SUPPLEMENT FOR NEAR EAST
PROGRAMME FOR THE 1990 WORLD CENSUS OF AGRICULTURE
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1990 WORLD CENSUS OF
AGRICULTURE

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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 Near East.

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PART I

PURPOSES 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 (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 Near East Supplement to the WP is to detail the considerations that are likely to apply to countries within the Near East Region. The countries of the Near East Region (with the exception of the petroleum producing countries) are similar in that they are heavily dependent on the agricultural sector; however, despite the importance of agriculture, agricultural statistics are not well developed.

2. For the purposes of the census of agriculture, the Near East Region is defined as comprising the following countries:

Afghanistan  Kuwait  Somalia
Algeria  Lebanon  Sudan
Bahrain  Libya  Syria
Cyprus  Mauritania  Tunisia
Djibouti  Morocco  Turkey
Egypt  Oman  United Arab Emirates
Iran, Islamic Republic of  Pakistan  Yemen Arab Republic
Iraq  Qatar  Yemen, People’s
Jordan  Saudi Arabia, Kingdom of

Structure of Part II

3. This supplement provides, section by section in Part 2, specific details of possible Near East modifications to the WP. Recommendations, proposals and commentaries are given, and various ways of expanding, reducing or modifying the WP in the Near East context are indicated.
4. Part 2 closely follows the sequence and pattern of the WP. Five numbered sections are presented, each of which relates to the corresponding chapter of the WP. The supplement contains passages summarizing relevant aspects of the WP, marked "Summary of WP" and indented for ease of reference.

The System Document

5. The Programme for the 1990 World Census of Agriculture differs in one important respect from previous decennial programmes for the world censuses of agriculture: This most recent programme has been prepared within the context of a fundamental planning document, Food and Agricultural Statistics in the Context of a National Information System, FAO, Rome, 1986, hereafter called the System Document.

6. The System Document provides a conceptually full treatment of data, their purposes and sources as an integrated statistical programme. Certain aspects of the WP, in particular, the schema for numbering data items, relate directly to the fuller listing in the System Document. This document makes specific and extensive reference to the agricultural census as a major source of data, setting the census within the wide framework of a full range of data collection activities of a national statistical programme.

7. The System Document should be regarded as the basis for both new developments in food and agricultural statistics and modifications of established practices. It provides a thorough analysis of the basic reasons for collecting data and the relationship of such data to the analytical aspects of a national information system. The System Document is the first manual of a series of statistical development papers and therefore starts at a relatively broad conceptual level, serving as the introduction to the more detailed volumes. The second manual in the series is the Programme for the 1990 World Census of Agriculture.

8. The System Document is aimed explicitly at aiding the improvement of statistical programmes in developing countries. It suggests that many of the statistical development problems encountered heretofore can be overcome by (a) improving the communication and coordination between
providers and users of agricultural statistics, (b) recognizing statistical needs in the context of information for decision making on food and agriculture, and (c) designing and implementing statistical programmes to fill in the needs. While some countries in the Near East Region have relatively well-developed statistical programmes and have conducted agricultural censuses and surveys for several decades, many of the countries in the Region have only begun to develop their statistical programmes, and have conducted their first agricultural census during the 1970s or 1980s. All Near East countries, especially those that are establishing their statistical programmes now, should take into account the proposals and recommendations of the System Document in developing their statistical programmes.

9. Regardless of a country's degree of development in statistical services, the System Document offers a framework and a practical tool for review, analysis and potential further improvement in data collection. Consequently, all countries of the region can benefit from the recommendations contained in the System Document.

10. Several common factors currently have an impact on the statistical programmes of many countries. These factors include the growing pressure and constraints on resources, the increased urgency for delivering usable data and analysing them, advances in statistical methods for data collection, the current rapid strides in computing technology, both hardware and software, and the demands for cost effectiveness of all tasks. The System Document can be used as an objective manual by all statisticians and their professional colleagues to determine the impact of these pressures and the most appropriate way to respond to them.

11. In short, all countries, regardless of the level of development of their statistical services, are encouraged to use the System Document to examine and evaluate their current programmes of data collection. The document offers recommendations for change and improvement, in particular, for the establishment of a long term programme of censuses and surveys.
PART II

THE WORLD PROGRAMME AND NEAR EAST MODIFICATIONS

Section 1: Introduction

12. Summary of WP. Chapter I of the WP presents a brief history of previous decennial World Censuses of Agriculture (WCA), and information on planning for the 1990 WCA. The responsibility of FAO to collect and disseminate information is stated in Article I of its Constitution. The need for an integrated national statistical programme is described in detail in the System Document. The same document recommends a long term data collection programme. Within such a plan, census data collection should be limited primarily to items which describe structure (rather than, for instance, performance) and which change slowly over time.

13. Other important features of the census are as follows:

a) The statistical unit is the agricultural holding;
b) Wide coverage of holdings provides a sampling frame for specialized surveys and provides data for small areas and for sub-groups of population;
c) Definitions and classifications are harmonized with those used in other data 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.

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

15. All of the introductory principles covered in Chapter I of the WP are applicable to countries in the Near East Region, with some modifications as discussed later. Special
considerations apply to countries that have already established a developed statistical data collection programme on food and agriculture. Paragraphs 5 to 11 above describe the general ways in which the recommendations of the System Document can be usefully interpreted and put into practice.

16. It is necessary to strike a balance between national and international requirements for both the scope and coverage of the 1990 census. Bearing in mind that resources are limited, countries are strongly recommended to design their agricultural censuses to be complete, in terms of the range of items and tabulations which are detailed in the WP and this Supplement. For the 1990 WCA the range of items has been deliberately restricted to assist in this approach. Both natural and imposed constraints will limit the census scope and coverage: some items are not relevant to a particular country’s agriculture; other items may be of some relevance but are not sufficiently significant to warrant the allocation of scarce resources.

17. The 1990 WCA is not intended to be an external, centrally imposed task over the countries. It should be a mutually beneficial exercise for all countries with significant contributions of both design and data from as many countries as possible. Therefore, it is important that a substantial measure of internationally comparable material be provided for central collation, analysis and dissemination. Guidance on aspects of high priority is given in the WP and is modified for the Near East in the following paragraphs of this Supplement.

18. The 1990 WCA also provides an excellent opportunity for individual countries to critically assess their agricultural census programmes by reviewing their practices and examining the presentation and use of census data. All countries, regardless of their current level of development in statistical services, will benefit from such a review. At the very least, the details contained in the WP and this Supplement comprise a checklist. Ideally these documents should stimulate thought and discussion leading to review for further improvement. In fact, such processes of regular re-examination and subsequent improvement are in themselves desirable features of advanced systems. A review of census programmes should preferably be undertaken within the wider review recommended above for the whole information system of which the census is a key component.
Section 2: Methodological Considerations

19. Objectives. (Summary of WP paragraphs 2.1 to 2.6) The first basic objective of the census is to collect data on structural variables which change slowly. Although countries may wish to collect further data, this should not be at the expense of this first objective. The second objective is to provide a frame for specialized surveys on agricultural holdings, demonstrating the use of census data for improved sample design and estimation techniques.

20. Many countries of the region are experienced in the collection of both the structural, slowly changing variables such as holding size and also those of short term interest such as livestock characteristics. Indeed, for many items there is no clear cut dividing line. Even some structural variables can change rather quickly under certain circumstances. Decision on the right balance of items in a census depends on prevailing conditions and anticipated changes. Often it is valuable to use the census to collect benchmark data on some short term variables which are then regularly updated by sample surveys linked back to the census.

21. Census operations should result in an excellent statistical frame for other surveys. However, such a frame can become seriously outdated between censuses, introducing biases into results of sample surveys based on these frames. Thus, it should be noted that suitable updating and maintenance of the frame is a task to be designed as a continual process, integral with census planning.

22. Keeping the two basic objectives in mind, the countries in the region should give priority to obtaining data regarding the status and participation of women in food and agriculture related activities. This is one of the areas on which there is a data gap. (Para 52)

23. 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 computing facilities. The census programme should not be overly ambitious.

24. The WP foresees a high correlation between the scope of a country's agricultural census and its level of statistical development. Some Near East countries with medium statistical development and sufficient resources may also want to include some additional objectives in their census scope, but countries with limited technical personnel and financial resources are strongly recommended to restrict their census scope to the items presented in Chapter 3 of the WP.

25. **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.

26. Although the holding is the basic statistical unit for the agricultural census, for most of the countries in the region 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 identifying landless rural households, an important concern of WCARRD.

27. After identification of the holding through households, it is a common practice 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. If no social or other implications must be taken into account, 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.

28. Countries of the region 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.

29. 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.

30. To ensure inter-census comparability and linkages with other data sources such as a 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 use the geo-coding of administrative areas developed for the population census. 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.

31. **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.

32. While in those countries in which rapid changes are occurring in the agricultural structure the advantages of
conducting censuses at intervals more frequent than 10 years are many, conducting frequent censuses is hardly feasible for the majority of the Near East countries. Yet these countries must at least try to adhere to the WP recommendation concerning the time reference for censuses, that is, to use a 12-month period covering as much as possible of the calendar year 1990, or if this is not possible, a year close to 1990, to make international comparisons more meaningful.

33. For time references, a general distinction is often made in statistical work between "stock" variables, which relate to the amount of an item at a given point in time, e.g., number of cattle, and "flow" variables, which can only be measured over a period, e.g., amount of labour in man-weeks. Most items in the census are of the "stock" type, but many are designed to identify the presence or absence of a characteristic, e.g., whether irrigation was practised; often these variables have to be interpreted over a whole year or an even longer period.

34. Complete or Sample Enumeration. (Summary of WP paras 2.17 to 2.21) Agricultural censuses can be undertaken by sample survey, full enumeration or a combination of both for different sub-populations of holdings. Full enumeration is recommended to give detailed structural results for all areas and to give a good frame for further work. However, because full enumeration puts heavy demands on resources, sometimes sampling is necessary. Determining whether complete or sample enumeration is appropriate requires a high level of professional expertise.

35. For Near East countries as well as all other developing countries, it is difficult to suggest in advance whether an agricultural census should be conducted through complete enumeration, sampling or a combination of both. As noted in the WP, census objectives and practicality must be considered in selecting the most appropriate method to be used. However, in normal circumstances it is most likely wise to use both as complementary methods. Complete enumeration may include a few basic items or certain areas and the remaining items or areas may be counted by sample enumeration.
36. **Census Frame.** (Summary of WP paras 2.22 to 2.29) A thorough method of identifying holdings is necessary for the census. Some countries maintain a full list or register for statistical or administrative purposes and thus have an immediate basis for the census (and they will have already satisfied fully or partly the second basic objective of providing a frame for other surveys). Other sources of the census frame include: the population census (preferably a recent one) and associated material such as enumeration areas; lists of localities; and aerial photographs or maps.

37. Clearly, it is best for countries to have a complete list or register of holdings. This should identify each statistical unit and preferably also include the latest known information on one or two key variables such as total size of the holding. Obviously this can be an expensive tool for countries with a large number of small holdings. Such countries are recommended to have specific methods of more frequent updating of register information on larger or more significant holdings and also to have occasional inter-censal sample checks on other parts of the register to monitor its accuracy. Countries with established farm list systems should incorporate appropriate regular checking, if necessary, by register maintenance surveys. Censuses and surveys are fundamentally dependent on their frames.

38. In many countries of the region, holdings operated by government agencies are common. These holdings should be listed separately and counted by complete enumeration. A register should be started for these holdings after the census.

39. If a population census can be carried out before the census of agriculture, the countries should consider adding to the questionnaires of the population census one or two questions which will identify the holders. This identification is useful particularly in urban areas where agricultural activities are not as common as in rural areas.

40. **Non-sampling Errors, Data Processing, Analysis.** (Summary of WP paras 2.30 to 2.33) Many sources of errors are possible in collected census data. Appropriate quality control is necessary, as is planning for
data processing (see later paragraphs 5.48 to 5.62). An analytical use of census data, including modelling, should be considered in the planning phase.

41. It is often more important in statistical work to identify and measure the different effects of non-sampling errors than it is to try to eliminate all errors. In some circumstances error correction is possible automatically by computer. This usually involves the replacement of suspect data by values which are plausible in relation to the data from similar holdings. Countries are strongly recommended to include a quality check survey in their census programme.

42. The WP stresses the importance of adequate planning and preparation of the data processing phase of the census. This caveat is also valid for some Near East countries where data processing facilities and qualified technical personnel sources are not sufficient. Census authorities in such countries should make use of all possibilities already available in their own countries and if these do not suffice, then seek data processing support from international institutions.
Section 3: Proposed Census Items

43. **Introduction.** The classification of items is directly derived from the scheme detailed in the System Document. It covers a wider range of categories and more detailed items than does the WP. See Chapter 5 of the System Document for the general classification of information. Also see Appendix I, thereof, for full detail of the numbering scheme and all relevant data sources. In particular, Appendix I shows the items which may be collected by the census and their relationship with other items and with data sources in the full scheme.

44. Clearly, advantages are to be derived by structuring census items using a wider classification scheme in this way. However, it should be noted that as a result, certain items relating to the holder, the household and the holding are divided among categories 01 to 04 (identification, general characteristics, demographic and anthropometric characteristics, and employment).

45. Items covering various characteristics of the household members appear in the first four categories and include some priority items in the WP. Since rural populations are of significant size and depend largely on agricultural activities in the countries, there is obviously a strong case for the collection of a full range of household data. In addition, authorities in these countries may need to know about part-time farming, the effects of agricultural seasonality on rural labour markets, or the extent to which whole households depend on farming or other work.

46. **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 part of the tabulated results. It is obviously necessary to identify the holding and the holder, the head of household, and the respondent, if it is not the holder. Because households and holdings usually overlap, households can serve to identify holdings.

47. The data item identifying the holding may in itself be sufficient to determine the location and permit an area code to be placed on the census record of each holding. When
separate area codes are not recorded for each parcel (see paras 61 to 63 below) this holding code can be used for the production of aggregated results at different levels of area within a country. In some national systems a separate identifying and area coding device may be used, such as a holding number, specific to the census or even for more permanent use as part of a farm list or register.

48. Category 02: General Characteristics. The first of these is the legal status of the holder. This is a priority item and is the key to understanding a basic feature of the agricultural structure, namely who has the effective managerial and resource control over the activities of the holding. The precise categorization may need modification in some countries but, as an absolute minimum, the three categories should be retained: private (or small group of individuals), juridical person or group, and government or an agency thereof. The last includes municipalities and similar organs of government. Other special holders not specified in any category, such as tribes, clans, private schools and religious institutions should be identified separately.

49. The second set of general characteristics concerns the hired manager who operates the holding. It may be necessary to record that there is more than one manager, e.g., in the case of large farms. The identification of the manager, i.e., his name and address, need normally be recorded only when this is necessary to help with the actual administration of the census. It should not be that the manager is any one who has any personal financial responsibility for the holding.

50. The third set of general characteristics relates to the other economic activities, if any, associated with the holding. Ideally, these should be ascertained for the whole ownership "enterprise" as defined in paragraph 3.30 of the WP. In practice it may not be possible to do this (indeed it may not be meaningful without some measure of the total economic size of the ownership enterprise and of its other agricultural holdings). These items may be more usefully interpreted in relation to the entrepreneurial activities of the holder or of the "establishment" as defined in paragraph 3.31 of the WP.
51. The classification of other economic activities may be extended to include service industries, possibly with a special sub-division of tourism for some countries. Also, it may be helpful to record here the holdings that sell their agricultural produce directly to consumers.

52. **Category 03: Demographic Characteristics.** The recommended items in the WP are the number of household members and the age and sex of each, plus a name for identification purposes in the operation of the census, particularly if this is linked with a population census. For Near East countries, the sex of holder is considered a priority item. Tabulations based on sex of holder will make it possible to analyse the holdings operated by women separately.

53. In some Near East countries, especially in the regions close to national border lines, there may be holders whose nationality is different from that of the country in which they are living. To identify such holders, the item "citizenship" should be added to the items mentioned in paragraph 3.34 in the WP.

54. **Category 04: Employment.** This category provides employment data (a) for each household member, and (b) for agricultural workers other than the holder's household members. Items proposed in this category identify household members who are economically active and qualitatively indicate their contribution to the holding work.

55. Since younger children usually participate in agricultural work in developing countries, the minimum age limit for economically active persons in the Near East Region countries is recommended to be 10 years.

56. In the second section on employment, i.e., on non-household workers, it is recommended that countries collect one extra piece of data:

   Number of occasional agricultural workers (male and female)

The time reference for this is the day of enumeration. This item will provide a broad indicator of the importance of non-regular labour on the holding.
57. Near East 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 returns could be used as a frame for such specific surveys on labour.

58. To give an overall broad measure of labour a final item is defined as follows:

\[
\text{Total number of workers (including holder, household and non-household)}
\]
- permanent
- occasional

59. In some countries, some of the non-household agricultural workers may be of a different nationality. To identify such workers the following item should be added to items included in paragraph 3.38 of the WP:

\[
\text{For permanent non-household workers citizenship}
\]

60. Under paragraphs 3.43 in the WP, "unemployed" could be sub-divided into two classes:

(a) unemployed, but was employed before
(b) unemployed, and never worked before

61. **Category 05: Land and Water.** This category comprises the following main topics: fragmentation of the holding into separate parcels; tenure; broad types of land use on the holding, by area; and irrigation and drainage. In the WP most of the details of these topics are recommended for the level of the parcel. Therefore, the primary decision to be made for each country on these items is whether or not there is a good case for collecting such details for each parcel of land within the holding.

62. If the country's agriculture is highly fragmented in this way, or if policies relating to the number of parcels are being implemented, or if for some other reason it is important to measure the long-term changes in the number and
size pattern of parcels, then the considerable extra expense of collecting such detail may well be justified. Indeed, further data might be worth collecting, for instance, to give some measure of distance between parcels, or of other factors related to efficiency of farming operations. On the other hand, in some countries the extent of fragmentation of holdings into parcels is not a significant factor and the cost of collection is not likely to be worthwhile.

63. In countries which do not collect details on land use at the level of the parcel, it is therefore important to note that the same details (shown under division 052 (For each parcel)) should be collected at the level of the entire holding, subject to modifications discussed below. Items are discussed in the order in which they appear in the WP.

64. On item 051211 (Whether land was rented to others during the year), it is necessary that the enumerator be able to distinguish between land farmed by the owner and land rented to another farmer. Land rented to others usually becomes part of another agricultural holding. Thus, the statistical unit which is characterized by this item will often not be the holding but the holder in his capacity as owner.

65. Items in sections 0518 (Irrigation) and 0519 (Drainage) will be of value in most Near East countries and should be included with irrigation as a priority item. In particular, it is suggested that countries collect data on types of irrigation and areas of crops irrigated (under this category or under category 06 Crops) to assist in planning for water resources.

66. In section 0522, items on tenure comprise basic structural information and are all marked as priority. They simply relate to the areas of the parcel (or holding) which are owned, rented or held in some other way. Squatter and tribal forms of tenure are expected to be important for some Near East Region countries.

67. Sub-section 05244 (Land under permanent meadows and pastures) is divided into cultivated and naturally grown grass. The latter consists of pasture, often on hilly
ground, unimproved by fertilizer, cultivation, reseeding or drainage. This land is sometimes referred to as "rough grazing".

68. In practice, it is often not easy to identify on holdings the areas of woodlands or forest which have economic value (subsection 05245). Farm woodlands in some countries are typically multi-purpose, and frequently offer recreational facilities. It may be necessary, therefore, to show all woodland under this item, not limiting it simply to woodland with economic use. The total amount of woodland cover on farms will thus be shown separately in the data and it is preferable to including multi-purpose or non-economic woodland in the residual subsection 05246 (All other land). Agricultural holdings with associated but separately identifiable forestry enterprises (trees being grown primarily for economic use) should not include such areas; these more properly belong to forestry rather than to agriculture.

69. In some countries it may not be worthwhile separating items 052461 (Unused potentially productive land) and 052462 (Other land not elsewhere specified), in particular where the former is known to be small.

70. As a general point, it should be noted that data on land use cannot necessarily be calculated directly from crop areas. Paragraphs 3.96 to 3.107 of the WP provide detailed advice on the treatment of area concepts for temporary and permanent crops, and for simultaneous cultivation. Differences may arise in various ways, for instance, through counting a successively cropped area only once in land use but twice or more in crop area.

71. For the general land use breakdown, a problem may arise in some countries for land which simultaneously has both permanent crops and arable (or pasture), or has woodland and arable (or pasture). Examples are cereals with olive trees, cereals with vines, and pasture with cork oak. Some guidance on the identification of individual crop areas is given in the WP (paragraph 3.102, etc.). However, for general land use classification it may be necessary to introduce mixed categories as appropriate.
72. **Category 06: Crops.** This category covers basic features of crop cultivation and includes items (a) for entire holding, and (b) for each parcel.

73. The key information is the name and area of crops, both temporary and permanent. All crops that are significant in a country's agriculture should be included. Significance should be judged by such factors as relative area and value, and intrinsic interest, e.g., for a newly developing crop. Crops which are significant in only some areas of a country should be included. In general, the structural nature of a census means that countries should cover all their cultivated crops except those which are insignificant.

74. The information on permanent crops (in subsection 06124 at a holding level, and section 0625 at parcel level) refers to "trees". It will be seen from the list of permanent crops in the second main section of Appendix 2 to the WP and this should be interpreted in practice as all kinds of permanent plants, i.e., vines, bushes, etc.

75. The most important data for each permanent crop is the total area of plants in compact plantation, i.e., the sum of items 061243 (Area under plants of productive age) and 061245 (Area under plants of non-productive age), or the corresponding sum at parcel level. This should be regarded as a priority item, i.e., for each permanent crop:

   **Total area under plants in compact plantation (by crop)**

76. Individual countries may also wish to follow the full scheme laid out in the WP. This requires dividing the total area according to the productive age of the plants, and enumerating the number of productive age plants (thus showing plant density) and the number of scattered plants. Such data are likely to be more important for selected permanent crops grown on trees.

77. The remaining items in this category concern the use of inorganic and organic fertilizers, pesticides, and high yield seeds. The WP asks for data indicating simply whether holdings do or do not use these inputs. For all countries of the region such information would be enhanced by extra data collected through frequent sample surveys specifying
types and amounts used and on the crops which are grown using these inputs.

78. Category 07-08: Livestock. When censuses are held infrequently they should not be seen as the main source of information on livestock numbers, which can change quite rapidly. Many countries undertake more frequent surveys on livestock. However, the census provides a good opportunity to collect basic livestock data which will be useful in designing such surveys and which can also be used in conjunction with other census data to illuminate the basic structure of a country's agriculture.

79. The first item in this category simply records the system of livestock production in use on the holding. The four very broad types of livestock systems include (a) nomadic or totally pastoral, (b) semi-nomadic or semi-pastoral, (c) sedentary pastoral and (d) ranching; these are of relevance for comparisons across the world. As noted in paragraph 28, for some countries, nomadic and semi-nomadic livestock production systems are very important and particular attention should be paid to collecting data from these holdings.

80. Livestock numbers should be regarded as priority items in the census, but only for types of livestock which are significant in each country's agriculture. These are cattle, buffaloes, sheep, goats, camels, horses, asses, mules and poultry. Countries are also recommended to use the census as an opportunity to include as many as possible of the minor types which are not surveyed frequently.

81. Special considerations apply to the equine types, i.e., horses, asses, mules and hinnies. Such livestock on agricultural holdings falls broadly into two main categories. The first, comprising "agricultural" equines, includes breeding animals, animals used for draught on the farm and animals for consumption. The second category includes all "non-agricultural" equines, i.e., animals for recreation, racing or other non-agricultural purposes. A division between these two main categories is recommended. Some countries may wish to collect details of "agricultural" sub-types. Collection of data on the non-agricultural group may not be worthwhile; on the other hand, it may be oper-
ationally convenient to collect data on all equines on holdings at the same time. The subdivision of equines into horses, asses, etc., is also a matter for each country’s decision.

82. Much less detail on livestock is requested in the 1990 WP than in the previous world programmes. Previously the main livestock types were divided by age and sex, and some were also classified by purpose; it is often useful to distinguish between breeding animals and others. For this countries are recommended to review these possibilities in order to determine which breakdowns are valuable enough to be collected at the same time.

83. **Category 09: Machinery and Equipment.** Capital inputs are a significant and, in the long term, increasingly important factor in agriculture. But the subject of mechanization is complex and specialized: there is a very wide possible range of machinery and equipment, and development is continuous. Detailed information can often be better collected through specific surveys. Countries are nevertheless recommended to use the census to collect basic information on this topic, in particular, to permit cross-analysis with other census items and to allow broad comparisons between countries.

84. The list of machinery and equipment given in Appendix 3 to the WP may need to be modified for individual countries. The guiding principle is that data should be sought covering all the main groupings, as follows:

- Stationary power machinery
- Tractors
- Tilling, planting and cultivating
- Harvesting and threshing – for forage
- Harvesting and threshing – for grain and other crops
- Handling and processing
- For livestock
- Transport
- Office machinery

Detailed subdivisions of these main groupings should be based, as closely as possible, on the list provided. Some countries, where large numbers of farmers use simple tools
and equipment, may wish to have a list of these tools, in addition to the list of machinery provided in WP. Countries with a special interest in the amount and pattern of irrigation should consider adding irrigation machinery as a further main grouping.

85. Some countries may wish to collect information on the power rating of tractors and, possibly, combine harvesters. For tractors the following groupings are recommended:

- Under 25 KW (kilowatts)
- 25 to under 40 KW
- 40 to under 60 KW
- 60 KW and over

The relevant tabulations may be extended accordingly to show a break-down by power rating.

86. The time reference recommended for most machinery items in the WP is the agricultural year. However, if an estimate of the total number of a particular type of machine 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 in use during the year on different holdings. To be enumerated, the machine must, of course, be physically present on the holding on that day.

87. **Category 10: Buildings.** This category is new for the world census. Data on buildings are set out in full in the System Document and countries should determine whether basic data on non-residential agricultural buildings should be collected in the census. Buildings are capital assets and important in farming.

88. Countries are recommended to consider the inclusion of data on both tenure and area (or volume) of buildings. The latter is more important, but is likely to be relatively expensive to collect.

89. **Category 11: Ancillary Activities.** The purpose of items shown in division 111 (Forestry) is to identify the holdings which have forest trees. These trees may be in the woodland or forest area under item 052451 or they may be
scattered. If there are significant numbers of such trees with economic value, this category provides an opportunity to record them.

90. The other division, 112 (Fisheries), covers fish farming. Countries in which this is a significant activity will wish to include these items, but they should not be regarded as priority items for most countries in the Near East Region.

91. **List of census items.** A list of items for the Near East 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 NEAR EAST CONTEXT

Category 01: Identification

*011101  Holding address
*0112011 Holder’s name
011202  Holder’s address, if different from holding
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 3: 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 4: Employment

041101 Whether economically active – for each household member
0412011 Whether the holder has occupation(s) other than being a holder
0412012 Whether has more than one occupation – for each household member
0412021 Main occupation of holder
0412022 Main occupation – for each household member
042101 Whether any work done on holding during the year – for each household member
042102 Whether permanent or occasional agricultural worker on the holding – for each household member
042107 Number of household members that are permanent agricultural workers on holding
042108 Number of household members that are occasional agricultural workers on holding
042211 Whether permanent agricultural workers (other than household members) employed during the year
042212 Whether occasional agricultural workers (other than household members) employed during the year
042221 Number of permanent agricultural workers (other than household members) – male
042222 Number of permanent agricultural workers (other than household members) – female
042231 Number of occasional agricultural workers (other than household members) – total
042301 Total number of permanent agricultural workers (household members plus others)
042302 Total number of occasional agricultural workers (household members plus others)
042401 The class in which the holder belongs according to the estimated amount of time he/she worked on the holding during the year as proportion of full-time work
(a) less than half of full-time
(b) half or more but less than full-time
(c) full-time
042402 Number of household members in each class according to the estimated amount of time they worked on the holding during the year as proportion of full-time work
(a) less than half of full-time
(b) half or more but less than full-time
(c) full-time

042403 Number of permanent agricultural workers other than household members in each class according to the estimated amount of time they worked on the holding during the year as proportion of full-time work
(a) less than half of full-time
(b) half or more but less than full-time
(c) full-time

042404 Total man-weeks (or man-months) worked by occasional agricultural workers other than household members during the year

042405 Total man-weeks (or man-months) worked by occasional agricultural workers - household members during the year

**Category 05: Land and water**

*051101 Number of parcels
*051102 Total area
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
061245  Area under trees of nonproductive 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 source and 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
102221  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
Section 4: Tabulation Programme

92. **Introduction.** (Summary of WP) Chapter IV starts with a brief outline of the nature of summarization and offers guidance on the presentation of tables. This chapter stresses the importance of designing and developing the tables from the outset as a part of the whole census design and it notes that countries may restrict or augment the recommended tabulations. Ten of the data items are selected as characteristics for cross-tabulation and the rationale for each is briefly described.

Detailed classes are provided for all the characteristics which are used to define the table layouts and 21 variables which may be tabulated are described. The schema for identifying and constructing the proposed tables is given in Figure 1 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.

93. There have been significant new advances during recent years in computer software technology for the rapid production of tables from basic data files as and when required by data users. See paragraph 119 below. However, for general reference and for ready comparison of data between countries, it will still be necessary to produce sets of basic tables in a well-harmonized format. That is the purpose of the tabulation programme presented in the WP.

94. As stressed in the WP, countries in which censuses are conducted on a sample basis should avoid excessive cross-tabulations. Because of small sample size, sampling errors of the estimates in some cells of tables may be very large.

95. **Summary Statistics.** Near East Region countries are recommended to pay particular attention to producing tables with summary statistics. This is an important first step towards converting the data of basic tables into the information needed by users. (See section 3.3 of the System Document for a discussion of "data" and "information"). For a busy user, the presence of derived figures such as averages and ratios in the tabular presentation can ensure that the material will be understood in the limited time available.
96. A wide variety of secondary figures for easier interpretation can be computed. Precise details are not prescribed here, but the following guidelines are given in relation to frequency distributions of quantitative variables:

(a) The summary measures of mean and median, together with the upper and lower quartiles and the 10 and 90 percentiles;

(b) Percentage versions of the frequency distributions for the main variables; and

(c) The cumulative amount of a variable accounted for by the top 10%, 25%, 50% of holdings, e.g., x thousand cattle (y percent of the total) are on the largest 10 percent of cattle holdings.

Some of these figures must be computed from the basic data. Others can be calculated, or estimated, at the aggregate level of the table and for these the methods noted in paragraph 126 below are relevant.

97. The Tabulation Schema. The tabulation programme in the WP develops further the general style of table definition in the 1980 World Programme: the tables are derived from a compact schema rather than set out explicitly as in programmes before 1980. The schema generates up to about 175 possible basic tables. It is intended that some of these should be replicated. In particular, the tables showing crops and livestock are to be produced for each type of crop and livestock; also, any table may in principle be replicated for particular areas and regions of a country to show geographical variations within a country.

98. Figure 1 in the WP provides the key to the components in the construction of each table. Three such components should be examined. First, each row of Figure 1 gives the primary characteristic 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, the final stage of "cross-classification" allows for 21 possible variables. In
effect, the list of these variables in paragraph 4.21 of the WP defines the actual variables which are being tabulated including counts of holdings. Figures 2 and 3 of the WP give examples showing how two detailed table layouts are constructed in practice from the conceptual schema.

99. **Priority Tables.** Tables marked with an asterisk in Figure 1 of the WP are priority tables. These basically follow the identification of priority items 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. Countries are recommended to obtain the priority tables (where the sex of holder is not one of the classification variables) in two subsets: one for male holders and the other for female holders. This additional classification by sex of holder is needed for better evaluation of women holders.

100. The modifications described above in Section 3 of this Supplement lead to the following priority tables for the Near East:

- Number and total area of holdings by total (or agricultural land) area and by holder’s legal status
- Number and total area of holdings by total (or agricultural land) area and by holder’s age and sex
- Number and total area of holdings by total (or agricultural land) area and by holder’s main occupation
- Number and total area of holdings by total (or agricultural land) area and by total number of permanent workers
- Number and total area of holdings by total (or agricultural land) area and by cropland (or arable land) area
- Number and total area of holdings by total (or agricultural land) area and by irrigation practice (in these tables instead of total area of holdings, agricultural land of holdings could also be published)
- Reporting number and total area of holdings by total (or agricultural land) area and by land tenure
- Reporting number and area of specific land use classes of holdings by total (or agricultural land) area and by land use
101. Users of statistics are increasingly seeking from countries early census results. Because full census tables typically take a rather long time to produce, countries are strongly urged to provide provisional versions of the above priority tables, or as many of them as possible, at the very earliest opportunity and to send them to FAO, with notes explaining the nature of the provisionality. Even if the data are subject to later adjustment when processing has been finalized, it is well worth sending provisional versions earlier. FAO will disseminate this material once it has been received.

102. **Further Tables and Data.** Area of agricultural land is given as an alternative to total area in all the tables showing a distribution of holdings based on area. Paragraph 4.7 of the WP provides a discussion of these alternatives with agricultural land area being defined at paragraph 3.72 thereof. For the countries of the region, agricultural area in general provides a better basis for comparison between countries and should therefore be regarded as the recommended alternative. It would be valuable, however, if the countries also provided a special cross-tabulation as follows, to show differences between the two measures in practice:

Number, total area and agricultural area of holdings by total area and by agricultural area.
103. In countries in which the type of land tenure is mixed within one holding it will be beneficial to also indicate in the body of the relevant tables the areas of the holding under each type of tenure.

104. Countries that collect data regarding the number of permanent agricultural workers are recommended to utilize this as a classification variable to obtain various tables.

105. **Class Intervals.** Paragraphs 4.16–4.18 of the WP give recommendations on class intervals. Near East Region countries may need to make some changes in these recommended classes in accordance with the region's conditions. In the event that changes are made, the countries should try to ensure that the adopted classes can be regrouped into the recommended classes in the WP.

106. Under paragraph 4.17 of the WP, the last class within item 031101 (Number of household members) for the Near East Region may be changed as follows:

   - 10 to 14
   - 15 and over

107. Item 031202 (Age classification of holder's household members) in paragraph 4.18 may be extended to include more classes in line with the age classification recommended by the UN for population censuses. The extended classification will be as follows:

   - Under 10 years
   - 10 to 14 years
   - 15 to 19 years
   - 20 to 24 years
   - 25 to 29 years
   - 30 to 34 years
   - 35 to 39 years
   - 40 to 44 years
   - 45 to 49 years
   - 50 to 54 years
   - 55 to 59 years
   - 60 to 64 years
   - 65 years and over
This will facilitate comparison of population data collected from the population census with that of the agricultural census.

108. For the countries some of the quantitative class intervals may need to be extended upwards. For instance, intensive sheep or poultry holdings may have many more of these livestock than the highest values shown in the WP. Where this occurs countries should extend the intervals by following the principle of 1, 2 and 5 raised to powers of 10, e.g., \(\ldots/100/200/500/1000/2000/5000\ldots\).

109. As mentioned above (see paragraphs 53 and 59) in some countries, especially in national border areas, there may be holders and/or workers with a nationality other than the country in which they are living. To identify such holders and workers, item "citizenship" should be added to the items included in paragraph 4.18 of the WP:

- Citizenship of holder (031207)
- Citizenship of permanent agricultural workers (045104)

110. "Holder's (permanent agricultural worker's) citizenship" should be cross-classified in the same way as the holder's age and sex and worker's sex.
Section 5: Guidelines for Taking a Census

111. Introduction. The final chapter of the WP provides a detailed and extensive checklist of practical matters to be taken into account in an agricultural census. In brief, it covers the following broad areas:

(a) administration, organization, budget preparation, staff recruitment, and publicity;
(b) design of questionnaire, tabulations, and sampling;
(c) practicalities of data collection, including field staff training, quality control, and errors;
(d) data processing from initial plans through data control and programming to production of results and quality evaluation; and
(e) publication and user access.

Finally, the necessity of good research for all aspects of census methodology and practice is emphasized.

112. Although much of this detailed advice will be familiar to census statisticians in some countries which have a long experience in undertaking agricultural censuses, the countries without this experience especially need these guidelines in conducting their censuses. However, this chapter of the WP does provide a good opportunity for each country of the region to consider afresh all practical details and, in particular, to review the state of knowledge and research in current census practice. The following paragraphs discuss further some specific points which may be of special interest in the Near East Region context.

113. 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 would be authorized by comprehensive legislation which also delineates the responsibilities of various agencies collecting food and agricultural statistics.
114. 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 persons on this committee who have responsibility for population censuses to ensure close coordination between the two censuses.

115. **Typology.** Paragraph 5.22 of the WP notes the need to tabulate results by various types of farming. The rules used for classification in each country may be different in detail but it is likely that holdings can be placed into these broad types:

- **Predominantly crops:** sub-divided possibly into
  - Field crops
  - Permanent crops
  - Horticulture

- **Predominantly livestock:** sub-divided possibly into
  - Cattle, sheep, goats, dairy farming, horses, asses, mules
  - Other livestock

- **Mixed crops and livestock**

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

116. Summary tabulations of typologically classified holdings are proposed as follows, using the classifications and codes in Chapter 4 of the WP:

- Up to eight types, as above by:
  - total area
    (or agricultural area) (a,c,(d))
  - temporary crop area
    (each significant crop) (a,j)
  - permanent crop area
    (each crop in compact plantation) (a,i)
- livestock numbers
  (each significant type)  \[a_1(m)\]

Additionally, it would be valuable to give a cross-
tabulation of types by "all workers" or by permanent
workers.

117. **Advance Estimates.** Paragraphs 5.46 and 5.47 of the WP
record comments on some pros and cons of preparing tabu-
lations for early results, using a sample of the full data.
It is worth emphasizing that such tabulations serve two
distinct purposes. First, they can often be an invaluable
tool for the census statistician for early evaluation of the
quality of the aggregate material (see also paragraphs 5.63
and 5.64 of the WP). Such advance or trial tables often
indicate errors in data or processing; these can then be
rectified before full tabulation. In addition, modifi-
cations to table layouts and classifications are often
indicated by early results. Although experience is a good
guide to table design, the table can usually be improved by
empirical assessment using the new data.

118. Second, advance material can be used to quickly provide
results to users. For this use, however, it is necessary
to not only be aware of sampling errors, but also the
possibility of bias arising from the use of a sample of the
earlier questionnaires. However, the increasing pressures
for timely data indicate that it is usually well worth
sacrificing some accuracy for the advantage of speed. The
statistician will, of course, always wish to provide advance
data with the fullest possible information about the likely
scale of errors. This is of special relevance for the
provision to FAO of early key results of the 1990 World
Census (see paragraph 101 above).

119. **Tabulation Software.** Paragraphs 5.55 et seq of the WP
provide a discussion about the preparation of computer
programmes. Very powerful computer packages for extraction
and tabulation of data, often linked to database methods,
are available. They remove from the statistician the
constraints of detailed pre-specification and of long
production times for purpose-built tabulation programmes.
New strategies for tabulation are becoming feasible which
result in large gains in productivity. It is possible to
produce very large numbers of tables more cheaply than in the past.

120. **Error Correction.** Paragraphs 5.57 to 5.59 of the WP discuss various aspects of error identification and correction. An additional factor to be taken into account in advanced systems is that it is often possible to use the statistical properties of the collected data to define more efficient and cost-effective tests for errors and the subsequent corrective action. Initially, experience and prior judgement are necessary to establish the thresholds of acceptable basic data. But as more material becomes available during the course of data acquisition, it is worth conducting a regular monitoring exercise to scrutinise the spread of values and the occurrence of outliers. It is possible, then, to refine the error handling procedures so that an improved balance between accuracy and cost is obtained.

121. If such relatively advanced techniques are to be adopted, it is necessary to plan well ahead. The computer programmes for error detection and correction must be very flexible, to allow rapid changes in the parameters which define levels of acceptability and the scale of automatic adjustment. The programmes should also provide for the introduction of new types of tests and correction. Software for the diagnostic work, i.e., statistical analysis of data distributions, must be readily available; typically this can now be done using powerful packages.

122. **Secondary Data.** Paragraph 5.60 of the WP refers briefly to the derivation of codes from primary collected data; for instance, to signify size classes. This is an example of the importance of the general class of secondary data; countries are recommended to pay full attention to exploiting the collected material in this way. In principle, secondary data at the level of the holding, derived by calculation from the primary data, comprise a valuable way of extracting more value from expensively collected primary data. Secondary data should be stored on the same computer record of the holding with the primary data, in matched parallel files, or in an appropriately linked holding record within a database.
123. The example quoted of coded classes is largely an operational convenience for table production. Secondary data which add information can take various forms. Typology information (paragraph 116) is one example. Another which is particularly recommended is the use of ratios showing, for instance, the fraction of total area taken in the land use classes, the fraction of a particular crop area to total cropland, or the number of grazing animals of a given type in relation to the area of grassland. A wide variety of informative ratios at the holding level can be calculated as secondary data. Tabulation and statistical analysis at this level provide a fuller appreciation of the nature of variation in the holding population than do the comparable ratios derived at the aggregate level.

124. 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. 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 is now available for such hardware.

125. The outlook for large on-line storage by optical disc methods is particularly promising. The considerable benefits of low cost and independence of mainframe computers indicate that close attention should be paid to the option of microcomputing for basic census work.

126. There is already a powerful and extensive range of microcomputer software available for analysis and improved presentation of statistical tables. The use of spreadsheet and data base management packages gives a much enhanced product, especially if full advantage is taken of linked graphics facilities. See the recommendations at paragraphs 95 and 96 above on the presentation of derived figures and graphs in tables. For this kind of work, microcomputers already often afford better facilities than larger machines,
in terms of both technique flexibility, and ease of use. Microcomputers are a cost-effective tool for data entry, editing, and validation which traditionally were done by mainframe computers.

127. User Access to Data. As paragraph 5.69 of the WP points out, it is important to maximize access to expensively collected data. It may be possible to do so by depositing the basic material in a suitable archive, but some countries will be prevented from doing this by their laws or customs on statistical secrecy. In such cases it is worth examining whether making the holding level data anonymous and unidentifiable, will meet the needs for confidentiality. If this is still not permissible, then much of the value for future work by social and economic scientists can still be retained, by depositing aggregate data based on the smallest possible areas or localities which preserve confidentiality.

128. Research into Methods. The WP concludes with a strong recommendation for further research into census technique and method. The need for this cannot be over-emphasized. All countries should develop such research programmes suitable to their own needs by close cooperation with their academic institutions.

129. Statistical methods based on sampling are well served by a wealth of theoretical material but the foundations of census work more generally are not so strongly based. Census methods have usually been established piecemeal over many years, and are often influenced by the practical constraints of administrative procedures. In particular, more research work needs to be done on so-called "non-sampling" errors; on efficient methods for testing and automatically adjusting basic data; on the effective presentation of statistical results for maximum information content; and perhaps, most important, on the fundamental question of striking the right balance between the needs for statistical information and the cost of producing it.