SUPPLEMENT FOR AFRICA
PROGRAMME FOR THE
1990 WORLD CENSUS OF
AGRICULTURE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1991
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FOREWORD

The Statistical Development Series is a sequence of comprehensive technical manuals on various aspects of the statistical programmes which make up a national information system for food and agriculture. Emphasis in these manuals is placed on the standardization of concepts and efforts to integrate statistical programmes and minimize duplications.

The organization of agricultural censuses is one of the important parts of national programmes and is the subject of a separate publication entitled Programme for the 1990 World Census of Agriculture. Following the recommendations of regional statistical Statutory Bodies of FAO, regional supplements are prepared to provide recommendations on subjects particular to individual regions. The present volume is the Supplement for Africa.

M. Trkulja
Director
Statistics Division
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PART I

PURPOSE AND CONTEXT

Introduction

1. FAO Statistical Development Series No 2, Programme for the 1990 World Census of Agriculture (FAO, Rome, 1986) hereafter called the World Programme or WP, has been prepared for use in all countries of the world. However, particular considerations may apply within different regional groupings of countries across the world. The purpose of this African Supplement to the WP is to detail the considerations that are likely to apply to countries within the African Region. Most of the countries of the Region have participated in the World Census of Agriculture (WCA) Programmes sponsored by FAO in the past and have gained valuable experience in conducting the agricultural census. However, these countries vary a great deal with respect to food and agricultural statistical systems and infrastructure, agricultural and rural environments and the socio-economic conditions that influence the ability to conduct an agricultural census.

2. For the purpose of the WP, the African Region is broadly defined to comprise the following countries:

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Côte d'Ivoire  
Equatorial Guinea  
Ethiopia  
Mali  
Mauritius  
Mozambique  
Namibia  
Uganda  
Zaire  
Zambia  
Zimbabwe

Algeria, Djibouti, Egypt, Libya, Mauritania, Morocco, Somalia, Sudan, Tunisia that are included in the Near East Region may also benefit from this African Supplement in planning their agricultural censuses.

Structure of Part II of the African Supplement

3. This Supplement provides, section by section in Part II, specific details of possible changes to the WP to accommodate Africa. Recommendations and proposals are given for modifying the WP in the context of the African Region are indicated.

4. Part II contains the core of the Supplement and closely follows the sequence and pattern of the WP itself. Five sections are presented in the Supplement, each of which relates to the corresponding chapter of the WP. The Supplement contains passages summarizing the relevant parts of the WP, marked "Summary of WP" and indented for ease of reference.

Promotion of the 1990 World Census of Agriculture in the Context of a National Information System

5. The Programme for the 1990 WCA approved by the Twenty-third Session of the FAO Conference in Rome in November 1985 is the first WP conceived and developed within the context of a national information system for food and agriculture. FAO Statistical Development Series No. 1, Food and Agricultural Statistics in the Context of a National Information System (FAO, Rome, 1986); hereafter termed the "System Document" presents this integrated statistical programme.

6. The information system context requires that observation of real life phenomena relating to food and agriculture and rural development be based on relevant
conceptualization. The information system should result in accurate and timely data flowing into complementary analytical programmes so that both data and analytical insights can provide a more adequate and continuous information base for decision-making in food and agriculture and rural development.

7. Countries should view the agricultural census along with related sample survey programme as the basic building block for the development of the national food and agricultural information system. Development of the national information system is a step-by-step progressive development process, relying heavily on the development of a country's agricultural census and related survey programmes and other relevant data sources.

Within the context of the national information system the programme activities of the census comprise the following interrelated processes:

- conceptualization of the objective and scope of the census programme;
- operationalization of definitions and concepts used in the programme;
- enumeration and measurement;
- data processing, interpretation and analysis; and
- dissemination of the data from the programme.

8. In addition to the traditional approach to planning and conducting an agricultural census programme, the information system indicates the need for countries to:

- assemble and organize all information relating to the food and agriculture and rural development complex, policy concerns and the role of government in food and agriculture;
- evaluate the country's existing capability to generate food and agricultural statistics
relative to needs and to draft a long-term development programme (say of ten years) including appropriate censuses and surveys as well as administrative records, village level statistics and other sources of basic data (the plan should make adequate provisions for the statistical infrastructure, data processing and dissemination so that not only data but also data generating capabilities are developed and institutionalized); and

- establish and maintain the government coordinating capability with representation from appropriate ministries and departments to review, approve, monitor and evaluate progress and problems in implementation and to recommend changes in the long-term statistical development plan.

9. The System Document can provide a basis for both new developments in food and agricultural statistics and modification of established practices of agricultural census and surveys. It provides an operational device for identifying data gaps, harmonizing concepts, definitions and classification criteria in data collection programmes and for filling-in the data gaps on a systematic basis.

10. Regardless of a country’s state of development in statistical services, the System Document offers a framework and a practical tool for review, analysis and potential further development of the food and agricultural statistics including the agricultural census.

11. Several common factors currently affect the statistical programmes of many countries. These include the growing pressure and constraints on resources, an increased urgency for delivery of usable results and their relevant analysis, advances in statistical methods for data collection, current rapid strides in computer technology -both hardware and
software— and the demands for cost-effectiveness and cost-justification of all statistical activities. The System Document can be used as an objective and at the same time stimulating manual by all countries of the Region to determine the impact of these pressures and the most appropriate way of responding to them.

12. The countries are encouraged to use the System Document to examine and analyse their current food and agricultural statistical programmes. The document offers recommendations for change and development, in particular, the establishment of an explicit long-term pattern of activities for data collection including an agricultural census. Many countries of the African Region may prefer to start with a minimum programme of annual work to collect data in order not to overload existing facilities devoted to statistical activities. This would require a careful listing of data needed in the order of their priority.

13. Timeliness of data has been acquiring more importance among other desirable characteristics of data. Decision makers wish to have data through methods and techniques that do not require long years to produce data. One of the important points to observe to produce timely data is to restrict the scope of each data collection activity to its basic objectives. The System Document is particularly useful in delineating the scope of each census, survey or other data collection activity.
PART II

THE WORLD PROGRAMME AND MODIFICATIONS FOR AFRICA

Section 1: Introduction

14. **Summary of WP.** Chapter 1 of the WP presents a brief history of previous decennial WCAs and information on the planning of the 1990 Census. The basic requirement to collect and disseminate information is based on Article 1 of the FAO Constitution. Emphasis is placed on the need for an integrated and systematic approach to food and agricultural statistics as described by the System Document. The preparation of a long-term data collection plan is recommended. Within such a plan, agricultural census should be limited primarily to items that describe structure (rather than, for instance, performance) that change slowly over time. Other general and desirable features of the census include (a) the agricultural holding serves as the statistical unit; (b) a wide coverage of holdings provides a sampling frame for other surveys and provides data for small areas and for specialized groups; (c) definitions and classifications are harmonized with those used in other sources; (d) the scope of items is deliberately restricted with some tailoring of the census to each country’s own situation; and (e) maximum use of the collected data is achieved by extensive cross-tabulation of results.

15. Although there was no African Supplement for the 1980 WCA, such supplements were prepared for the 1960 and 1970 WCAs. These were limited to additional (or modified) items, definitions and tabulations. The present Supplement covers these aspects and also provides a wider discussion and amplification of each section of the WP.

16. All of the introductory principles covered in Chapter 1 of the WP are applicable to countries in the
African Region, with some modifications as discussed later. Paragraphs 5 to 13 above describe the general ways in which the recommendations of the System Document can be usefully interpreted and put into practice.

17. On the whole, to strike a balance between national and international requirements for both the scope and content of the 1990 WCA, countries of the African Region are urged to design their agricultural censuses to be as complete as resources will allow, having in mind the items and tabulations detailed in the WP and this supplement.

18. The WCA should be viewed as a mutually beneficial programme for individual countries of the Region incorporating significant contributions to both design and data from as many countries as possible. It will be helpful if a significant quantum of internationally comparable data are available from the census programme implemented by the countries of the Region. These data will be collated, analysed and disseminated by FAO for international and country uses.

19. The 1990 WCA will also provide an excellent opportunity for individual countries of the Region to critically assess their agricultural census and related programmes by reviewing the census methodology and practices, and examining the value and use of collected census materials and their analysis and presentation. All countries of the Region, regardless of their current agricultural census capability, are likely to benefit from such a review. The details of the WP and this Supplement comprise a useful checklist and these documents can stimulate thought and discussion leading to thorough review and further development. The process of regular re-examination and subsequent improvement in the agricultural census related programme should be an integral part of the country’s endeavour to set up and operationalize the national information system for food and agriculture of which the agricultural census is a key component.
Section 2: Methodological Considerations

20. Census Objectives. (Summary of WP paras 2.1 to 2.6) The first basic objective of the census is to collect data on structural variables that change slowly. Although countries may wish to collect further data, this should not be at the expense of these basic data. The second objective is to provide a frame for other surveys.

21. The two basic objectives of the WP are:

- to provide data for measuring structural changes in the food and agricultural sector; and
- to provide a frame for agricultural and other sample surveys.

Keeping these basic objectives in mind, the countries of the Region may wish to amplify the objectives of their agricultural census and related programme to provide also:

- data for measuring structural changes in the rural sector of the national economy;
- data for identifying and alleviating rural poverty including the identification of various target groups;
- data on the status and participation of women in food and agriculture related activities; and
- data for community level (or village level) statistics for use in local level planning.

22. In view of the predominance of the rural sector in most economies of the Region, there is a growing demand for structural data on the rural economy as a whole, and not only for food and agriculture related activities. These structural data will be used for monitoring and evaluating programmes and policies related to national food security and the alleviation of rural poverty and for promoting agricultural growth with equity and people’s participation in most of the developing countries of the African Region.
Alleviation of rural poverty and promotion of the welfare of rural women are the professed goals of many of the countries of the Region. Periodic compilation of socio-economic indicators based on agricultural census and other data sources is also being institutionalized in most countries of the Region through the WCARRD (World Conference on Agrarian Reform and Rural Development) related activities. There is also growing demand for village or community level data from censuses for use at the local level for promoting the people’s participation in local level planning.

23. The additional objectives suggested above can be viewed as amplifications of the first basic objective advocated for the WP. Cross-tabulations by sex of holder and disaggregations by agro-ecological zones will help to fulfill these objectives in most country programmes. A feasible strategy that is cost-effective for most countries is the collection of the basic benchmark data through the agricultural census and of more detailed information through the census related survey programme.

24. Most countries are expected to conduct a population census in the current decade. Agricultural census operations within the 1990 WP may be linked with the population census through a common geo-coding of all units of administrative areas and a harmonization of concepts and definitions. This should result in a frame for agricultural census and other surveys in most countries of the Region.

25. Census Scope. (Summary of WP paras 2.7 to 2.10) The items to be collected are summarized in logical groups: the holding, the holder and household; manpower, land, crops, livestock, machinery, buildings; tenure; miscellaneous items. In determining the scope of the census, countries should closely consider both the availability of data sources other than the census and the full range of required resources, i.e., personnel and
equipment, particularly data processing facilities and budgetary allocation.

26. The scope of the country's agricultural census is dependent on its effective agricultural census taking capability. For smaller countries and those at the early stage of developing their agricultural census capabilities, it is recommended that they restrict the scope of their census to a reduced programme within the framework of Chapter 3 of the WP. Countries with sufficient census capabilities may wish to widen the scope of their census.

27. Statistical Unit and Coverage. (Summary of WP paras 2.11 to 2.13) The holding is the statistical unit for the census; good coverage in the census by area and size of agricultural holding is necessary. Practical decisions on coverage depend on the significance of very small holdings in a country's agricultural structure. In certain instances, even the smallest holdings should be covered by special surveys. Omission of urban areas from the census may result in the loss of valuable information.

28. Although the holding is the basic statistical unit for the agricultural census, for most of the countries it is convenient to use the household as the unit which enables the identification of the holder and the holding. Using the household has the advantage of providing a frame for landless rural households during the process of house to house visits to identify holders.

29. After identification of the holding through households, it is a practice in some countries to exclude from the census small holdings below a threshold size which varies from country to country, to reduce the burden of enumeration. The threshold size below which data will not be collected should be set as low as possible, because small holdings comprise a great part of total agricultural holdings in the
Region. A reasonable threshold based on economic considerations would exclude the smallest holdings which contribute in total only 1% or so of a few key output-related items such as number of livestock or area of cropland. The number of holdings falling below the threshold size as well as the landless households should be included in the tabulation programme of the census. Special surveys should be planned to cover those holdings excluded from the census of agriculture.

30. Countries should pay special attention to include semi-desert areas in their censuses. Omission of semi-desert areas may cause important losses of information on livestock resources because of nomadic livestock holdings existing in such areas. All efforts necessary to obtain a complete frame for these nomadic tribes are fully justified.

31. In view of the significant amount of livestock, poultry, vegetable and crop growing activities carried out in urban areas in the Region, the countries are strongly advised to carry out their agricultural census throughout their entire territorial jurisdiction. Omission of urban areas may result in loss of valuable information.

32. To ensure inter-census comparability and linkages with other data sources such as population census, it is necessary to adopt a standard definition and classification of urban and rural areas of the country. In particular, such a standardized classification system will help resolve the problem of including the peripheral rural areas in the fast growing urban spill in many developing countries of the Region. A convenient approach is to adopt the definition and classification followed in the country's population census and to develop the geo-coding of administrative areas for statistical purposes. The countries that still lack a geo-coding scheme are advised to develop such a system as early as possible through an expert committee and if required, through international assistance.
33. Frequency, Time Reference, Enumeration Period. (Summary of WP paras 2.14 to 2.16) Countries should take at least one census in the period 1986–95, using a reference period of 12 months in or close to 1990. Enumeration should be done over as short a period as possible.

34. While most countries of the African Region conduct population censuses regularly, once in ten years, mostly in and around years ending with 0 or 1, and some developed countries even conduct a mid-decade population census as well, this pattern of conducting the agricultural census regularly at least once in ten years is now being strengthened under the impetus of the decennial Programme for the World Census of Agriculture sponsored by FAO. Following the WP recommendation, it is strongly urged that all countries of the Region try to conduct at least one agricultural census in the period 1986–95, and through proper planning of resources take into account the lead time involved in implementing such a census programme. For technical and other reasons it will be convenient for most countries of the Region to conduct their agricultural census following their population census in years close to 1990. Such a sequence may also enable many countries of the Region to use a geo-code, enumeration area maps and other infrastructure facilities that are shared between the two censuses and by so doing achieve a substantial cost saving.

35. Most items in the agricultural census are of a "stock" type and it is an established practice to relate such stock variables to a particular point in time, usually the day of enumeration. The "flow" type variables, such as amount of labour or irrigation practised will have to be measured over a period. (See also paragraph 3.22 of the WP.)

36. Complete or Sample Enumeration. (Summary of WP paras 2.17 to 2.21) Agricultural censuses may be conducted through complete enumeration or sampling or a combination of both. In a national
statistical programme for food and agriculture, it is desirable to carry out the agricultural census by complete enumeration, which fulfills all objectives of an agricultural census. It is thus possible to obtain statistics for agro-ecological or administrative zones irrespective of size. Complete enumeration also provides a frame useful for subsequent sample surveys. However, complete enumeration puts more demands on resources. Sample enumeration is undertaken when inadequate funds, personnel, transport and data processing equipment preclude complete enumeration; however, sample enumeration requires expertise in sampling theory.

37. The methods of conducting the agricultural census in countries fall into two broad types: the first method concerns the complete count of all holdings. The second method relates to carrying out the census programme on a sample basis. A full count census provides structural data by community (or the lowest administrative area) and a geographical-administrative basis for evaluating agrarian reform and rural development, while sample enumeration can generate more detailed data on many aspects of agriculture.

38. A few countries in the Region are opting for a combination of complete and sample enumeration. In such a combination, generally, government holdings or large holdings are covered by complete enumeration and sampling methods are applied to remaining holdings. In a few countries of the Region agricultural census has been carried out on a complete enumeration basis. But majority of countries have been conducting their agricultural censuses through sample enumeration.

39. For very small countries or countries with sufficient infrastructure facilities (such as roads, communication) a complete enumeration may be recommended. For other countries, the national authorities are urged to undertake preparatory studies to determine the most appropriate method of census
taking. In this respect, they may also undertake case studies to examine the feasibility of programme integration as well as organizational integration in order to achieve cost reduction and realize economies of scale. The practice of complete enumeration of large private holdings and holdings operated by the government is recommended for countries that decide to utilize sampling methods. The choice of appropriate sample design is a technical subject which requires expertise in this field. Care must be paid to basic aspects to ensure that the estimates are sufficiently precise. Whenever sampling methods are utilized, estimates of sampling errors should be made available to the users of data.

40. Census Frame. (Summary of WP paras 2.22 to 2.29) A frame is a list or a means to identify the holdings and is needed not only for sample but also for complete enumeration. An ideal census frame would be a complete list of all holdings, such as a register of holdings or farm registers established in some countries. Most countries do not have a farm register and thus need other types of frames. A population census can provide a frame if relevant questions for identifying holders are included. Other possible frames for an agricultural census include a list of enumeration areas prepared for the population census, a list of localities, aerial photographs and maps.

41. The countries of the African Region do not have farm registers covering all holdings and universal identification of holders through the population census by incorporating relevant questions has also not been tested in most countries. On the other hand, the countries have been using population census enumeration area frames of households for identification of holders and holdings. If a list of population census enumeration areas is used as a frame in the agricultural census, care should be taken to ensure that the frame is updated, that it covers all the
national territory, that the enumeration area boundary is clearly demarcated and identified and that there is no overlapping. A locality list or a list of villages may also be used as a frame in some countries. However, the census frame, be it a population census enumeration area list or a list of localities, needs to be thoroughly verified and updated before undertaking the agricultural census. Verification and updating of the census list should be an important component in the census undertakings of all countries of the Region. Equally important is that the localities should be stratified in an efficient way to increase the precision of sample estimates. There are a few countries where farmers do not live in villages but they live on their holdings. Appropriate measures need to be taken to ensure the completeness of the frame in such cases.

42. Large private holdings and the holdings operated by the government occupy an important place in the economy of many countries of the Region. A continuing register should be started for these holdings as part of agricultural census programme.

43. Non-Sampling Errors, Data Processing, Analysis. (Summary WP paras 2.30 to 2.33) Many sources of errors are possible in census data. Appropriate quality control is necessary as is planning for data processing (see also WP paragraphs 5.48 to 5.64). An analytical use of census data should be considered in the planning phase and countries conducting an agricultural census regularly or periodically should undertake inter-census comparisons to analyse the trends of structural changes taking place in agriculture.

44. Both a full count census and sample enumeration suffer from non-sampling errors such as coverage error, various response errors and erroneous enumeration. Countries of the Region should invariably incorporate rigorous quality control systems that include field control in their census undertaking, so that both
coverage error and response errors remain within reasonable levels and do not threaten to vitiate the quality of the census. Countries with a reasonable census taking capability should undertake a direct check of the quality and coverage of the census through a post enumeration quality check (PEC) survey and other indirect checks that are feasible. Experiences of countries undertaking PEC surveys and other indirect checks should be shared so that more countries are induced to undertake such surveys for assessing and improving the quality of their census data.

45. Data processing difficulties are still one of the major problems in the timely publishing and dissemination of agricultural census results in many countries of the Region. As a first step towards identifying the problems and developing an adequate data processing capability, countries of the Region are urged to evaluate thoroughly the problems faced in the processing of the 1980 series of the census and to identify the remedial measures. Based on such an evaluation, the countries of the Region intending to undertake the 1990 Programme should adequately plan and prepare the data processing phase of the census, specifically taking into account the recent advances in computer hardware and software technology.
Section 3: Proposed Census Items

46. Introduction. The classification of items of the 1990 WP is based on the scheme detailed in the System Document that covers a wider range of categories and detailed items for the food and agriculture information system. Chapter 5 of the System Document and Appendix I thereof provide full details of the general classification of information, their numbering scheme and all relevant data sources. In particular, Appendix I shows the items that may be collected by the agricultural census and their relationship with other items and other data sources in the full information system. By and large, the agricultural census, with related sample survey programme, provides data on the key items categorized in the information system. However, in an effort to keep the census operation simple and uncluttered, the WP advocates the inclusion of only limited items. Countries may wish to include more detailed and elaborate information in the related sample survey programme according to their capabilities and needs.

47. By selecting the agricultural census items from the wider classification scheme of the System Document, advantages such as overall consistency in the system, and linkages and harmonization with other data sources are derived. However, as a result, items relating to the holder, the household and the holding are divided among categories 01 to 04 (identification, general characteristics, demographic and anthropometric characteristics, employment and occupation).

48. Items covering various characteristics of the household members of the holder appear in the first four categories and include some priority items in the WP. Since in most countries of the African Region the rural populations are of a significant size and depend largely on agricultural activities, to fulfil requirements of ARRD (Agrarian Reform and Rural Development), statistical offices are under pressure to collect information on employment and underemployment
in rural households, status of women in agricultural
and non-agricultural activities in the rural areas, and
the effects of agricultural seasonality on the rural
labour market. The countries are strongly recommended
to evaluate their capabilities before embarking on a
census with a broad scope.

49. **Category 01: Identification.** These items,
detailed in paragraph 3.7 of the WP, contribute to the
effective execution of the census, but do not become a
part of the tabulated results. It is obviously
necessary to identify the holding and the holder, the
head of the household and the respondent, if he/she is
not the holder. Since a one to one correspondence
between households and holdings is quite common in
Africa, households, as noted earlier, can serve to
identify holdings in most countries of the Region. It
could be helpful to ask the clan or ethnic group of the
holder in addition to items cited in paragraph 3.7
of the WP. This information is useful to distinguish
holders having the same names.

50. If the household is used to identify the holding,
it is necessary to bear in mind that for agricultural
census purposes only the *de jure* or "usual member"
concept of households will be relevant and not the *de
facto* or "persons present on the enumeration day"
concept. In conducting the population census, on the
other hand, the practice in many countries of the
Region is to adopt the *de facto* concept of households.
To the extent the two concepts differ, household
information obtained from the population census will
not be strictly comparable to those from the
agricultural census.

51. The definition of the concept of household may
need to be further elaborated taking the social
conditions of each country into account. The
definition adopted in the 1984 population census of
Ghana is given as Annex to serve as an example.
52. Again, if the household is used to identify the holding, in the rare event of two or more holdings being operated by different members of the same household, clear instructions about demarcation and identification of the holdings must be given to ensure their correct enumeration in the census. Special care should be taken to enumerate, through an operation distinct from household enumeration, the institutional type of agricultural holdings in the country (i.e., holdings operated by Government agencies and juridical persons).

53. The data item identifying the holding may in itself be sufficient to determine the location and permit an area code (preferably the geo-code, if available) to be placed on the census record of each holding.

54. Category 02: General Characteristics. The main item in this category is the legal status of the holder and hired manager. The integration of the holding with other economic units or enterprises engaged in economic activities like agricultural services, hunting and trapping, forestry and logging, fishing, manufacturing etc. may be relevant mainly for large plantations where food processing is also carried out.

55. Category 03: Demographic and Anthropometric Characteristics. The recommended items in the WP are the number of household members and the name, age and sex of each, including the identification of the head of the household, particularly if linkage with the population census is desired. Data on the age and sex of the holder will be particularly valuable for judging the status of women in agriculture and for constructing socio-economic indicators on rural women’s status. Therefore, countries of the Region are strongly recommended to collect data on sex and age of holder.

56. Category 04: Employment. This category provides employment and occupation data for the holder’s
household members and agricultural workers other than the holder’s household members.

57. Since young children usually participate in agricultural work, the minimum age limit for economically active persons in the African Region countries is recommended to be 10 years.

58. African Region countries are recommended to restrict the number of items on labour to the bare minimum. Detailed data on labour should be collected through specific surveys such as labour force or farm management surveys. In countries where this recommendation is adopted census of agriculture could provide a frame for such specific surveys on labour.

59. Countries of the Region executing specific surveys with the household as the unit of enumeration will be able to collect employment and occupation data for all households in the rural area including holders’ households. Such data should be collected for all members of the households by age and sex, so that data relating to women, child labour and target groups of rural population including farm population can be clearly identified for satisfying various policy needs and national programme objectives.

60. In countries where holders usually have more than one occupation, information on all occupations separated by main and other occupations should also be collected.

61. To give an over all broad measure of labour a final item is defined as follows:

   Total number of permanent workers (including both household and non-household)
   - male
   - female
62. **Category 05: Land and Water.** This category comprises the following major topics: fragmentation of the holding into separate parcels; tenure; broad types of land use on the holding, by area; and practices of irrigation and drainage.

63. The WP recommends the collection of most of the details of these topics at the level of the parcel, then the aggregation of the parcels to get the total measure of the holding. For countries of the Region where fragmentation of the holding into more than one parcel is common, there are significant advantages in collecting basic land use and tenure information by each separate parcel. However, in view of the considerable extra expense involved in collecting such detail, for countries where fragmentation of holdings into parcels is not a significant factor, the information need not be collected by individual parcels. A feasible strategy for these countries will be to restrict the collection of details only to the level of the entire holding in the census and through a sample survey to collect more detailed information by individual parcels. In such cases, the location of the entire holding in the administrative/geographical sub-divisions must be decided in some appropriate way, for instance, by recording the position in the area where the main part of the holding is located.

64. The growing phenomenon of landlessness is a policy concern for ARRD in many countries of the Region. Suggestions have been put forth to provide detailed information on landlessness through agricultural censuses. In view of its importance, countries of the Region may wish to establish a frame of the landless households during the identification of holders through canvassing households. This frame can then be used to conduct a specific survey on these households.

65. In addition to landlessness, the problem of share cropping causes concern in rural development policy-making in some countries of the Region. In such countries, details of land that is share cropped should
be separated from the area other than that share cropped so that data on share cropping can be shown separately (item 052222). Similarly, in countries where squatter and tribal forms of tenure are important, such forms of tenure should be enumerated according to country practice (item 05224). In general, items 0522 or items on tenure comprising basic structural information relating to the areas of the holding that are owned, rented or held through other tenure arrangements, are considered priority items for countries of the Region.

66. Land use classification is a key item of the agricultural census and is required to understand conditions prevailing in countries of the Region. It must be sufficiently disaggregated and based on mutually exclusive classifications that avoid overlap or duplication and allow unique aggregation at the country level down to the smallest administrative unit. The land use classification provided in item 0524 may need some amplification or modification to suit the specific conditions of the African Region, in particular, to provide information on certain critically needed categories such as forest land on farm holdings; area sown more than once; area of land used as seed bed, etc. Classification of land use at the holding level may follow the classification provided in paragraph 3.72 of the WP with the modification proposed in the next paragraph.

67. In many countries of the Region, farm forestry located on the holding as distinguished from permanent crops (paragraph 3.108 of the WP) or compact plantation (paragraph 3.109 of the WP), provides fuel wood and biomass as a domestic energy resource for the holder's household and is a source of additional income and employment for the holder and members of the holder's household. Some countries have also embarked on the promotion of a farm forestry programme through assistance from FAO and other donors. As such, it is proposed that land under farm forestry be introduced as a separate land use item in countries of the Region
where such activity is considered important for policy purposes. Consequently in land use classification, "Woodland and Forest" can be sub-divided as follows:

(i) Area on which farm forestry is practised; and
(ii) Other.

Before adopting a land use classification other than the one presented in the WP, countries are advised to conduct elaborate case studies to judge the appropriateness of the classification. In any case, the broad classifications should not deviate altogether from the WP classification so as to lose international comparability.

68. Transplantation of paddy seedlings and/or sale of seedlings are important activities in some paddy growing countries of the Region. Seed beds of the farm holding (regarded as a nursery item in 3.83 of WP) must be included as a separate item in those countries. Some areas of seed beds are only used for seed nurseries and seedlings, and no crops are subsequently grown in those areas of seed beds. However, there are some farm areas under seed beds that are used for both purposes. These two types of seed beds may be treated separately. The area of the seed bed growing crops should be accounted for under the area of crops, while the area of the seed bed growing no crops should be reported as area under seed bed.

69. The practice of mixed cropping is common as a risk aversion device in some countries of the Region. Seeds of some crops are sown together in an area of the holding at a particular time. The crops of that area may be harvested at one time or one after another at different times. Specific instructions for treating areas under mixed crops should be included in the country programme where applicable and such areas may be shown separately to judge the overall importance of such an activity for policy purposes.

70. Some of the alternatives of allocating area to
various crops involved in mixed cropping are mentioned below. As the first alternative each combination can be treated as a separate class, thus eliminating the problem of allocation of land to individual crops. This method can be useful only if number of different combinations of mixed crops is few.

71. As the second alternative the primary crops can be identified and all combinations involving a particular primary crop are classified into the same group (e.g. maize and other crops). This alternative overestimates the area attributed to primary crops and ignores all other crops.

72. As the third alternative the predominant crop in each mixture can be identified and all land is attributed to it. The criteria adopted to select the predominant crop in the mixture may be the area occupied. This criteria is valid particularly for cases where the crops are of similar botanic habit. The area occupied by each one of the crops in the mixture can be estimated by eye inspection or by count of number of plants in selected unit areas. In some cases, the predominant crop may be determined in terms of the value of production. This alternative gives an overestimate of areas under certain crops while it underestimates the areas under some other crops.

73. As the fourth alternative for each crop in a mixture the total area is recorded as either "principal constituent" or "secondary constituent" depending on whether a given crop is the predominant crop or not in that mixture. The disadvantage of this alternative is that the total of areas will far exceed the area actually under crops.

74. As the fifth alternative, to each crop in a mixture an estimated area is attributed as if it was in pure stand based on eye estimate or count of number of plants in selected unit areas, or amount of seed used. This alternative provides area figures for each crop, however it ignores the reality of mixed cropping.
75. In the case of associated crops if the permanent crops are not in plantation form, they can be treated as scattered trees with no area figure attributed to them.

76. It is necessary to note that data on land use cannot necessarily be calculated directly from crop areas. Paragraphs 3.96 to 3.107 of the WP provide detailed measures on the area concept for temporary and permanent crops and for simultaneous cultivation. Differences may arise in various ways, for instance, through counting a successive cropped area only once in land use but twice or more in area harvested.

77. Category 06: Crops. This category covers basic features of crop cultivation and the use of selected inputs, viz., fertilizers, pesticides, seeds and seedlings for the entire holding and for each parcel comprising the holding.

78. The WP does not recommend obtaining crop production data through the agricultural census. In general, data on crop production may be obtained through annual surveys which may involve crop cutting experiments. For these surveys agricultural census could provide a good sampling frame. While choosing between crop-cutting and farmer interview techniques to collect data regarding crop production, countries are recommended to carry out experimental research to find out relative superiority of these techniques under the conditions prevailing in the country.

79. Whether information under the broad category 06 should be collected for the holding only or by parcels as well, the observation made in paragraph 63 should apply. That is, countries in which it is feasible to collect information by parcel, should continue to collect the information by each parcel; for others, information by holding only, will suffice.

80. Key information under crops includes the name and area of crops - both temporary and permanent. In fact,
one of the basic reasons for conducting agricultural censuses in countries of the Region has been to obtain periodic information on temporary crops. All crops that are significant in a country's agriculture should be included. Significance should be judged by factors such as area, relative value and policy interest, e.g., for a newly introduced crop. Crops that are significant in only some areas of a country should also be included. In general, the structural nature of the census means that countries should, so far as feasible, cover all their cultivated crops including both the so-called "major" and "minor" crops; in fact, the census may be the only objective source of information on many of the minor crops in most countries of the Region. To ensure proper coverage of all temporary crops, it is necessary for all countries to prepare an exhaustive crop list grouped into meaningful categories by following the crop list provided in the WP, taking into account prevailing agricultural practices. For operational purposes, such a list must use commonly understood local crop names and separate codes for each crop.

81. In view of their large numbers, collection of basic data on permanent crops through the agricultural census is recommended. For enumeration purposes, the permanent crops in countries can be viewed as a compact plantation or scattered trees on individual holdings or commercial plantations. The commercial plantations should preferably be enumerated completely.

82. The other items in category 06 concern the use of inorganic and organic fertilizers, pesticides and high yielding seeds in crop cultivation of the holding. The WP requires the collection of data indicating simply whether holdings do or do not use these inputs. These are important items for policy purposes for most countries of the Region. Detailed data on them should be collected through sample surveys in order to avoid overloading the census enumeration. The value of sample survey data is enhanced manifold if they can be linked with irrigation usage and are detailed by type
and quantity (if feasible) of crops grown using these inputs and irrigation.

83. **Category 07-08: Livestock.** The WP category 07-08 provides a collection of data on the holding livestock system type and the present livestock population kept on the holding. In keeping with the common practice, countries are advised not to collect livestock production information through the agricultural census, but to collect such information through specially designed livestock surveys based on a census frame.

84. Livestock numbers should be regarded as a priority item. For the African Region, important animals are cattle, sheep, goats, pigs, camels, horses, asses, poultry and ducks. Countries are also recommended to use the census as an opportunity to include as many types of livestock as possible that are not usually covered through surveys or that are surveyed infrequently. Items like number of geese, pigeons and beehives and other items, i.e., the activities that are often promoted in rural areas in poverty alleviation programmes of some countries need also to be covered separately.

85. Countries should note that there is much less detail on livestock in the 1990 WP than there was in the previous world programmes. In the previous programmes the main livestock types were divided by age and sex and some were also classified by purpose. For the 1990 WCA, countries are recommended to review the possibilities in the context of their requirements in order to determine which breakdowns are valuable enough to be collected at the same time.

86. **Category 09: Machinery and Equipment.** Category 09 identifies machinery and equipment used by the holding, wholly or partly for agricultural production. All machinery and equipment used exclusively for non-agricultural purposes are excluded.

87. **Use of agricultural machinery and equipment**
generally depends on the farming system prevalent in the country. There is also wide variation in the use of agricultural machinery and equipment among countries of the Region. In a few countries of the Region, use of agricultural machinery as itemized in the WP is common, while in the developing countries simple tools and equipment are used predominantly. Detailed information on agricultural machinery and farm equipment/implements can often be better collected through specialized surveys based on the frame provided by the census. Nevertheless, countries are recommended to use the agricultural census to collect basic information on this topic, in particular to permit cross-analysis and linkages with other census items for policy purposes and to allow broad inter-country comparisons. For most countries, the most feasible approach will be to collect selected information of high priority through the census and details through specialized surveys.

88. The list of machinery and equipment given in Appendix 3 of the WP may be modified to suit the specific needs of the individual countries. In particular, countries may wish to add a list of farm tools and equipment used on the farms for agricultural purposes in addition to modifying or adapting the WP list to suit the actual country conditions. The specific country list of tools and equipment may follow the following groupings in order to facilitate inter-country comparison within the Region:

Tools for soil preparation and cultivation
- Plows
- Spades
- Harrows
- Hoes, hooks and weeders
- Pumps for pesticides
- Others

Implements for harvesting
- Sickles
- Scythes
- Weed cutters
- Mowers
- Hand rakes
- Forks
- Hatchets
- Potato diggers
- Beet lifters
- Others

Equipment for transportation
- Binding materials
- Containers
- Carrying supports
- Wheelbarrows
- Windlasses
- Hand pumps
- Others

For correct identification and enumeration, local names of each of the tools or implements need to be given in the list. For proper identification, each tool or piece of equipment should have a code number.

89. In addition to adding this list of simple tools and implements, countries of the Region may also need to modify the list of machinery and equipment given in Appendix 3 of the WP to suit specific country conditions. The guiding principle is that data should be sought covering all the following main groupings:

- Stationary power machinery
- Tractors
- Tilling, planting and cultivating
- Harvesting and threshing
  - for forage
  - for grain and other crops
- Handling and processing
- For livestock
- Transport
- Office machinery
A detailed sub-division of these main groupings should be based as closely as possible on the WP list. Countries with a special interest in the volume and pattern of irrigation may consider adding irrigation machinery as a further main grouping.

90. The time reference recommended for most machinery and implement items in the WP is the agricultural year. If an estimate of the total number of a particular type of machine or implement for all holdings is required, it is necessary to redefine the time reference to be the day of enumeration to avoid overestimation by multiple counting of the same machine/implement in use during the year on different holdings. The machine/implement must be present on the holding on that day.

91. The WP also recommends that each machine be categorized in one of the seven classes with regard to source. Each country must determine the importance of variation in the source of farm machinery/equipment in its own agriculture. It may be appropriate to reduce the number of classes.

92. Category 10: Buildings and Other Structures. Category 10 refers to data on the use of non-residential buildings by the holding. This category is new for the world census. Data on buildings are set out in full in the System Document and it is opportune for countries to examine whether basic data on non-residential agricultural buildings should be collected in the agricultural census. Buildings are capital assets and important in farming.

93. Buildings should include all structures with more than one year's life and used for non-residential purposes. Use of buildings and structures on holdings both for living and for non-residential purposes is quite frequent in countries of the Region. In such cases, it will be convenient to enumerate the whole of the structure/building and to separate the non-residential portion. If additional information on
the type of structures, their tenure and area (volume) are collected, such data when cross-classified with other census information will provide powerful indicators for use in ARRD and other policy purposes.

94. Farmers often carry seeds out of their own production for subsequent use. Storage of seeds and allocation of space for the storage is an important activity on the holding. In the same way, space for the storage of chemical fertilizers and pesticides is also important. These two items may be separately shown in items under 10221 (Area or Volume). Countries may also wish to subdivide the item 102213 (for storing agricultural products) by important crops stored.

95. Category 11: Ancillary Activities. Category 11 identifies holdings carrying out forestry and fishery activities ancillary to agriculture. Both of these are priority items for most countries and deserve to be included in the census. The purpose of items in division 111 (Forestry) is to identify the holdings that have forest trees. Forest trees include bamboo and other woody vegetation not included as permanent crops covered in category 06. The remarks made in paragraph 67 should apply and enumeration of holdings should be done in such a way that aggregation of area under farm forestry is possible.

96. Division 112 (Fisheries) covers fish farming and farming of other aquatic animals like frogs, crabs, etc., and should include aquaculture where it is important. In view of their importance in the Region and recent policy interest in promoting small-scale fishing activities, countries may consider the items in this division as priority items for inclusion in the census.

97. List of Census Items. List of census items for the African Region is given in the following table. The items are shown by categories. The asterisk indicates the priority items.
LIST OF CENSUS ITEMS IN THE ASIA AND PACIFIC CONTEXT

Category 01: Identification

*011101  Holding address
*011201  Holder’s name
011202  Holder’s address, if different from holding
011203  Holder’s clan or ethnic group
011301  Whether or not respondent is holder
011302  Respondent’s name, if not holder
012201  Head of household’s name

Category 02: General characteristics

021101  Legal status of holder
021201  Whether there is (are) hired manager(s)
021202  Name of hired manager(s)
021203  Address of hired manager(s), if different from holding
021301  Whether holding is part of an enterprise engaged also in other economic activities
021302  Other economic activities of enterprise
   (a) Agricultural services
   (b) Hunting, trapping and game propagation
   (c) Forestry and logging
   (d) Fishing
   (e) Manufacturing
   (f) Tourism
   (g) Retail trade (selling products directly to consumers)
   (h) Other

Category 03: Demographic characteristics

031101  Number of household members
031201  Names of household members
*0312021  Age of holder
0312022  Ages of household members
*0312031  Sex of holder
0312032  Sex of household members

**Category 04: Employment**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>041101</td>
<td>Whether economically active - for each household member</td>
</tr>
<tr>
<td>0412011</td>
<td>Whether the holder has occupation(s) other than being a holder</td>
</tr>
<tr>
<td>0412021</td>
<td>Main occupation of holder</td>
</tr>
<tr>
<td>042101</td>
<td>Whether any work done on holding during the year - for each household member</td>
</tr>
<tr>
<td>042102</td>
<td>Whether permanent or occasional agricultural worker on the holding - for each household member</td>
</tr>
<tr>
<td>042107</td>
<td>Number of household members that are permanent agricultural workers on the holding</td>
</tr>
<tr>
<td>042108</td>
<td>Number of household members that are occasional agricultural workers on the holding</td>
</tr>
<tr>
<td>042211</td>
<td>Whether permanent agricultural workers (other than household members) employed during the year</td>
</tr>
<tr>
<td>042212</td>
<td>Whether occasional agricultural workers (other than household members) employed during the year</td>
</tr>
<tr>
<td>042221</td>
<td>Number of permanent agricultural workers (other than household members) - male</td>
</tr>
<tr>
<td>042222</td>
<td>Number of permanent agricultural workers (other than household members) - female</td>
</tr>
<tr>
<td>042301</td>
<td>Total number of permanent agricultural workers (household members plus others)</td>
</tr>
<tr>
<td>042302</td>
<td>Total number of occasional agricultural workers (household members plus others)</td>
</tr>
<tr>
<td>0423011</td>
<td>- Male</td>
</tr>
<tr>
<td>0423012</td>
<td>- Female</td>
</tr>
</tbody>
</table>

**Category 05: Land and water**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*051101</td>
<td>Number of parcels</td>
</tr>
<tr>
<td>*051102</td>
<td>Total area</td>
</tr>
</tbody>
</table>
051211 Whether land was rented to others during the year
*051812 Whether any land in the holding actually irrigated during the year
051911 Whether any land in the holding has drainage facilities
*0522 Area by tenure
*0524 Land use

Category 06: Crops

061111 Name of temporary crops grown
*061141 Area harvested by temporary crops
061211 Name of permanent crops grown
061241 Number of scattered trees
061242 Number of trees of productive age in compact plantations
061243 Area under trees of productive age in compact plantations
061311 Whether inorganic fertilizers applied
061331 Whether organic manure or other fertilizers applied
061401 Whether pesticides applied during the year
061501 Whether high yield variety seeds used during the year

Category 07-08: Livestock

071101 Type of livestock production system
*0712-0713 Animal numbers

Category 09: Machinery and equipment

091101 Whether used on holding during the past year (for each type of machinery and equipment)
091201 Numbers used on holding by type of machinery and equipment
Category 10: Buildings and other structures

102111 Whether any non-residential buildings used
102121 Type of tenure for each non-residential building used
10221 Area or volume

Category 11: Ancillary activities

111101 Whether forest trees exist on holding
111211 Total number of forest trees
*112101 Whether fish or other aquatic animals and plants are taken from the waters within the holding
*112201 Type of cultural installation used for fisheries

98. Further Items for Consideration. In view of the interest displayed by many countries in using the agricultural census programme as a source of data for ARRD and other policies and programmes, several Regional expert consultations and Regional meetings have noted a variety of further items for possible inclusion in individual countries' censuses. These are briefly described below and should be viewed as a check list that could be expanded or shortened by inclusion or deletion of items. It is recommended that the check list and the items be reviewed during census planning in each country to determine which items merit inclusion. Classification and tabulation proposals are not given, however, countries that intend to include one or more such items are invited to inform the FAO Statistics Division at an early stage to facilitate harmonization of details.

The role of women in agricultural activities: data on the ways in which women participate in the work of the holding;
Landless agricultural labour: data on landless agricultural labour households in support of rural poverty alleviation and ARRD programmes;

Community or village data on various public facilities: as support to ARRD programmes countries may consider a simple village or community questionnaire to collect information on the existence of various facilities like pure drinking water, electricity, primary schools, bus stations, markets, dispensaries and health/family planning service facilities, etc.;

Environmental information: selected data showing the relationship between agricultural activity and the broader environmental issues like salinity, water logging, soil erosion and desertification of agricultural lands; plus the general impact of the removal and planting of trees and hedges, conservation of wildlife and the environmental impact of chemical fertilizers and pesticides;

Government support to agriculture: data on the subsidy and the amount of other government support received by holdings;

Physical properties of non-residential buildings: Data regarding the construction material;

Agricultural credits and loans: data on amount, terms and sources of credit used by holders;

Some of these data, particularly those on credit, are difficult to collect in a census. Inclusion of sensitive questions in a census may hamper the quality of information on other items since such questions lead to biases in the mind of respondents. Consequently, the countries are advised to carry out special surveys on such topics instead of including these topics in the agricultural census.
Section 4: Tabulation Programme

99. Introduction: Summary of WP. The tabulation programme given in Chapter 4 of the SP refers to the list of tables and other summary measures to be published as census end products. Chapter 4 starts with a brief outline of the nature of summarization and gives guidance on the presentation of tables. It stresses the importance of designing and developing tables from the outset as part of the whole census programme and notes that countries may restrict or augment the recommended tables. Ten of the data items are selected as main classification criteria for cross-tabulation and the rationale for each is briefly described. Detailed classes are provided for all the characteristics that are used to define the table layouts. Thirty-seven variables (including the ten main classification criteria) that may be tabulated are then described. The scheme for identifying and constructing proposed tables is given in Figure 1 of the WP and two examples of its use are shown. Tables marked as priority follow from the items marked as priority in Chapter 3 of the WP.

100. The main purpose of the tabulation programme presented in the WP is to ensure the production of sets of basic tables, in a well-harmonized format, for general reference and for ready comparison of data between countries. In producing tables, countries of the Region should take advantage of the significant advances in recent years in computer software technology that enable countries to rapidly produce tables from basic data files as and when required by data users.

101. Countries of the Region should prepare tables for the lowest administrative units in case the census is undertaken on a complete enumeration basis to provide data for grassroot planning and action programmes. In
the case of a complete census, every effort should be made to link the basic tables with those of the population census. By using common geo-codes and common levels of aggregation of administrative units beginning with the lowest unit or village/community level, the agricultural census will be linked to the population census. It would be a key step in census data dissemination if village or community tables prepared in this manner were made available to the communities and local government organizations at the lowest level for their use at the grassroots level.

102. As stressed in the WP, countries in which the census will be conducted on a sample enumeration basis will be able to provide mainly aggregate country level totals, disaggregated only up to a certain level of administrative units depending on the size of the sample. These countries should avoid excessive cross-tabulations. Because of limitations of the sample size, sampling errors of the estimates in some cells of the tables may be very large. In any case, for tables based on sample enumeration, sampling errors of some important estimates should be included in the tables produced.

103. Summary Statistics. For countries of the Region the first step toward converting the census data into information needed by the users is the production of tables with summary statistics. Derived figures such as averages or ratios should be included in the tabular presentation as they will help users evaluate the tabulated data. Countries should compute a wide variety of secondary figures for easier interpretation and evaluation of the census data and also for construction of a variety of socio-economic indicators needed for ARRD and other policies. While the countries are required to identify and work out the precise details, presented below are guidelines for frequency distributions of quantitative variables:
- the summary measures of mean and median together with the upper and lower quartiles and the 10 and 90 percentiles;

- percentage versions of the frequency distributions for the main variables; and

- the cumulative amount of variable (such as quantum of land, number of livestock or poultry) accounted for by the top and bottom deciles of the holding.

When calculated or estimated from the grouped data at the aggregate level of the tables, these secondary figures are likely to differ, often significantly (as in the case of deciles for example) from those calculated from the disaggregated basic data. It is thus advised that they all be calculated from the disaggregated basic data.

104. The Tabulation Scheme. Tables in the tabulation programme of the WP are derived from a compact scheme rather than set out explicitly as in World Programmes before 1980. The scheme generates up to about 175 possible tables and it is intended that some of them should be replicated. In particular, countries may want to produce specific tables showing crops and livestock for each of the major types of crops and livestock; also tables in summary form should be produced for all administrative units. In addition, detailed tables should be prepared for particular areas or Regions of the country to show geographical variations within the country.

105. Figure 1 in the WP provides the key to the components in the construction of tables. There are three such components to consider. First, each row in Figure 1 gives the primary characteristics of the table; the rows follow the sequence of the main data categories 02 to 11. Second, the columns of Figure 1 show the ten possible characteristics for "main classification", i.e., the first stage of cross-classification. Third, there are 37 possible
variables for the final stage of "cross-classification". In effect, the list of these provided in paragraph 4.21 of the WP defines the actual variables, including counts of holdings, that are being tabulated. Figures 2 and 3 of the WP give examples to show how detailed table layouts can be constructed in practice from the conceptual scheme.

106. Tables marked with asterisks in Figure 1 of the WP are the priority tables; they basically follow the priority items identified in Chapter 3 of the WP. However, only a subset of all possible cross-tabulations of priority items is marked, with an emphasis on cross-tabulation by size of holding.

107. For countries of the Region the following priority tables are suggested:

- Number and total area of holdings by total area and by age of holder
- Number and total area of holdings by total area and by total number of permanent workers
- Number and total area of holdings by total area and by irrigation practice
- Reporting number and total area of holdings by total area and by land tenure
- Reporting number and area of specific land use classes of holdings by total area
- Number of holdings and area harvested for a crop by total area (for each important crop)
- Number of holdings and area under trees in compact plantations for a permanent crop by total area (for each crop in compact plantation)
- Number of holdings and number of cattle (or other livestock) by total area (for each significant type).

In these tables "total area" can be replaced by another land criteria depending on the concept used in the country. It is recommended that the same tables are produced separately for holdings with female holders.
108. In spite of advances in data processing technology, processing of agricultural census data is often delayed. On the other hand, in view of mounting pressures from users for early results, countries of the Region are strongly urged to produce advance tabulation. Two options are available: if data entry has been completed expeditiously, a selection of the priority tables may be prepared using important data elements of all the census documents. In contrast, in the case of a delay in data entry, advance tables can be based on a systematic sample of the documents. Even if the data are subject to later adjustment when processing has been finalized, it is well worth producing provisional versions at the earliest opportunity.

109. In countries where the type of land tenure within each holding is generally mixed, it would be desirable to show in the body of relevant tables the areas of the holding held under each type of tenure.

110. Countries are recommended to provide as many as possible of the further tables in the scheme of the WP in accordance with their capability and resources.

111. Class Intervals and Local Units of Measurement. Paragraphs 4.16 to 4.18 of the WP deal with the recommended class intervals. Countries are urged to adopt the WP recommended classes to the extent possible, while at the same time paying attention to the dangers of excessive number of classes. For countries with predominantly small holdings, smaller class intervals at the lower end may be required, while at the upper end, fewer classes than those shown in the WP will suffice. Similarly, in age classification of a holder's household members, the recommended age classification should be in five year age-groups with an additional class of under 10 years (for measuring child labour). This will facilitate comparison with the population census data. On the whole, in the event the countries make changes in the class intervals to
suit the local conditions, it should be ensured that the adopted class intervals can be regrouped into the recommended classes of the WP.

112. For national uses countries of the Region are required to prepare tables in local units. In such cases, equivalence between local units and the WP recommended international units, particularly for land area measures, must be established so that tables in local units can be converted to tables in international units.
Section 5: Guidelines for Taking a Census

113. Introduction. The final chapter of the WP provides an extensive check list of operational matters to be taken into account in conducting an agricultural census. It covers the following broad areas:

- administration, budget, organization and publicity;
- design of questionnaires, tabulations and sampling;
- practicalities of data collection, pretesting and pilot census, training of trainers, supervisors and enumerators;
- assessment of the quality of census and post enumeration quality check survey;
- data processing from initial plans through data control and programming to production of results and quality evaluation; and
- publication and user access.

Finally, the necessity of good research in all aspects of census methodology and practice is emphasized. Most countries have experience in undertaking agricultural censuses and will be familiar with all aspects of the suggestions offered in the WP for census taking. However, those without this experience will benefit from considering these guidelines in conducting their censuses. In summary, this chapter of the WP does provide a good opportunity for every country to consider afresh all practical details and, in particular, to review state-of-the art agricultural census taking and research in census technology and practice. The following paragraphs further discuss some specific points that may be of special interest in the African Region context.

114. Organization. In many countries of the Region more than one agency collects data on food and agriculture. To prevent duplicative efforts and publication of conflicting statistics, all countries are recommended to take an inventory of these data
collection activities and their scope at the onset of planning for the census of agriculture. Ideally, the census should be authorized by a comprehensive legislation which also delineates the responsibilities of various agencies collecting food and agriculture statistics.

115. In paragraph 5.8 of the WP, countries are recommended to establish an inter-ministerial committee to perform overall census supervision. It would be advisable to include some experts on this committee who have responsibility for population censuses to ensure close coordination between the two censuses.

116. Listing holdings. In the past, in many countries of the Region census of agriculture has been conducted through sample enumeration. The sample design generally is a two-stage design where the first stage is the selection of villages and the second stage is the selection of holdings. In the second stage, selection of holdings necessitates a list of holdings in the sample villages. Such a list is prepared through house to house visit in the village. During this canvass landless households can be identified and a frame for such households can be prepared for specific surveys on them.

117. Census Questionnaire. Much effort has been devoted to improving questionnaire designs in countries of the Region. To prepare census questionnaires properly, scope and operational procedures of the census should be precisely defined at the very beginning. Contents and formats of the questionnaire should then be outlined and a first pre-test done to check the suitability of the questionnaire and field operation scheme.

118. A technical committee comprising subject matter and data processing experts and major users should be involved in preparing the questionnaire. After the first pretest, the questionnaire, along with specifics of field procedure, should be placed before the
technical committee for review. After necessary adjustments, some more pretests, preferably two, should be carried out to refine the questionnaire format, contents, wording and sequence of questions. In addition, the manuals for field enumeration must be reviewed before the pilot census is undertaken. This should be the statistical operation for finalizing the questionnaire, manuals and all other procedures of the census. Data processing experts should be involved at all stages to help in developing the coding system and editing specifications and working out the tabulation plan.

119. If crop items are included in the census it will be necessary to list all crops, assign codes to them and include the crop list for use at the enumeration stage. This can be best done if the questionnaire for field enumeration is provided in book form and not as loose sheets. Such a book should contain a number of questionnaires approximately equal to the average number of holdings in the enumeration area. Additional books should be provided for enumeration areas larger than the average. Providing the census questionnaire in book form will allow the possibility of incorporating, for example, the summary instructions for field enumeration on the outer cover and the crop list and code on the inner cover.

120. Pseudo-tabulation is one effective way of judging the adequacy and relevance of the various items in the questionnaire. It is recommended that before finalizing the census questionnaires pseudo-tabulation be undertaken with data collected in the pretests in close collaboration with questionnaire designers and data processors to indicate whether it is possible to obtain all the data envisaged, test feasibility of their cross tabulation, and determine whether these data can be processed directly if machine readable questionnaires are designed. In summary, the census questionnaire should be rather short and the design and format should facilitate ease of field enumeration,
subsequent editing and correction and data entry operation.

121. It will be observed that enumeration quality in the census will be ensured if a thorough review of all filled-in questionnaires of all enumerators is undertaken within the first two or three days after the start of the census enumeration. This will eliminate continued erroneous or incomplete enumeration by particular enumerators. Countries of the Region are recommended to make such a step obligatory in their census enumeration.

122. In most countries, the agricultural census is conducted under specific law that mandates the confidentiality of census information. Experience reveals that if reminders of this confidentiality are clearly indicated in the questionnaire book, the willingness of respondents to give reliable responses is increased.

123. Census Training. Census training is another key element that largely determines the success of field enumeration. The challenge to most countries in census training is, given the constraints of time and resources, how to train large numbers of field enumerators that are dispersed all over the country. Since enumerators obviously cannot be trained at a single location in most countries, the key to success is the replication of training to the enumerators and the standardization of such training. As a feasible strategy, countries of the Region are advised to begin with a core group of master trainers and to train them in all aspects of census taking and to replicate the training, ultimately to the enumerators. The greatest success has been achieved when the number of personnel levels through which the training is passed is contained at two. Standardization can be assured at all levels of training including the ultimate training of the enumerators if training is imparted through a carefully developed "verbatim" training manual that incorporates the enumeration procedures and
questionnaire contents and can be read aloud systematically instead of resorting to training through explanations that vary from trainer to trainer. Mock interviews in which trainees fill in one or two of the actual census questionnaires need to be provided. Enlarged blow-up copies of the actual census questionnaires, that complement the verbatim manual, facilitate training, and it is recommended that countries adopt the verbatim training manual and blow-up questionnaire as standard tools of census training, in their 1990 Programme. All census supervisors also need to be trained along with their enumerators, in using these verbatim training manuals.

124. Field Control System and Census Plan. Setting up a centralized field control system, preferably computerized, is another element of the management of dispersed field logistics and enumeration. Setting up an effective central control system must begin with a carefully executed pre-census operation to (1) divide the country into suitable number of enumeration areas (EAs) on the basis of a careful counting of enumeration units within every enumeration area, (2) delineate the EA boundaries on suitably prepared EA maps of uniform scale identifying appropriate landmarks for the easy identification of the EA boundaries during field enumeration and (3) geo-code the EAs for later identification and tabulation purposes. The preliminary counts of the enumeration units need to be as accurate as possible since they form the basis of fixing the number of enumerators and supervisors, packaging and distributing census materials and disbursing honoraria for field work. Particulars of the census EAs may be computerized by convenient administrative areas. In that case, the incorporation of subsequent changes in the number of enumerators and supervisors, and the corresponding changes in the requirement of enumeration materials will be relatively easy to accomplish and can be continued until the field enumeration is completed. In larger countries where census materials including questionnaires will be voluminous, the logistics of distribution of census
materials should be carefully planned. Experience shows that it is most convenient to distribute census questionnaire books and other enumeration materials to individual enumerators and supervisors in a group in the training class right after the completion of training. The location and number of training centres for the training of field enumerators and supervisors must also be carefully selected taking into consideration the availability of the number of ultimate trainers, the number of trainees and availability of blackboards, tables, benches, etc. The use of educational institutions as training centres (primary and secondary schools) has traditionally proved effective in most countries of the Region. Finally, the availability of a comprehensive census plan detailing all aspects of census taking including field control and a detailed timetable of training, enumeration, tabulation and publication of results, etc., is extremely useful for ensuring systematic control. All countries of the Region are strongly advised to prepare such a plan and to receive administrative approval of the plan at the highest level possible and to then use the plan as the main control instrument in execution of their census programme.

125. Census publicity. Publicity is an essential element of census public relations that ensure the success of nationwide operations like the agricultural census. Experience shows that the most effective advertising media for the census, affordable by all countries is radio. Radio broadcast is relatively inexpensive and reaches homes and should be relied upon by all countries irrespective of other publicity campaigns.

126. Post Enumeration Quality Check. Direct checking of the quality of the census enumeration is essential. The undertaking of a post enumeration quality check (PEC) through a sample survey to test coverage and quality of response (i.e., to estimate coverage error and response error) in the census operation is
recommended for most countries. Countries undertaking a PEC should carefully define the PEC methodology, particularly the matching and timing of the PEC survey, taking into account the points raised in paragraph 5.42 of the WP.

127. Census Data Processing. Paragraphs 5.48 through 5.68 of the WP draw attention to the various steps that must be taken to expedite processing the census data. In fact, with the rapid development in computer hardware and software, countries will have many opportunities to process their 1990 censuses efficiently. Countries using manual punching in data entry are likely to take considerably longer time for census processing unless they take steps to ensure rapid manual data entry operations.

128. Microcomputers (PC). Following are some points regarding microcomputers to be considered further to those made in paragraph 5.62 of the WP. The rate of progress in microcomputing has been very rapid and microcomputers are now suitable for fairly large-scale processing at reasonably low cost. The current generation of production models is typically based on 16-bit or 32-bit processors, with up to 16 Megabyte (Mb), and in some cases more, of RAM; and with disk storage ranging to hundreds of Mb capacity. There is some prospect, within a few years of having even more powerful microcomputer systems. Quite advanced data entry, correction and storage software can be purchased. Also, various types of statistical analysis software are now available on such hardware. In particular, use of spreadsheet and data base management packages can give a much enhanced product especially if full advantage is taken of linked graphics facilities. Presentation of data through computer graphics will often facilitate understanding the tables and make the presentation vivid. Likewise, to expedite publication of census reports, the developing countries of the Region should combine text processing with tabulation. With the selection of an appropriate software package, text processing along with the preparation of selected
tables will be quite feasible on the microcomputer at a minimum cost for most of the developing countries of the Region.

129. Countries should be encouraged to undertake comprehensive editing on the computer particularly by using package programmes such as CONCOR, UNEDIT, etc. Initially, experience and seasoned judgement will be necessary to establish the thresholds of acceptable basic data. As more materials become available during the course of data acquisition, it will be valuable to conduct a regular monitoring exercise to scrutinize the spread of values and the occurrence of outliers. It will then be possible to refine the procedures so as to obtain an improved balance between accuracy and costs. Statistics on the number and type of errors detected through a computer edit should be documented and should form part of the administrative report of the census. FAO has published a volume in Statistical Development Series with the title "Microcomputer based data processing - 1990 World Census of Agriculture" which describes the application of various software in processing agricultural census questionnaires, using microcomputer.

130. In addition to the use of software packages for editing and tabulations, in those countries where the shortage of computer programmers and system analysts is acute and likely to delay processing of the census results, steps should be taken to train a sufficient number of such personnel. If required, international donor assistance may be sought for the purpose. Often Technical Cooperation among Developing Countries (TCDC) arrangements are quite effective for such purposes.

131. **Advance Estimates.** Countries should prepare tabulations for early results of the census, using a sample of the full data. Two major benefits are likely to accrue from such advance tabulations. First, the advance tabulations will be an invaluable tool for the census takers for the early evaluation of the quality of the aggregate material, thus indicating errors in
data processing that can be rectified before full tabulation and also contributing to the modification and improvement of table layouts. Second, of course, advance tabulations make possible the provision of results far in advance of the final publication of census results to the users.

132. **Typology.** As noted in paragraph 5.22 of the WP, countries may wish to tabulate results by certain farm typology as well. Such a classification will facilitate the grouping of farms into relatively homogeneous classes that maximize the difference between classes. For most countries that are subject to population pressure on the land, the commonly used farm typology is by size of farm, i.e., by small, medium and large farm holdings. Countries adopting a typology by farm size will, however, need to spell out clearly the cut-off points for demarcation of such size classes for inter-country comparison and also comparison between censuses. Another typology that countries may want to consider is the categorization of the farm holdings by crops and livestocks such as:

<table>
<thead>
<tr>
<th>Predominantly crops:</th>
<th>subdivided possibly into</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field crops</td>
<td></td>
</tr>
<tr>
<td>Permanent crops</td>
<td></td>
</tr>
<tr>
<td>Horticulture</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predominantly livestock:</th>
<th>subdivided into</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle, sheep, goats, dairy farming,</td>
<td></td>
</tr>
<tr>
<td>Other livestock</td>
<td></td>
</tr>
</tbody>
</table>

| Mixed crops and livestock: |

As a rule of thumb, the predominance of a particular activity may be indicated if it contributes two-thirds or more of the total for a holding.

133. **Indicators.** In addition to the tables, countries are recommended to prepare as many indicators and ratios as possible from the primary data. In fact,
compilation of socio-economic indicators from the agricultural census data for policy purposes should be one of the key objectives of the agricultural census in the Region. The indicators and other secondary data should be presented through computer graphics in addition to the tabulated data for fuller appreciation of census results.

134. User Access to Census Data. Within the provisions of confidentiality, countries of the Region are advised to provide full access to the census data for all types of users - national and international, policy makers, individual researchers, academic bodies or private individuals. Similarly, small area data, particularly those relating to villages or communities should be made available to the community level institutions or local bodies to encourage the use of data in local level planning. Sometimes it may be necessary to impose user charges calibrated on the volume and comprehensiveness of the data or tabulation requested. Increasingly, user access to the census data will be required to be in machine readable format either in the form of a minicomputer diskette or main frame tapes. Countries should be encouraged to take adequate steps to provide such services.

135. Research into Methods. The WP concludes with a strong recommendation for further research into census techniques. A number of countries will be in a relatively advantageous position to contribute to such knowledge by suitable research programmes carried out through the collaboration of census statisticians and academic institutions. Findings of such research should be widely disseminated.
ANNEX

Definition of household adopted in the 1984 Population Census of Ghana

A household consists of a person or group of persons who live together in the same house or compound, share the same housekeeping arrangements and are catered for as one unit. (this part of the definition is in compliance with the definition for a household as advanced by the United Nations Statistical office. However, because of the situation existing in the country, further elucidation on the topic is given thus: It is important to remember that members of a household are not necessarily related - by blood or marriage - because maid-servants may form part of a household. On the other hand, not all those related in the same house or compound are necessarily members of the same household. Two brothers who live in the same house with their wives and children may or may not form separate households depending on their catering arrangements. The same can be said of a father and his married children. Thus in many cases, a house or compound may be broken into separate households.

Dividing a house or compound into households may not be easy. However, the following examples should provide the necessary guidelines for deciding who should form a household:

(a) In general, a household consists of a man, his wife, children and some other relatives or a maid-servant who may be living with them.

(b) In large family houses where there are more than two generations of people living in the same house, one must not automatically treat the grandfather, his married children and their families as forming one household. First, find out which members of his house have a common catering arrangement and regard each such unit as a household. He may, for example, have four sons, each of whom has a separate arrangement for the
preparation of food for his own "family". Each of these units must be treated as a household. If the father shares meals with one of his married children, he should be classified as part of that household. An exception to the above principle is where in a house or compound, a man has several wives, but each wife and her children occupy their own set of rooms in the house, and the man eats successively with each of his wives. In such a case, the man, his wives, their children, etc., should be treated as one household.

(c) One may also come across a married man who does not live in the same house as his wife or wives. The children may take their meals in their respective mothers' house. But if the children sleep in their father's house, they should be considered as forming one household with the father (not the mother).

(d) A lodger who sleeps and eats at least one meal a day with the household should be considered as a member of that household.

(e) A servant or steward and his family who live in a house or in an out-house in the same compound as the employer but prepare their own food and eat separately should not be considered as members of the employer's household. They should be considered as forming a separate household. However, a maid-servant or servant who eats and sleeps with the family of the employer should be considered as a member of the employer’s household.

(f) It two or more unrelated persons live together in one flat or in one room, they may or may not be regarded as one household depending on whether or not they have a common catering arrangement.

(g) It will be seen from the example (f) above that one person may constitute a household if the person lives alone in a house or part of a house, or even if the person lives with others in one room but prepares and eats his meals separately.
(h) The members of staff of institutions, except night watchmen, should be treated as members of households. They should never be treated as inmates of institutions.