	24,112	7,308	14,928	7,120	7,315	10,976	78,934	21.4
MALE	25<45	4,692	24,357	7,607	12,165	8,147	7,928	9,132	74,027	20.1
	45<65	4,048	10,690	3,782	6,642	4,094	4,323	5,178	38,757	10.5
	65 years	460	5,091	2,275	3,678	1,860	1,745	3,386	18,495	5.0
	Sub-total								368,592	100.0
	Under 10	5,378	31,782	10,876	20,632	11,956	11,773	14,036	106,433	29.1
	10<15	3,123	13,553	5,632	7,501	4,350	4,200	7,781	46,141	12.6
FEMALE	15<25	5,118	22,703	6,463	13,396	7,183	8,127	10,061	73,051	20.0
	25<45	5,899	30,465	9,000	16,658	8,905	10,587	16,059	97,573	26.7
	45<65	2,169	7,013	4,719	6,708	3,230	3,475	5,365	32,679	8.9
	65 years	520	3,323	1,427	1,680	816	1,095	1,101	9,963	2.7
	Sub-total								365,839	100.0
TOTAL									734,431	

♦ Table 3 shows that the total number of family members living in the Holder's Households, who actually constitute the main farming population, was approximately 734,000, divided almost equally between males and females. This implies a ratio of 11 household members to one holder, a ratio which is somewhat constant to all the LGAs, with the exception of BASSE LGA where the ratio was 12 household members to one holder, a ratio almost equally divided between the male and female members. Of the total family members living in the holder's household, there are more females, 23%, than males, 21%, between the ages 15 and 45 years.

25. <u>Hectarage under Cultivation</u>:

CHART 4: HECTARAGE UNDER CULTIVATION BY LGA
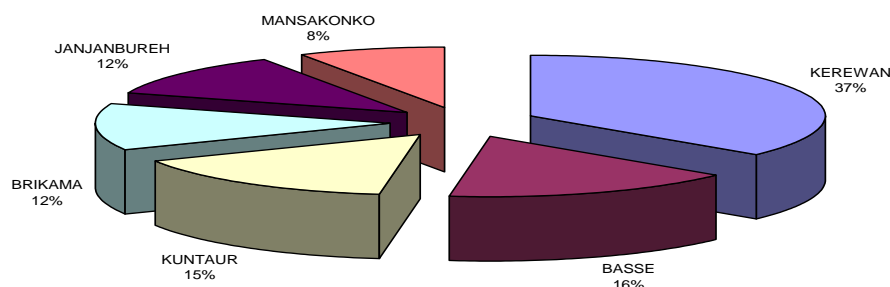
TABLE 4: HECTARAGE UNDER CULTIVATION PER HOLDER BY LGA

LGA	HECTARAGE UNDER CULTIVATION (IN HECTARES)	NUMBER OF HOLDERS	ACREAGE PER HOLDER (IN HECTARES)
KEREWAN	110,329.4	13,694	8.1
BASSE	49,153.6	8,156	6.0
KUNTAUR	47,072.3	6,850	6.9
BRIKAMA	37,889.8	21,383	1.8
JANJANBUREH	35,975.7	7,524	4.8
MANSAKONKO	24,435.3	7,066	3.5
KANIFING	Not Applicable	4,467	
TOTAL (THE GAMBIA)	304,856.1	69,140	4.4

♦ Data from the census (Table 4) reveals a total hectarage of nearly 305,000 hectares, under cultivation by smallholders for practically all the major crops in the country. This is some 30% of the total land area, which is in line with similar results from other countries in the sub-region. The largest hectarage under cultivation, 110,329.4 hectares, was reported in the KEREWAN LGA, although the largest population of farmers is to be found in the BRIKAMA LGA. Table 4 shows that the area cultivated per holder is largest in KEREWAN LGA, which is almost double that cultivated in the BRIKAMA LGA.

CHART 5: DISTRIBUTION OF AREAS FOR GROUNDNUTS, SESAME AND MAJOR CEREAL CROPS UNDER CULTIVATION
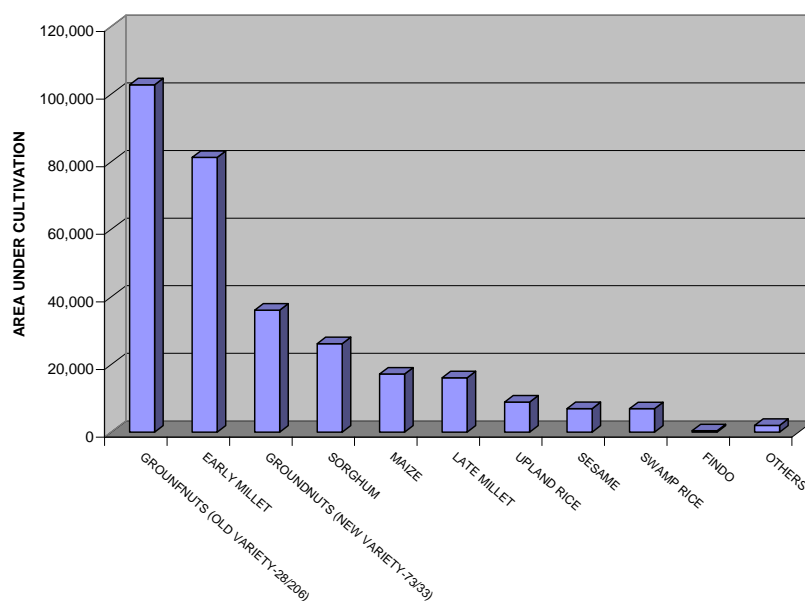
TABLE 5: PERCENTAGE DISTRIBUTION OF AREAS FOR GROUNDNUTS, SESAME AND THE MAJOR CEREAL CROPS UNDER CULTIVATION

CROPS	AREA (IN HECTARES)	PERCENTAGE DISTRIBUTION
GROUNFNUTS (OLD VARIETY-28/206)	102,779.3	33.7
EARLY MILLET	81,272.9	26.7
GROUNDNUTS (NEW VARIETY-73/33)	36,109.0	11.8
SORGHUM	26,174.6	8.6
MAIZE	17,201.5	5.6
LATE MILLET	16,087.2	5.3
UPLAND RICE	8,914.9	2.9
SESAME	6,968.1	2.3
SWAMP RICE	6,953.2	2.3
FINDO	399.6	0.1
OTHERS	1995.8	0.7
ALL CROPS	304,856.1	100.0

♦ The most widely grown crop was still groundnuts contributing 45.5% of the total hectarage under cultivation (Table 5). This was followed by millet, with 32%, and sorghum with 8.6% and then maize with 5.6%. Put together, these crops constitute over 91% of the total acreage under cultivation in the country.

CHART 6:DISTRIBUTION OF HOLDERS GROWING HORTICULTURE CROPS

TABLE 6: DISTRIBUTION OF HOLDERS GROWING HORTICULTURAL CROPS		
MAJOR HORTICULTURAL CROPS GROWN	**NUMBER OF GROWERS**[1]	**AS PERCENTAGE OF TOTAL NUMBER OF HOLDERS**
Hot Pepper/Chillies	**43718**	**63.2**
Tomato	**43198**	**62.5**
Okra	**40221**	**58.2**
Garden Eggs/Egg Plants	**26063**	**37.7**
Onions	**19674**	**28.5**
Pumpkins	**13880**	**20.1**
Cabbage	**13515**	**19.5**
Sweet Pepper	**11931**	**17.3**
Lettuce	**7834**	**11.3**
Talinum Leaves	**7184**	**10.4**
Watermelon	**7252**	**10.5**
Carrots	**2282**	**3.3**
Shallots	**1703**	**2.5**
Ginger	**1553**	**2.2**
Flowers	**774**	**1.1**
Egusi (Melon Seeds)	**520**	**0.8**
Nutmeg	**335**	**0.5**
Pineapple	**120**	**0.2**

♦ Table 6 indicates the percentage distribution of the total number of farmers reportedly growing the major **horticulture crops** in the country. The first five horticulture crops grown by most farmers are Hot Pepper/Chillies, reportedly grown by 63.2% of the farmers; Tomatoes, reportedly grown by 62.5% of the farmers; Okra, grown by 58.2% of the farmers; Garden Eggs, grown by 37.7% of the farmers; and Onions, grown by 28.5% of the farmers.

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[1] N.B.: A holder who reports growing two crops is counted twice, i.e. once for each crop. One that reports growing three crops, is counted thrice, and so on.
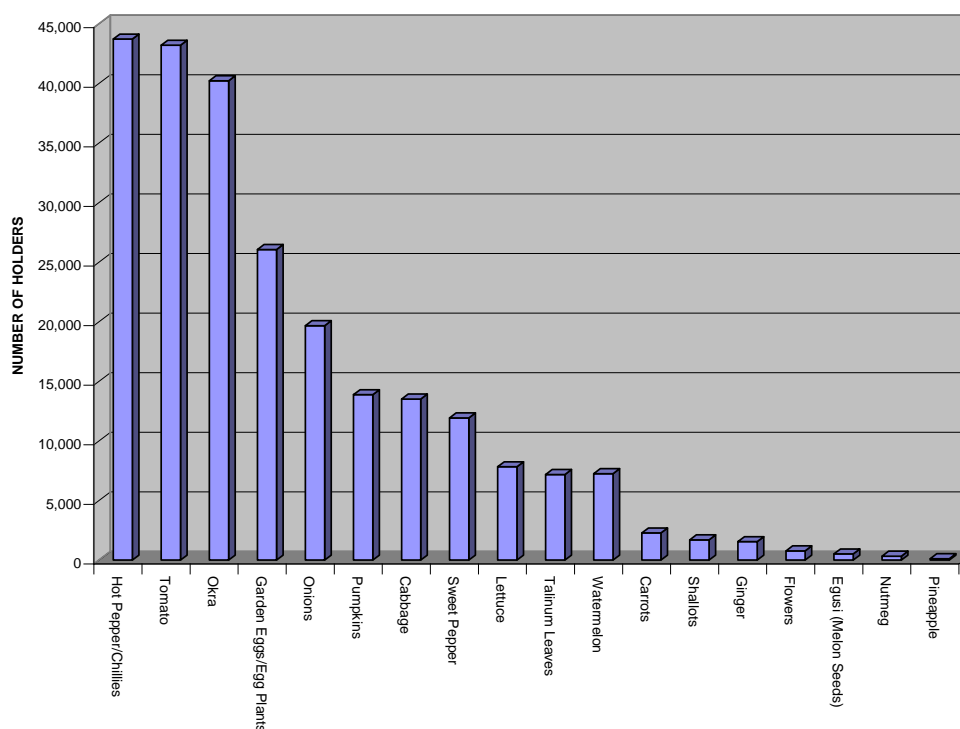
TABLE 7: DISTRIBUTION OF HOLDERS GROWING TREE CROPS

MAJOR TREE CROPS GROWN	NUMBER OF GROWERS	AS PERCENTAGE OF TOTAL NUMER OF HOLDERS
Mangoes	41,125	59.5
Oranges	18,406	26.6
Cashew	16,325	23.6
Paw-paw	11,346	16.4
Banana	11,047	16.0
Lime	4,179	6.0
Coconut	2,984	4.3
Oil Palm	1,252	1.8
Avocado	399	0.6
Cola	385	0.6
Shea-nut	187	0.3

♦ Likewise, Table 7 indicates the percentage of the total number of farmers reportedly growing the **tree crops,** with the percentages for the five most important ones as follows: 59.5% reported growing mangoes, 26.6% reported growing oranges, 23.6% reported growing cashew, 16.4% reported growing paw-paw, and 16.0% reported growing bananas.

26.   Production:

CHART 8 PRODUCTION FOR THE FOUR MAJOR CROPS
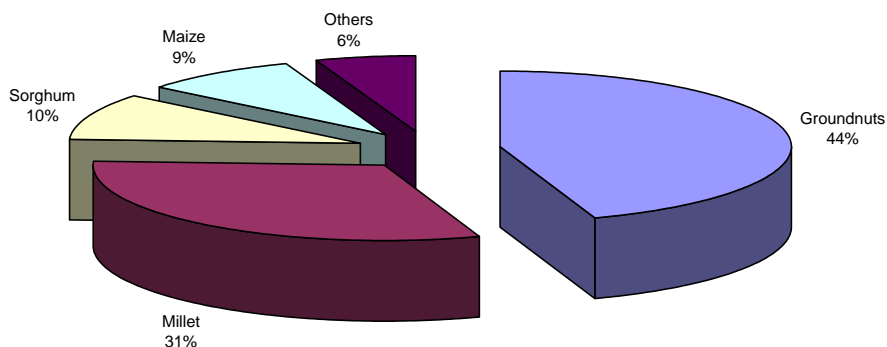
TABLE 8: PERCENTAGE PRODUCTION FOR THE FIRST FOUR MAJOR CROPS

CROPS	PRODUCTION (METRIC TONS)	PERCENTAGE DISTRIBUTION
Groundnuts	151,069	44.7
Millet	104,972	31.1
Sorghum	33,418	9.9
Maize	28,988	8.6
Others	19,200	5.7
Total (All crops)	337,647	100.0

♦ Production figures for the four major crops, that are cultivated in the country, groundnuts, millet, sorghum, and maize, are given in Table 8. The production of groundnuts, of just over 150,000 metric tons for the 2000/2001 crop season fitted closely with the predictions and forecasts from other of sources (144,000 metric tons CILLS Report 0f 2002). This showed an increase of about 10% over the previous year's production.

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Similarly for the millet crop, the production for the 2000/2001 crop season was approximately 105,000 metric tons, an increase of 12% over last year's production. Put together, these crops constitute over 94% of the total crop production in the country.

27. <u>Farm Population and their Occupations</u>:

CHART 9: HOUSEHOLD MEMBERS REPORTING PRIMARY OCCUPATION BY SEX
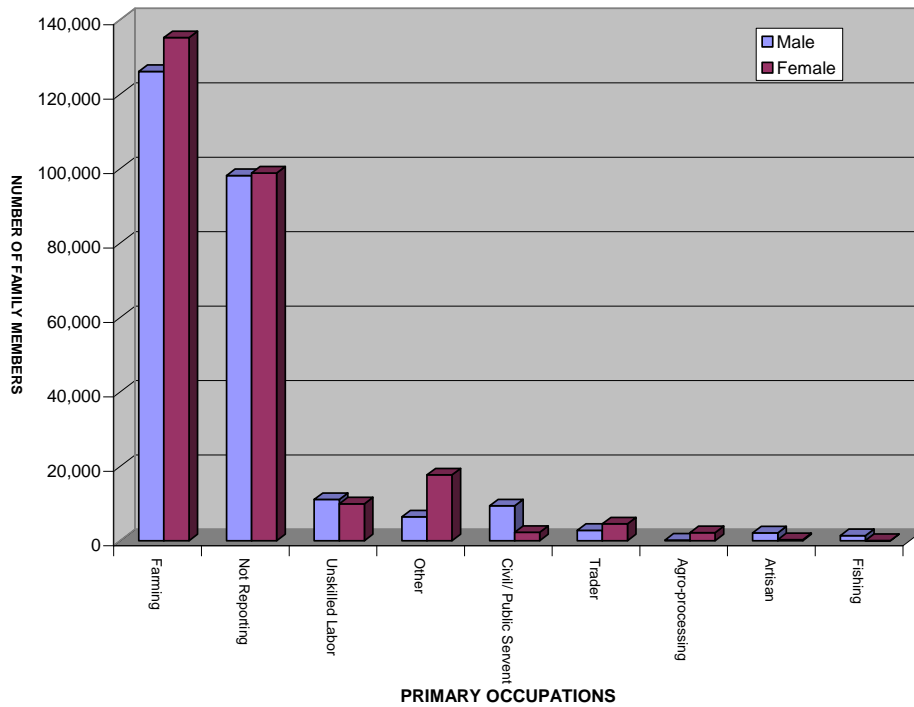
TABLE 9: HOUSEHOLD MEMBERS REPORTING PRIMARY OCCUPATIONS BY LGA AND TYPE

PRIMARY OCCUPATIONS		KANIFING	BRIKAMA	MANSAKONKO	KEREWAN	KUNTAUR	JANJAN-BUREH	BASSE	TOTAL (THE GAMBIA)
Farming	Male	1,995	42,301	17,574	25,552	12,317	11,168	15,195	126,101
	Female	1,122	41,343	19,279	27,370	12,510	13,712	19,863	135,200
	Total	3117	83644	36853	52922	24827	24880	35058	261301
Fisheries	Male	74	1,127	-	90	-	31	22	1,344
	Female	-	26	-	-	-	-	26	51
	Total	74	1153	-	90	-	31	48	1395
Agro-processing[2]	Male	-	131	-	-	-	16	-	147
	Female	132	2,011	-	-	-	-	-	2,143
	Total	132	2142	-	-	-	16	-	2290

The column header row spans under "Sex and Number of Household Members in LGA".

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[2] Agro-processing refers to small-scale processing, at the farm level, of farm produce such as the preparation of groundnut paste and groundnut oil, the de-husking of husked rice, the preparation of rice and millet flour, the preparation of fruit juices, etc.

Trader	Male	813	1,076	156	247	192	276	25	2,784
	Female	1,056	2,678	120	288	128	209	50	4,528
	Total	1869	3754	276	535	320	485	75	7312
Artisan	Male	443	1,325	86	111	65	79	-	2,108
	Female	-	166	-	26	-	38	26	256
	Total	443	1491	86	137	65	117	26	2364
Civil/ Public Servant	Male	2,364	4,428	756	691	402	559	155	9,356
	Female	924	895	142	63	70	149	-	2,243
	Total	3288	5323	898	754	472	708	155	11599
Unskilled Labour	Male	1,404	2,714	478	26	3,244	2,046	1,167	11,077
	Female	1,386	2,016	42	-	2,505	2,434	1,519	9,903
	Total	2790	4730	520	26	5749	4480	2686	20980
Other (e.g. drivers, etc)	Male	1,847	1,033	236	6,193	1,470	311	196	11,285
	Female	1,848	185	-	3,186	868	229	77	6,393
	Total	3695	1218	236	9379	2338	540	273	17678
Not Reporting	Male	10,564	26,910	6,880	14,529	8,094	11,932	19,230	98,139
	Female	10,493	27,738	7,658	15,012	8,403	10,712	18,808	98,823
	Total	21057	54648	14538	29541	16497	22644	38038	196962
All Primary Occupations	Male	19,504	81,045	26,166	47,439	25,784	26,418	35,990	262,346
	Female	16,961	77,058	27,241	45,945	24,484	27,483	40,369	259,541
	Total	36,463	158,103	53,407	93,384	50,268	53,901	76,359	521,887
Total Number of Holders		4,467	21,383	7,066	13,694	6,850	7,524	8,156	69,140

♦ The census results (Table 9) showed membership of the farmer's households with primary occupations, as approximately 522,000, divided equally between males and females. The table shows that the largest primary occupation was farming, engaging the services of 50% of this population. However, it must be conceded that some 38% of the household members, half of them males and the other half females failed to report any primary occupation. Further, about 4% reported as being unskilled while 3% reported other occupations such as drivers, etc, and 2% reported as employed in the Public Service. Only 1.4% reported trading as their primary occupation, 0.5% as artisans and 0.4% as agro-processing. Female members of the household dominated the trading and agro-processing sub-sectors viz. - Of the 1.4% of household members reporting trading as their primary occupation, 62% were females: Of the 0.5% household members reporting agro-processing as their primary occupation, 94% of them were females.

♦ As regards members of the farmer's household with secondary occupations, although 28% reported having farming as their main secondary occupation, a significant percentage, 22%, reported trading as their main secondary occupation. This contrasts with the 1.4% who reported trading as their main primary occupation. Also, 26% reported their main secondary occupation as unskilled labour, 8% reported other (such as drivers, and the like), 8% reported being artisans and 3% reported being in the agro-processing sector. Only 3% reported their main secondary occupation as being in the civil service. As was the case with the primary occupations, female members of the households dominated the trading and agro-processing sub-sectors. Of the 22% members of the household who reported trading as their secondary occupation, 59% were

females, while of the 3% members of the household who reported agro-processing as their main occupation, 84% were females.

28. Educational Levels:

♦ The census revealed just under 50% of the members of the farmer's household reported having no formal education; while 20% reported that they had received some type of non-formal education and 18% some form of primary education. Less that 1% reported having some formal training in agriculture. Out of the total number that reported having no formal education, 58% were females and 42% males.

29. Management of Holdings:

♦ The census revealed that the holders manage practically all holdings in the country, themselves. It was only in the BRIKAMA LGA that some 75 holdings, i.e. 0.3% of the total holdings in that LGA, were reported to be managed by hired managers and 443 holdings in KUNTAUR LGA, i.e. 6% of the total holdings in that LGA, were reported to be managed by some other arrangements.

30. Land Tenure:

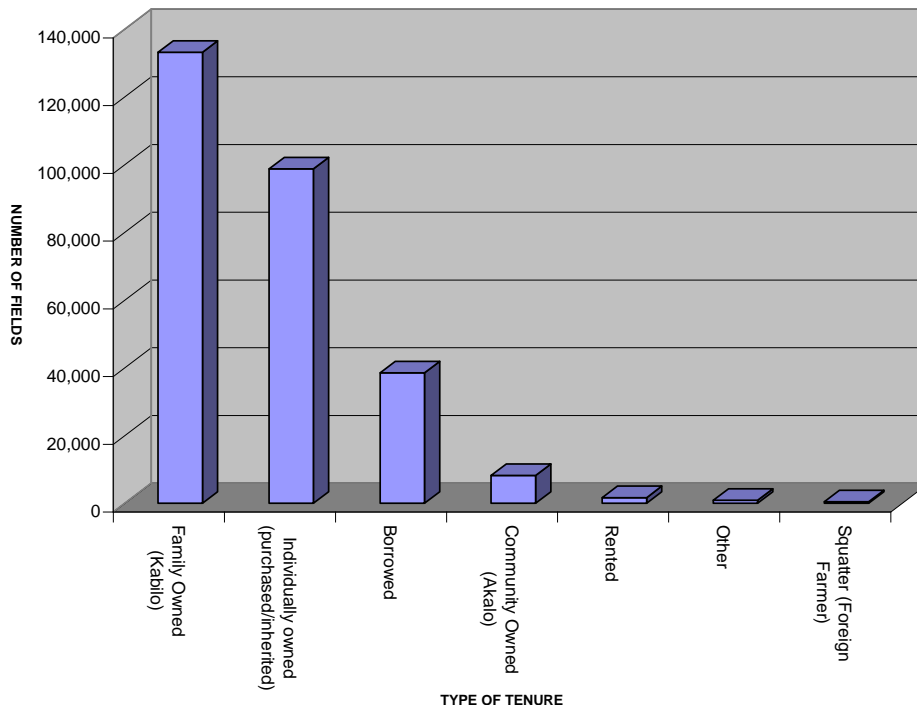**CHART 10: TYPE OF LAND TENURE REPORTED ON FIELDS**

TABLE 10: TYPE OF LAND TENURE REPORTED ON FIELDS BY LGA

TYPE OF TENURE		KANIFING	BRIKAMA	MANSAKONKO	KEREWAN	KUNTAUR	JANJAN-BUREH	BASSE	TOTAL (THE GAMBIA)
Community Owned (Akalo)	No.	Na	668	548	2,278	1,511	502	2,714	8,221
	%		1.3	1.6	3.5	5.8	1.3	4.2	2.9
Family Owned (Kabilo)	No.	Na	22,924	21,714	24,749	7,528	28,118	28,122	133,155
	%		44	61	38	29	71	44	46.9
Individually owned (purchased/inherited)	No.	Na	16,816	9,812	28,098	12,683	5,231	26,082	98,722
	%		32	28	43	48	13	40	34.8
Rented	No.	Na	216	571	335	128	135	288	1,673
	%		-	2	1	1	-	-	0.6
Borrowed	No.	Na	11,411	2,330	9,903	2,769	4,683	7,430	38,526
	%		22	7	15	11	12	12	13.6
Squatter (Foreign Farmer)	No.	Na	41	34	-	356	45	-	476
	%		0.1	0.1	-	1.4	0.1	-	0.2
Special Permission	No.	Na	444	343	-	919	415	55	2,176
	%		0.8	1		3.5	1	0.1	0.7
Other	No.	Na	75	-	-	357	467	-	899
	%		0.1	-	-	1.4	1.2	-	0.3
Total Fields Reporting	No.	Na	53,131	35,353	65,364	26,253	39,596	64,691	283,848
	%	Na	100	100	100	100	100	100	100

Number and Percentage Distribution of Fields reporting Tenure By LGA

♦ Table 10 reveals the land tenure system for farming fields. Seven types of land tenure on fields were reported as operating throughout the country. They are: Family ownership that refers to the type of ownership wherein means the right to land, which is exercised by a head of a family clan. Individual Ownership refers to land inherited or bought freehold. Borrowed land refers to land that is obtained from the owner for an agreed period. Community Ownership refers to land a system whereby right to title of land is vested in the community as a whole. In practice this right is usually exercised by a District Chief on behalf of the community by a Village Head (Alkalo) on behalf of their respective village communities. Squatter refers to land operated without the consent of the owner. Such people are generally squatters on Government land. Special Permission refers to land over which a holder is given the right to use it for any suitable purpose. Rented land refers to land that is rented. Others, in this context, refers to special instances found in which the holders were (a) operating on Government lands, and (b) operating on lands given to them as gifts but on which they cannot exercise the full right of ownership. For example, a husband presenting his land to his wife for use but which can be repossessed at anytime.

♦ A result from the census data gives the distribution of fields in the country according to the various tenure systems as follows: Family Ownership covered 46.9% of the fields in the country. Individual Ownership covered 34.8% of the total fields. Borrowed Land covered 13.6% of the fields. Community Ownership covered 2.9% of the total fields. Special

Permission covered 0.7% of the total field. Rented Lands covered 0.6% of the total fields. Others covered 0.3 of the total fields. Squatters covered 0.2% of the total fields. No Leased farming fields were discovered in the country.

31. Farm Practices:

CHART 11: DISTRIBUTION OF FIELDS BY TYPE OF ENERGY SOURCES USED BY LGA
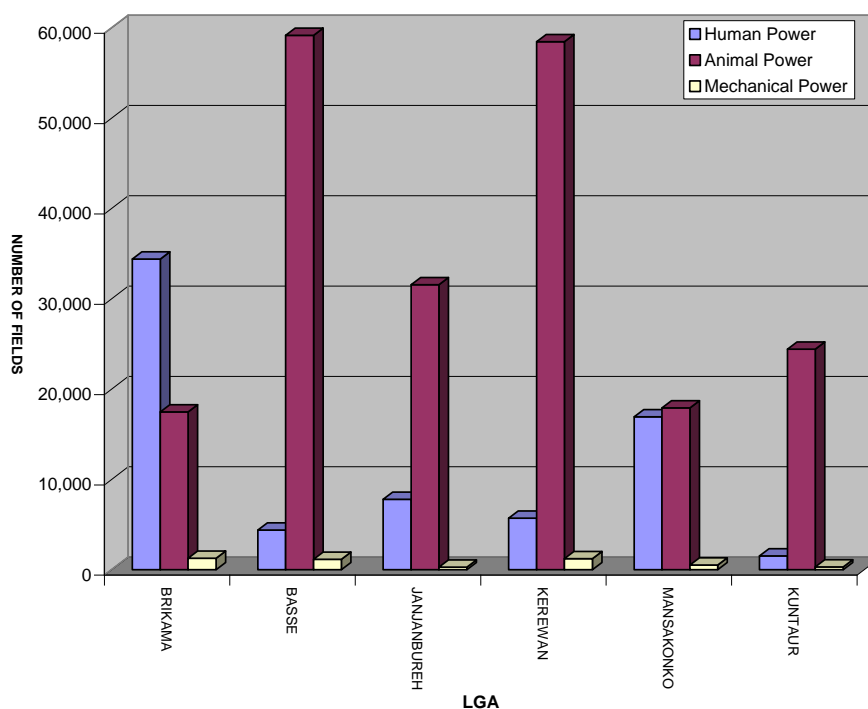
TABLE 11: NUMBER AND PERCENTAGE DISTRIBUTION OF FIELDS BY TYPE OF ENERGY SOURCES USED BY LGA

LGA		FIELDS REPORTING USE OF			TOTAL FIELDS REPORTING
		Human Power	Animal Power	Mechanical Power	
KANIFING	No	NA	NA	NA	NA
	%	NA	NA	NA	NA
BRIKAMA	No	34,394	17,460	1,277	53,131
	%	64.7	32.9	2.4	100.0
MANSAKONKO	No	16,936	17,902	515	35,353
	%	47.9	50.6	1.5	100.0
KEREWAN	No	5,704	58,442	1,218	65,364
	%	8.7	89.4	1.9	100.0
KUNTAUR	No	1,536	24,403	314	26,253
	%	5.9	92.9	1.2	100.0
JANJANBUREH	No	7,783	31,539	274	39,596
	%	19.7	79.6	0.7	100.0
BASSE	No	4,391	59,157	1,143	64,691
	%	6.8	91.4	1.8	100.0
TOTAL	No	70,744	208,903	4,741	284,388
	%	24.9	73.4	1.7	100.0

♦ Energy Sources used on Fields: Table 11 reveals that the source of energy used on the largest number of fields is Animal Power. 73.4% of the fields reported using Animal Power, followed by 24.9% reportedly using Human Power and 1.7% using Mechanical Power. Only in the BRIKAMA LGA, where the cultivation of groundnuts is less compared to the other LGAs, did a larger number of fields, 65%, reportedly use of more human than animal power. Further, the BRIKAMA LGA is a peri-urban LGA and the intensity of farming is comparatively less than in the other LGAs. In the case of mechanical power, these were basically for tractor use and were used mainly for clearing of the land before planting. Most likely this was done for a fee to be paid by the farmer, a condition which most probably is an inhibiting factor to framer's requests for tractor services.

CHART 12 A: DISTRIBUTION OF FIELDS BY TYPE OF TOOLS AND IMPLEMENTS USED
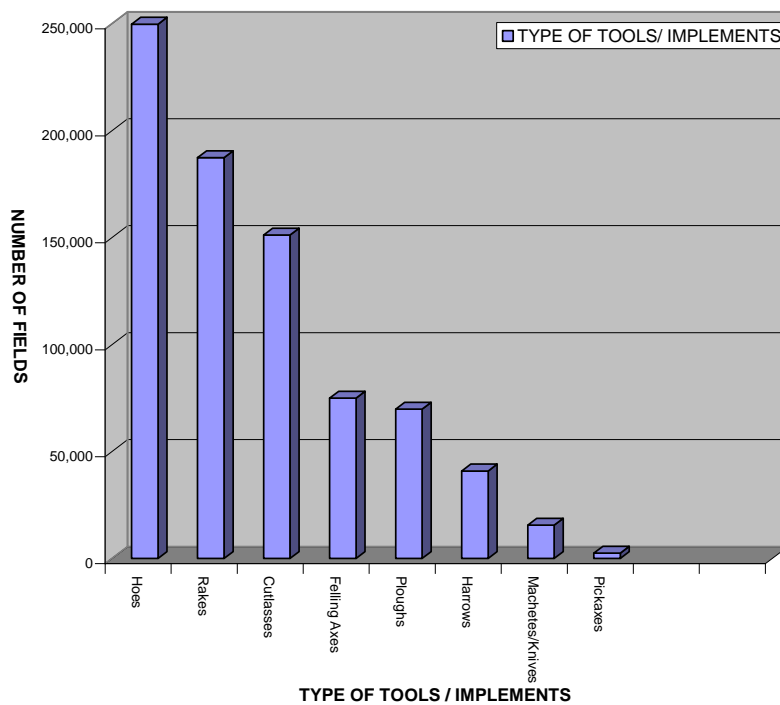
TABLE 12A: NUMBER AND PERCENTAGE DISTRIBUTION OF FIELDS(WITH HUMAN POWER ENERGY SOURCES) BY TYPE OF TOOLS AND IMPLEMENTS USED BY LGA

		Hoes	Cutlasses	Felling Axes	Pickaxes	Ploughs	Harrows	Machetes/ Knives	Rakes	TOTAL FIELDS REPORTING
LGA										
KANIFING	No.	NA	NA	NA	NA	NA	NA	NA	NA	NA
BRIKAMA	No.	39,246	31,961	2,684	276	19,487	12,310	624	3,390	34,394
MANSAKONKO	No.	23,208	19,485	9,119	37	8,041	147	8,519	9,549	16,936
KEREWAN	No.	61,717	39,796	17,067	1,146	7,794	7,478	468	57,490	5,704
KUNTAUR	No.	24,386	11,361	10,693	209	1,427	1,271	2,205	23,693	1,536
JANJANBUREH	No.	38,719	17,452	15,830	505	1,672	1,309	3,436	37,598	7,783
BASSE	No.	62,469	31,075	19,588	308	31,392	18,385	306	55,638	4,391
TOTAL	No.	249,745	151,130	74,981	2,481	69,813	40,900	15,558	187,358	70,744

The header "Fields[3] Reporting Use of" spans Hoes through Rakes.

♦ <u>Tools and Implements Used</u>: Table 12A reveals that on fields that use human power energy sources, most of the tools and implements used by the farmers are still the basic Hoe, Rake and Cutlass. This pattern was also reflected within the LGAs.

CHART 12 B : DISTRIBUTION OF FIELDS BY TYPE OF ANIMAL USED BY LGA

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[3] A field reporting use of two implements, e.g. hoe and cutlass, is counted twice, i.e. once for each implement. One that reports use of three implements is counted thrice, and so on.
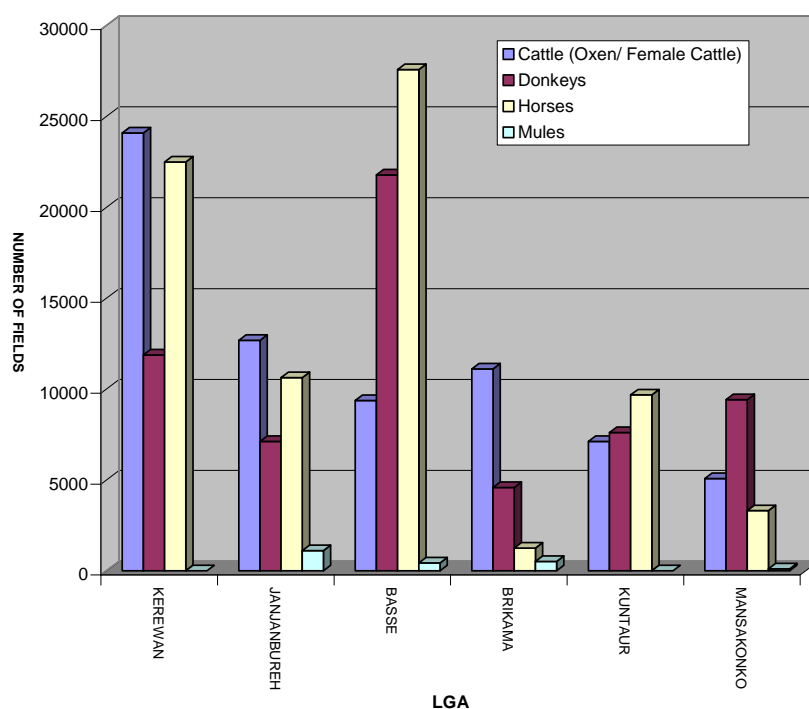
TABLE 12B: NUMBER AND PERCENTAGE DISTRIBUTION OF THE FIELDS (WITH ANIMAL POWER ENERGY SOURCE) BY TYPE OF ANIMAL USED BY LGA

		Fields Reporting Use of				TOTAL FIELDS REPORTING
		Cattle (Oxen/ Female Cattle)	Donkeys	Horses	Mules	
LGA						
KANIFING	No.	NA	NA	NA	NA	NA
	%					NA
BRIKAMA	No.	11,104	4,590	1,253	513	17,460
	%	63.6	26.3	7.2	2.9	100.0
MANSAKONKO	No.	5,072	9,416	3,309	105	17,902
	%	28.3	52.6	18.5	0.6	100.0
KEREWAN	No.	24,085	11,873	22,484	-	58,442
	%	41.2	20.3	38.5		100.0
KUNTAUR	No.	7,119	7,608	9,676	-	24,403
	%	29.2	31.2	39.7		100.0
JANJANBUREH	No.	12,680	7,121	10,631	1,107	31,539
	%	40.2	22.6	33.7	3.5	100.0
BASSE	No.	9,369	21,780	27,577	431	59,157
	%	15.8	36.8	46.6	0.7	100.0
TOTAL	No.	69,429	62,389	74,931	2,155	208,903
	%	33.2	29.9	35.9	1.0	100.0

♦ The animals utilized on fields that use animal power energy sources were mainly Horses, Cattle and Donkeys (Table 12B). A larger number of fields, 36%, reported using horses, flowed by 33% using Cattle, 30% using Donkeys. However, there was a wide variation in the use of these animals within some of the LGAs. Mules were used on 1% of the fields.

CHART 12C NUMBER AND PERCENTAGE DISTRIBUTION OF ANIMALS ON FIELDS WITH ANIMAL POWER ENERGY SOURCE BY LGA
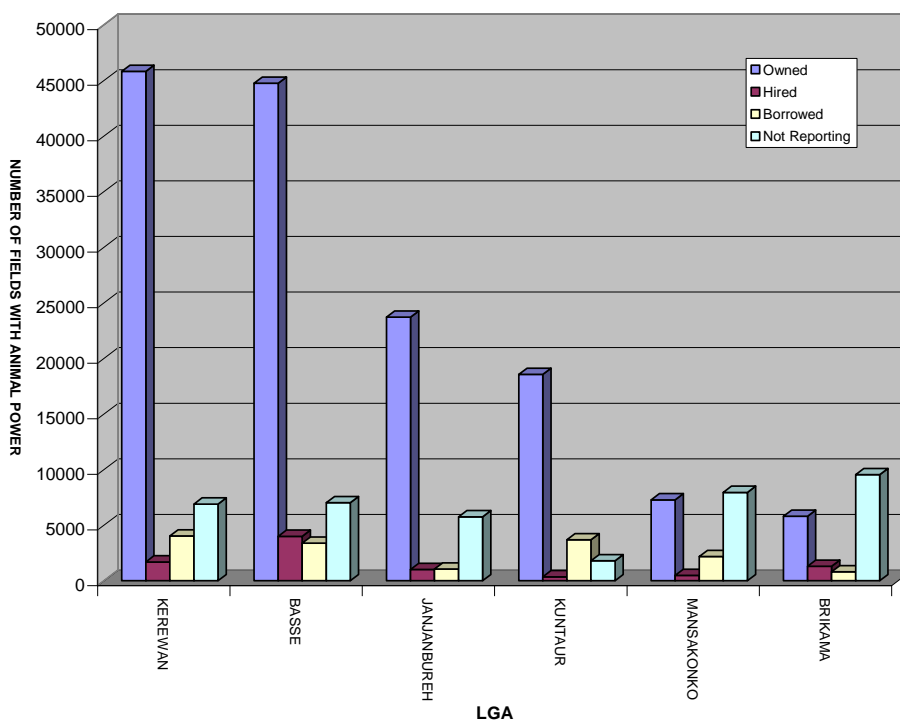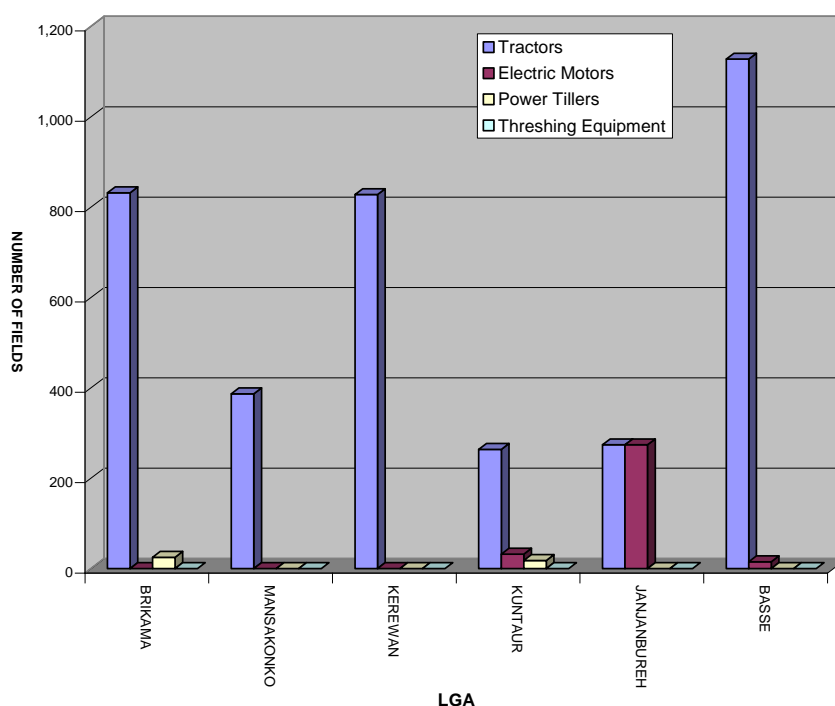
TABLE 12C: NUMBER AND PERCENTAGE DISTRIBUTION OF OWNERSHIP OF ANIMALS ON FIELDS WITH ANIMAL POWER ENERGY SOURCE BY LGA

LGA		Fields Reporting Animals Used as				TOTAL FIELDS
		Owned	Hired	Borrowed	Not reporting	
KANIFING	No	NA	NA	NA	NA	NA
	%	NA	NA	NA	NA	NA
BRIKAMA	No	5,807	1,309	802	9,543	17,460
	%	33.3	7.5	4.6	54.7	100.0
MANSAKONKO	No	7,284	488	2,181	7,949	17,902
	%	40.7	2.7	12.2	44.4	100.0
KEREWAN	No	45,814	1,697	4,030	6,902	58,442
	%	78.4	2.9	6.9	11.8	100.0
KUNTAUR	No	18,561	362	3,688	1,793	24,403
	%	76.1	1.5	15.1	7.3	100.0
JANJANBUREH	No	23,715	1,016	1,054	5,754	31,539
	%	75.2	3.2	3.3	18.2	100.0
BASSE	No	44,752	4,001	3,385	7,020	59,157
	%	75.6	6.8	5.7	11.9	100.0
TOTAL	No	145,932	8,872	15,139	38,961	208,903
	%	69.9	4.2	7.2	18.7	100.0

♦ Table 12C shows that 70% of the animals used on the fields with animal energy power sources were owned by the holders, 7.2% were reportedly borrowed, and 4.2% hired from others. However, a significant number, 18.7% declined to disclose ownership of the animals used on their fields.

CHART 12 D: DISTRIBUTION OF FIELDS BY TYPE OF MECHNICAL POWER USED BY LGA

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TABLE 12D: NUMBER AND PERCENTAGE DISTRIBUTION OF MACHINES USED ON FIELDS (WITH MECHANICAL POWER ENERGY SOURCES) BY LGA

LGA		Fields Reporting Use of				TOTAL FIELDS REPORTING
		Tractors	Electric Motors	Power Tillers	Threshing Equipment	
KANIFING	No.	NA	NA	NA	NA	NA
	%					NA
BRIKAMA	No.	832	-	25	-	1,277
	%	1.57		0.05		2.4
MANSAKONKO	No.	387	-	-	-	515
	%	1.09				1.5
KEREWAN	No.	828	-	-	-	1,218
	%	1.27				1.9
KUNTAUR	No.	264	32	18	-	314
	%	1.01	0.12	0.07		1.2
JANJANBUREH	No.	274	274	-	-	274
	%	0.69	0.69			0.7
BASSE	No.	1,128	15	-	-	1,143
	%	1.74	0.02			1.8
TOTAL (THE GAMBIA)	No.	3,713	321	43	-	4,741
	%	1.31	0.11	0.02		1.7

♦ Regarding the machines reported used on the fields that use mechanical power energy sources, Table 12D reveals that the use of such machines is very minimal and less than 1.5% of the fields were reported to have made use of them. Invariably, the machine used is the tractor, with 1.3% of the fields reported using tractors to cultivate their farms. A few other fields reported the use of electric motors, 0.1%, and power tillers, 0.02%. No field reported the use of threshing equipment.
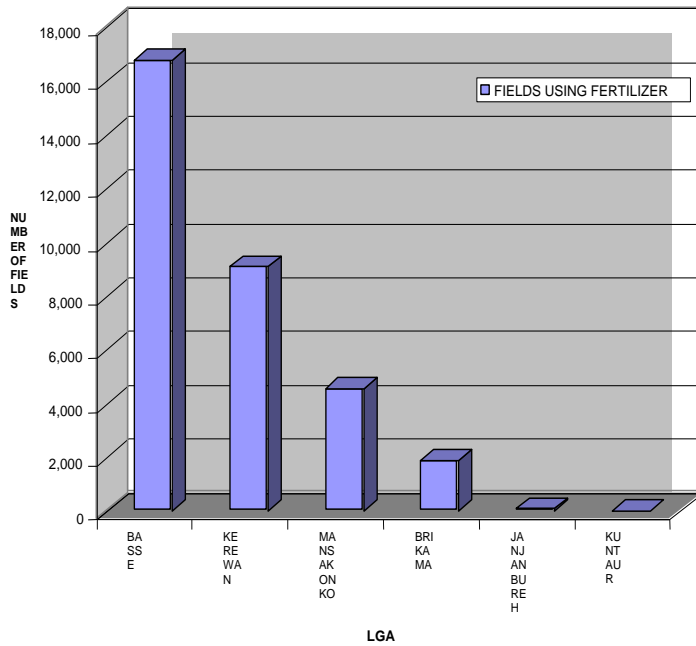
TABLE 13: NUMBER AND PERCENTAGE DISTRIBUTION OF FIELDS USING FERTILIZERS BY LGA

LGA	FIELDS USING FERTILIZER		TOTAL FIELDS REPORTING
	Number	As Percentage of Total fields	
KANIFING	NA	NA	NA
BASSE	16,739	5.89	64,691
KEREWAN	9,067	3.19	65,364
MANSAKONKO	4,554	1.60	35,353
BRIKAMA	1,884	0.66	53,131
JANJANBUREH	69	0.02	39,596
KUNTAUR	-	-	26,253
TOTAL (THE GAMBIA)	32,313	11.36	284,388

♦ Fertilizer Use: The results contained in Table 13 show that fertilizer use still is very minimal and just over 11% of the fields were reported to have made use of fertilizers of some sort. Although all the LGAs reported having fields that used fertilizer, the number of such fields was a very small fraction of the total fields in the LGAs, and ranged from 0.02% for the JANJANBUREH LGA to 6% for the BASSE LGA. This LGA contributed to over 50% of the total of fields that reported the use of fertilizer.

CHART 14 A: DISTRIBUTION OF FIELDS BY SOURCES OF SEED OBTAINED FOR PLANTING BY LGA

TABLE 14A: NUMBER AND PERCENTAGE DISTRIBUTION OF FIELDS BY SOURCES OF SEEDS USED FOR PLANTING
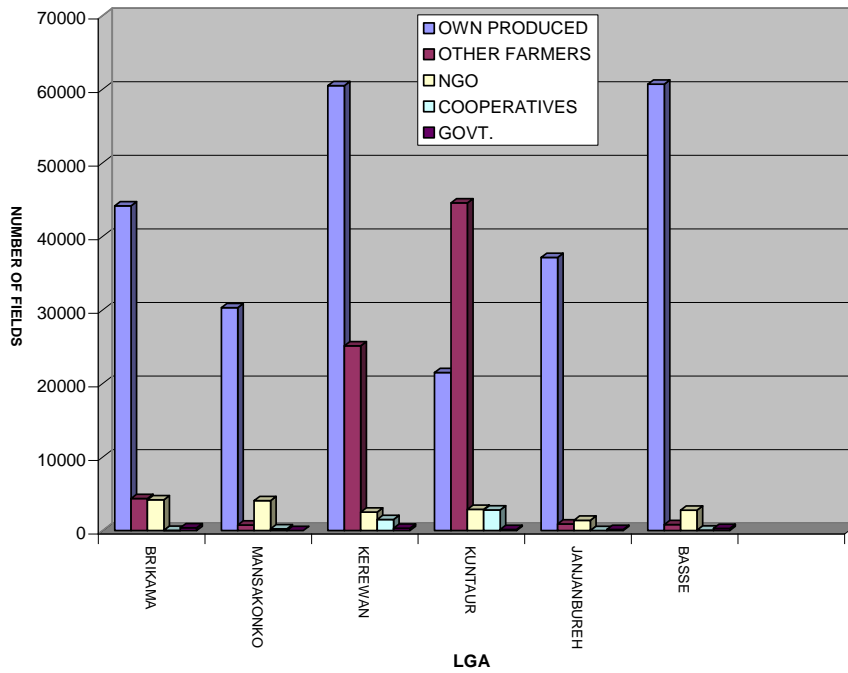
| | | Fields Reporting Sources of Seeds Planted as from | | | | | TOTAL FIELDS REPORTING |
		OWN PRODUCED	OTHER FARMERS	NGO	COOPERATIVES	GOVT.	
LGA/DISTRICT							
KANIFING	No	NA	NA	NA	NA	NA	NA
	%	NA	NA	NA	NA	NA	NA
BRIKAMA	No	44135	4351	4196	54	396	53131
	%	83.1	8.2	7.9	0.1	0.7	100.0
MANSAKONKO	No	30293	756	4068	235	-	35353
	%	85.7	2.1	11.5	0.7	-	100.0
KEREWAN	No	60471	25114	2510	1508	334	65364
	%	92.5	38.4	3.8	2.3	0.5	100.0
KUNTAUR	No	21477	44552	2896	2823	155	26253
	%	81.8	169.7	11.0	10.8	0.6	100.0
JANJANBUREH	No	37127	908	1411	-	150	39596
	%	93.8	2.3	3.6	-	0.4	100.0
BASSE	No	60692	826	2792	85	297	64691
	%	93.8	1.3	4.3	0.1	0.5	100.0
TOTAL	No	254195	76506	17875	4705	1332	284388
	%	89.4	26.9	6.3	1.7	0.5	100.0

♦ Sources of Seed: The results in Table 14A show that the main sources of seed used for the planting of crops was from the farmers themselves. Seeds planted on 89.4%

of the fields were reported as produced by the farmers themselves, while seeds planted on 26.9% of the fields were obtained from other farmers, either as gifts, charities, purchases etc. Seeds planted on a rather small percentage of fields, 8.5%, were reportedly obtained from NGOs, Cooperatives, Government, etc.

CHART 14 B: DISTRIBUTION OF FIELDS REPORTING SEED DRESSING BY LGA
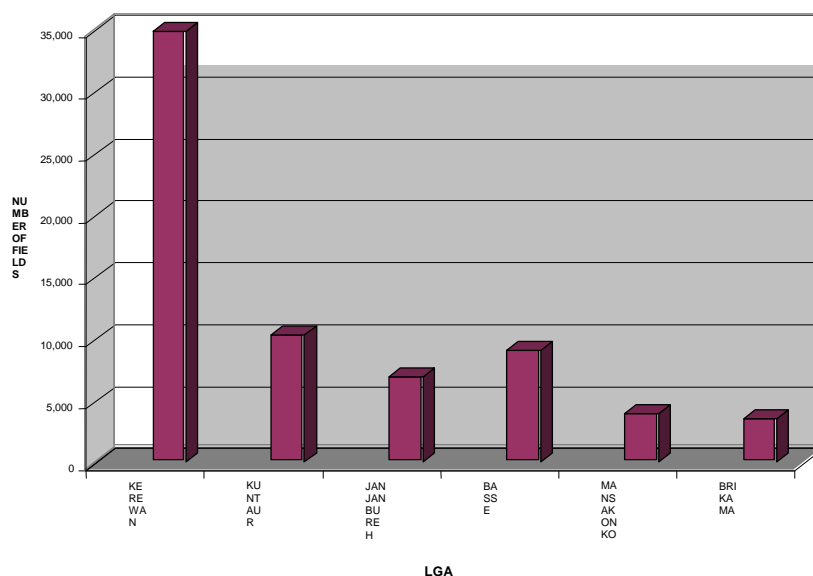
TABLE 14B: NUMBER AND PERCENTAGE DISTRIBUTION OF FIELDS REPORTING SEED DRESSING BY LGA

LGA	Fields Reporting use of Dressed Seeds		TOTAL FIELDS
	Number	As Percentage of total fields	
KANIFING	NA	NA	NA
KEREWAN	34,840	53.3	65,364
KUNTAUR	10,275	39.1	26,253
JANJANBUREH	6,934	17.5	39,596
BASSE	9,068	14.0	64,691
MANSAKONKO	3,947	11.2	35,353
BRIKAMA	3,576	6.7	53,131
TOTAL	68,641	24.1	284,388

♦ Seed Dressing (This refers to treatment of seeds - mostly groundnut seeds - before planting with appropriate chemicals in order to prevent pest infestatiion): The results in Table 14B show that seed dressing is operating on a significant proportion 24.1% of the total fields in the country. This is to be expected since basically, this activity is performed on groundnut fields, which is the largest crop cultivated in the country. Further, with the exception of two LGAs, the distribution pattern for this activity among the LGAs follows the pattern of the acreage under cultivation for groundnuts in the LGAs, i.e. the LGAs with the largest number of

fields under groundnut cultivation reported the largest number of fields using dressed seeds.

32.   Livestock and Poultry:

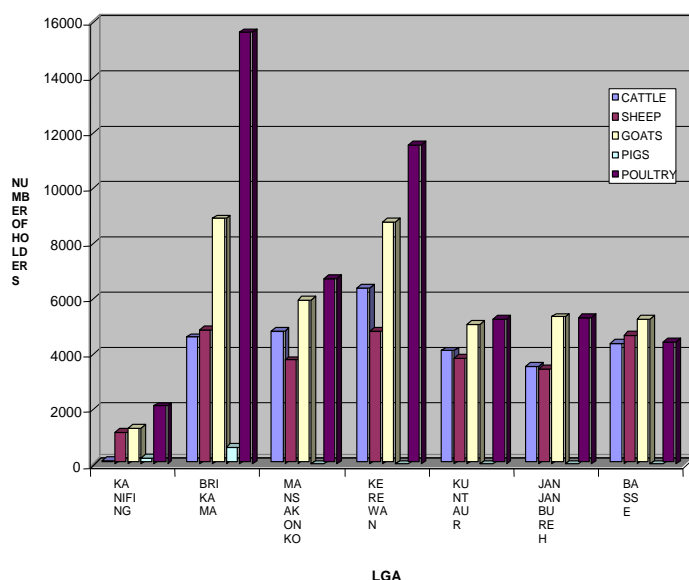**CHART 15 A: DISTRIBUTION OF LIVESTOCK FARMERS (ALL TYPES) BY REPORTING BY**

TABLE 15A: DISTRIBUTION OF LIVESTOCK FARMERS (ALL TYPES) AS PERCENTAGE OF TOTAL HOLDERS (FARMERS) BY LGA

	HOLDERS REPORTING										TOTAL HOLDERS (GAMBIA)	
	CATTLE		SHEEP		GOATS		PIGS		POULTRY			
	No	%	No	%	No	%	No	%	No	%	No	%
LGA												
KANIFING	105	2.4	1,145	25.6	1,296	29.0	235	5.3	2,094	46.9	4,467	100
BRIKAMA	4,576	21.4	4,845	22.7	8,859	41.4	614	2.9	15,572	72.8	21,383	100
MANSAKONKO	4,780	67.6	3,750	53.1	5,908	83.6	-	-	6,677	94.5	7,066	100
KEREWAN	6,344	46.3	4,811	35.1	8,738	63.8	-	-	11,524	84.2	13,694	100
KUNTAUR	4,093	59.8	3,813	55.7	5,029	73.4	-	-	5,245	76.6	6,850	100
JANJANBUREH	3,526	46.9	3,442	45.7	5,301	70.5	-	-	5,270	70.0	7,524	100
BASSE	4,375	53.6	4,654	57.1	5,239	64.2	-	-	4,404	54.0	8,156	100
TOTAL (THE GAMBIA)	27,799	40.2	26,460	38.3	40,370	58.4	849	1.2	50,786	73.5	69,140	100

♦   Table 15A reveals that the number of holders that reported the rearing livestock ranged from 74 % for poultry to 1% for pigs. 40% of the holders reported having cattle, 38% reported having sheep and 58% reported having goats. The largest numbers of cattle and goats holders were found in the KEREWAN LGA. BRIKAMA reported the largest number of holders rearing sheep, albeit not much larger than the number of sheep holders reported in the KEREWAN LGA.

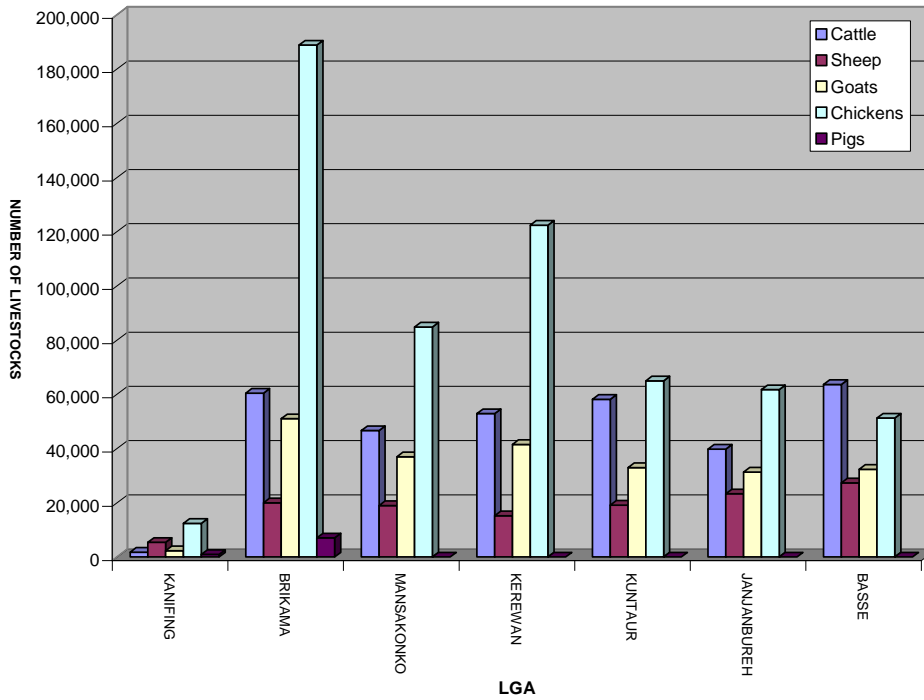**CHART 15 B:DISTRIBUTION OF LIVESTOCK NUMBERS BY LGA**

TABLE15B: AGE, NUMBER AND PERCENTAGE DISTRIBUTION OF LIVESTOCK (ALL TYPES) BY LGA

TYPE AND AGE OF LIVESTOCK		Distribution and Number of Livestock by LGA							
		KANIFING	BRIKAMA	MANSAKONKO	KEREWAN	KUNTAUR	JANJANBUREH	BASSE	TOTAL (THE GAMBIA)
Cattle	< 2 years	637	20,620	14,755	12,722	20,531	9,087	21,396	99,748
	≥ 2 years	1,094	39,789	31,866	40,136	37,632	30,652	42,250	223,419
	Total	1,731	60,409	46,621	52,858	58,163	39,739	63,646	323,167
	%	0.5	18.7	14.4	16.4	18	12.3	19.7	100
Sheep	< 1 year	1,649	7,236	6,304	3,955	6,503	7,301	8,674	41,622
	≥ 1 year	3,746	12,719	12,646	11,241	12,631	15,997	18,630	87,610
	Total	5,395	19,955	18,950	15,196	19,134	23,298	27,304	129,232
	%	4.2	15.4	14.7	11.8	14.8	18	21.1	100
Goats	<1 year	590	20,793	16,984	13,241	14,314	9,508	11,299	86,729
	≥ 1 year	1,724	30,203	19,998	28,229	18,624	21,841	21,057	141,676
	Total	2,314	50,996	36,982	41,469	32,938	31,349	32,356	228,404
	%	1	22.3	16.2	18.2	14.4	13.7	14.2	100
Poultry	< 6 months	5,600	103,158	54,130	63,713	38,333	27,868	25,285	318,088
	≥ 6 months	6,780	85,660	30,694	58,669	26,645	33,847	25,949	268,243
	Total	12,380	188,818	84,824	122,382	64,978	61,715	51,234	586,331
	%	2.1	32.2	15	21	11	11	9	100
Pigs	< 6 months	324	3,135	-	-	-	-	-	3,459
	≥ 6 months	616	3,937	-	-	-	-	-	4,553
	Total	940	7,022	-	-	-	-	-	7,962
	%	11.8	88.2	-	-	-	-	-	100

♦ Table 15B gives the distribution of the cattle population among the different LGAs in the country. Apart from the KANIFING LGA, which is a much urbanised LGA, there does not seem to be too much variation in the cattle population among

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each of the other LGAs. The JANJANBUREH LGA has cattle population of just over 30,000, but the cattle population for the others is between 45,000 and 60, 000. The actual distribution shows BASSE LGA leading with 19.7% of the cattle population, followed by 18.7% for BRIKAMA LGA, and then 18% for KUNTAUR LGA. The KEREWAN LGA registered 16.4% of the cattle population and the MASANKONKO LGA 14.4%. The JANJANBUREH LGA contribution was 12.3% and that of the KANIFING LGA, was 0.5%.

♦ The same picture is seen in the cases of the sheep and goats population. In regard to the sheep population, apart from the highest percentage of 27% reported in the BASSE LGA, the rest vary little between 23% and 15%. In regard to the goat population, apart from the highest percentage of 22.3% reported in the BRIKAMA LGA, the rest vary only from 14% to 18%.

♦ Much variation, however, is shown in regard to the total poultry population, where the range is from the lowest of 9% reported in the BASSE LGA to the highest 32%, reported in the BRIKIMA LGA.

♦ Only a total of about 8,000 pigs were reported in the BRIKAMA and KANIFING LGAs and just over 88% of this total area in the BRIKAMA LGA. It is to be noted that there are pockets of pig populations in practically all the LGA. However, the customary situation is that these populations are settled in clusters that may have inhibited their enumeration due to the sampling procedure used in the census.

♦ Special mention must be made of the fact that in the past, the country was divided into six Divisions that were later regrouped into seven Local Government Areas (LGAs). KANIFING DIVISION, (KD), became KANIFING LGA; WESTERN DIVISION (WD) became BRIKIMA LGA, LOWER RIVER DIVISION (LRD) became MANSAKONKO LGA, NORTH BANK DIVISION (NBD) became KEREWAN LGA, CENTRAL RIVER DIVISION (CRD) became split into KUNTAUR and JANJANBUREH LGAs and UPPER RIVER DIVISION (URD) became BASSE LGA. Going by these divisions, CRD thus reported the largest number of livestock for all categories except pigs, which are not produced there, and poultry for which the NRD reported the highest number although closely followed by that reported for the CRD.

♦ In regard to the breeding potentials, 69% of the total cattle population was reported to be of breeding age, 68% of the total sheep population was reported to be of breeding age, 62% of the total goat population was reported to be of breeding age, 46% of the total poultry population was reported to be of breeding age, and 57% of the total pig population was reported to be of breeding age.

33. Standard Errors of Estimates:

Table 16: STANDARD ERRORS AT THE NATIONAL LEVEL FOR SELECTED VARIABLES

VARIABLES	Percentage Standard Error

Total Holders	2.4
Crop Hectarage	
All Crops	2.0
Groundnuts (Old Variety)	2.9
Early Millet	3.0
Maize	5.3
Upland Rice	5.6
Sorghum	5.7
Late Millet	6.6
Groundnuts (New Variety)	6.7
Swampland Rice	8.7
Livestock	
Cattle	6.2
Sheep	4.5
Goats	3.2

♦ Table 16 presents the standard errors, SE, of estimates for the hectarage of some of the more important crops studied. Overall, the SE for the hectarage of all crops was 2.0%. However, for the individual crops, the SE ranged from 2.9% and 3% respectively for Groundnuts (old variety) and Early Millet to 8.7% for swampland rice. The relatively small SE registered for Groundnuts and Early Millet is most probably a reflection of the fact that very large percentages of fields were measured for these corps, since by far, they are reportedly grown on the largest number of fields. The large SE reported for Swampland Rice hectarage can be attributed as more of a reflection of operational difficulties at the field level. Swampland rice fields are more difficult to measure and, further, the number of such fields encountered in the census was relatively small. Overall, the Standard Errors reported compare favourably with those from such exercises undertaken in similar circumstances in countries of the region. Finally, considering the conditions under which the enumerators operate in order to obtain information, it is reasonable to believe that non-sampling errors must have been high.

♦ In regard to the total number of holders, the standard error was found to be 2.4%, which is not very different from what was envisaged during the planning stages of the census.

Detailed Data Requirements to Obtain the Objectives of the Programme

In the main, the following were identified by the user/producer workshop, as constituting the main statistical data requirements in the Gambia:-

1. **Crops**
   (i)   Prices (producer, market and shadow prices)
   (ii)   Production (yields under various cropping situations, by varieties, total production of small holder and large farms, pre-harvest losses due to pest and drought, post-harvest losses).
   (iii)   Area (arable land, area under cultivation and irrigation by crops).
   (iv)   Farm Budgets.
   (v)   Input usage by crop (seedlings, fertilizers, and farm implements).
   (vi)   Marketing
   (vii)   Transportation and Storage (stocks for food and cash crops, storage facilities).
   (viii) Household Consumption of food crops.
   (ix)   International Trade (import and export figures for cash and food crops)
   (x)   Farm Labour and Household Characteristics.
   (xi)   Price indices (urban and rural).

2. **Livestock**
   (i)   Population by type, breed, age functional classification.
   (ii)   Livestock Products.
   (iii)   Yield by breed.
   (iv)   Livestock Health
   (v)   Livestock Trade.
   (vi)   Prices.
   (vii)   Livestock holders Characteristics and labour by Gender and Age

3. **Fishing**
   (i)   Production by type – artisanal fishing.
   (ii)   Production by type – industrial fishing.
   (iii)   Persons Engaged in Fishing by gender and Age.
   (iv)   Prices.
   (v)   Fishing Equipment.
   (vi)   Fish Products.

4. **Forestry**
   (i)   Forest Area Statistics.
   (ii)   Fuel Wood Statistics.
   (iii)   Non Wood – Forest Statistics

(iv)   Persons Engaged by Gender and Age.

5.   Water Resources
        (i)   Irrigation.
        (ii)   Household Access to Portable water.
        (iii)   Rainfall and weather Statistics.

6.   Other General Needs
        (i)   Assess to Credit
        (ii)   Processing Facilities.
        (iii)   Land Use Statistics.

APPENDIX B

Development/Construction and Definition of Enumeration Areas (EAs.)

THE APPROACH

For the population census purposes, the entire country was divided into a number of smaller units of land areas whose sizes were deemed to be such that the counting of the population in each area, by an enumerator, can be conveniently and comfortably carried out within a reasonably short period of time. These divisions took into consideration the geographic expanse of the land as well as the existing human population, in general a habitation or "settlements" of 500 persons or less. The resulting units of land areas are called EAs.

DELINEATION OF E.A. BOUNDARIES

Initially, the basis for the preparation of EAs. are maps. Land base maps plus supplementary general knowledge of land use as well as information gained from previous surveys, were all utilised to prepare maps on which EAs. were demarcated. In the first instance the E.A. was tentatively demarcated on the maps, according to an assumed convenient size of the settlements (estimated from a previous count) which fall within a given land area, comprised of "dabadas" or villages.

From experience and for convenience, the boundaries of the EAs were identified by features which could comprise one or more of the following available physical features and important landmarks: rivers, streams, mountains, hills, ridges, dams, reservoirs, fields, roads, footpaths, electric and telephone poles and lines, and the like. Care was taken to ensure that the landmarks used to identify the EAs could be readily located on the ground. The delineation of the EA boundaries was done on the topo-sheets, which also depicted all the human settlements in the areas as well as the main physical features and landmarks identified.

In general, the work was undertaken geographic assistants, who were equipped with the base maps and such sheets before departing to the field. Once in the field, and being guided by the maps, these assistants canvass an entire section, constructing and redrawing the boundaries of EAs. According to their findings on the ground and to population counts of the settlements.

RESULTS

The exercise resulted in the mapping of 1601 Enumeration Areas and 1937 Settlements for the whole country and a distribution of Enumeration Areas by Districts is as follows:

Number	District	Number of Settlements (Villages)	Number of EAs
1	BANJUL SOUTH		25
1	BANJUL CENTRAL		24
1	BANJUL NORTH		37
2	KANIFING	17	361
3	KOMBO NORTH	38	121
4	KOMBO SOUTH	57	51
5	KOMBO CENTRAL	42	75
6	KOMOBO EAST	37	27
7	FONI BREFET	21	16
8	FONI BINTANG	55	18
9	FONI KANSALA	48	13

10	**FONI BONDALI**	26	8
11	**FONI JARROL**	23	10
12	**KIANG WEST**	36	19
13	**KIANG CENTRAL**	25	12
14	**KIANG EASt**	18	10
15	**JARRA WEST**	22	39
16	**JARRA CENTRAL**	24	10
17	**JARRA East**	30	19
18	**LOWER NIUMI**	68	61
19	**UPPER NIUMMI**	58	35
20	**JOKADU**	42	27
21	**LOWER BADDIU**	25	26
22	**CENTRAL BAKADU**	33	26
23	**UPPER BAKADU**	125	92
24	**LOWER SALOUM**	65	26
25	**UPPER SALOUM**	94	21
26	**NIANIJA**	35	10
27	**NIANI**	90	32
28	**SAMI**	70	33
29	**NIAMINA DANKUNKU**	26	10
30	**NIANIMA WEST**	32	10
31	**NIAMINA EAST**	52	24
32	**FULDU WEST**	220	80
33	**MACCARTHY ISLAND**	1	8
34	**FULDU EAST**	184	101
35	**KANTORA**	49	22
36	**WULI**	88	35
37	**SANDU**	61	27
	TOTAL	**1937**	**1601**

APPENDIX C

Example of Procedure for Selecting a Sample of EAs in a District

The aim is to use the "probability proportional to size" method (size in this case being the number of adults in agriculture) to select a sample of 25% of the EAs in the Kombo East District of The Gambia. Kombo East District has a total of 27 EAs and so 7 EAs are to be selected.

The total number of adults in agricultural in the district is 4188. Dividing this by 7 (i.e. the total number of EAs to be selected) resulted in a "sampling interval" of 598.3. A random number was then chosen between 1 and 598.3 as the "random start". This number was 241.3 and where this number fell in the cumulative column identified the first Enumeration Area to be selected. Using this random number as the initial starting number, the sampling interval was systematically and progressively added and wherever an accumulated number fell in the cumulative column identified a selected Enumeration Area.

The resulting selection of the 7 EAs was as follows:

DISTRICT: KOMBO EAST

EA Number	Settlements (Villages)	Adults in Agriculture	Cumulative Total	Systematic Addition	Selected EA
33001	Tubakuta Missiranding	81	81		
33002	Mandiaba	44	125		
33003	Kuloro	49	174		
33004	Kuloro	153	327	241.3	**Yes**
33005	Tunjina, Bonto (Tingage)	222	549		
33006	Pirang & Pirang Kabong	125	674		
33007	Pirang	197	871	839.6	**Yes**
33008	Pirang	204	1075		
33009	Borending	155	1230		
33010	Borending	205	1435		
33011	Borending	270	1705	1437.9	**Yes**
33012	Basori	101	1806		
33013	Basori	409	2215	2036.2	**Yes**
33014	Jiboro Kuta, Madina Talokoto	213	2428		
33015	Jida Sukoto, Jida Bajonki Jiboro Koto, Futo	118	2546		
33016	Duwasu, Jenung Kunda Niji, Omortoh	134	2680	2634.5	**Yes**
33017	Faraba Manokang	171	2851		
33018	Faraba Manokang	150	3001		
33019	Faraba Banta	224	3225		
33020	Faraba Banta	52	3277	3232.8	**Yes**
33021	Faraba Banta	152	3429		
33022	Sotokoi, Tanene	204	3633		
33023	Farabasutu, Tuman Tenda Suma Kunda, Bissinding Hamdali Kanjranba	65	3698		
33024	Kafuta	116	3814		
33025	Kafuta	141	3955	3831.1	**Yes**
33026	Kafuta	189	4144		

33027	Kafuta Tumbung, Sohm Sanianga	44	4188

The Estimators : The General Formulae for the Estimation Procedures

The related estimators are determined as follows:

Notation	Population	Sample
The total number of EAs (primary sampling units) in the ith district in a division	N_i	$n_i = 20$
Total adults in agriculture in the ith district in a division	A_i	A_i
Total adults in agriculture in the jth EA in the ith district in a division	A_{ij}	A_{ij}
Total number of holders in the ith district in a division	H_i	
Total number of holders (secondary sampling units) in the jth selected EA in the ith district in a division		H_{ij}
Total number of selected sample of holders (secondary sampling units) in the jth selected EA in the ith district in a division		$h_{ij} = 5$
Total number of fields of the kth selected holder in the jth selected E.A in the ith district (N.B. A sample out of the total fields of this holder is selected for yield and/or density studies)		f_{ijk}
Value of the x characteristic (e.g. acreage of a field) for all holders in the ith district in a division	X_i	
Value of the x characteristic (e.g. acreage of a field)of the kth selected holder in the jth selected EA in the ith district in a division		x_{ijk}
Yield of (1/90) th of an acre (i.e one plot) of the lth selected field of the kth selected holder in the jth EA of the ith district in a division		y_{ijkl}
Number of fields of the kth holder in thejth EA in the ith district included in the selected sub-sample of fields for yield studies		S_{ijk}

ESTIMATOR FOR THE TOTAL NUMBER OF HOLDERS IN A DISTRICT

An estimator for the total number of holders in the ith district as estimated from the sample of EAs selected from that district is given by:

$$\hat{H}_i = \frac{A_i}{n_i} \sum_{j=1}^{n_i} \frac{H_{ij}}{A_{ij}}$$

An estimate for the total number of holders in a division is obtained by adding the totals obtained for all the districts in the particular division. For the whole country, the total is obtained by adding the totals obtained for all the divisions.

ESTIMATOR FOR THE TOTAL OF A CHARACTERISTIC IN A DISTRICT (FOR EXAMPLE, TOTAL ACREAGE OF ALL FIELDS IN A DISTRICT)

The total of the characteristic, xijk, (e.g. total acreage) for all the k sample holders selected in the jth enumeration area in the ith district is equal to

$$x_{ij} = \sum_{k=1}^{h_{ij}} x_{ijk}$$

An estimator for the total acreage of the fields for all holders in the ith district is given by

$$\hat{X}_i = \frac{1}{n_i} \sum_{j=1}^{n_i} \left(\frac{A_i}{A_{ij}} \right) \left(\frac{H_i}{h_{ij}} \right) x_{ij}$$

Within the jth enumeration area, the term

$$Exp.(j) = \left(\frac{A_i}{A_{ij}} \right) \left(\frac{H_i}{h_{ij}} \right)$$

could be and was evaluated and use as a common expansion factor for each and every total, x_{ij}, obtained in the jth enumeration area. Thus in the actual calculations, any x_{ij} obtained within a district was simply multiplied by Exp. (j) and the products added for the district and divided by n_i to give

$$\hat{X}_i$$

ESTIMATOR FOR THE VARIANCE OF THE TOTAL HOLDERS IN A DISTRICT

An estimator for the variance of

$$\hat{H}_i$$ ₅₂

is given by

$$V\left(\hat{H}_i\right)=V\left[\frac{A_i}{n_i}\sum_{j=i}^{n_i}\frac{H_{ij}}{A_{ij}}\right]=\left(\frac{A_i}{n_i}\right)^2\sum_{j=1}^{n_i}V\left(\frac{H_{ij}}{A_{ij}}\right)$$

where

$$V\left(\frac{H_{ij}}{A_{ij}}\right)=\frac{1-f}{n_i\overline{A}_{ij}}\left[\frac{\sum\limits_{j=1}^{n_i}\left(H_{ij}-RA_{ij}\right)^2}{n_i-1}\right]$$

and the sampling fraction, f, and population ratio, R, are given by

$$f=\frac{n_i}{N_i} \qquad\qquad R=\frac{\sum\limits_{j=1}^{n_i}H_{ij}}{\sum\limits_{j=1}^{n_i}A_{ij}}$$

ESTIMATOR FOR THE VARIANCE OF THE TOTAL ACREAGE IN A DISTRICT

An estimator for the variance of

$$\hat{X}_i$$

is given by

$$V\left(\hat{X}_i\right)=\frac{1}{n_i(n_i-1)}\sum_{j=1}^{n_i}\left(x'_{ij}-\overline{x}'_i\right)^2$$

where

$$x'_{ij}=\frac{A_i}{A_{ij}}\frac{H_{ij}}{h_{ij}}\sum_{k=1}^{h_{ij}}x_{ijk}$$

and

$$\bar{x}'_i$$

is the unweighted means of the

$$x'_{ij}$$

and is given by

$$\bar{x}'_i = \frac{1}{n_i} \sum_{j=1}^{n_i} x'_{ij}$$

TOTAL FOR YIELDS

The yield per acre from the lth selected subsample field of the kth selected holder in the jth E.A of the ith district for a particular crop harvested from the plot in the field is given by 400 (y_{ijkl}), the size of the plot used being (5x5 =) 25 square metres of $1/400^{th}$ of a hectare.

The total yield per acre from all selected subsample of fields of all selected holders in all the selected E.AA in the ith district for the particular crop is given by

$$y_i = \sum_{j=i}^{n_i} \sum_{k=1}^{h_{ij}} \sum_{l=1}^{s_{ijk}} 400(y_{ijkl})$$

Estimate of the average yield per acre for the crop in the ith district is given by

$$\bar{y}_i = \frac{\displaystyle\sum_{j=1}^{n_i} \sum_{k=1}^{h_{ij}} \sum_{l=1}^{s_{ijk}} 400(y_{ijkl})}{\displaystyle\sum_{j=i}^{n_i} \sum_{k=1}^{h_{ij}} s_{ijk}}$$